


FOR ANY TYPE AND SIZE OF CYLINDER

# FLEX-HONE®

PACEHIGH LIMITED

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BRM

BRUSH RESEARCH MANUFACTURING CO., INC.

# FLEX-HONE®

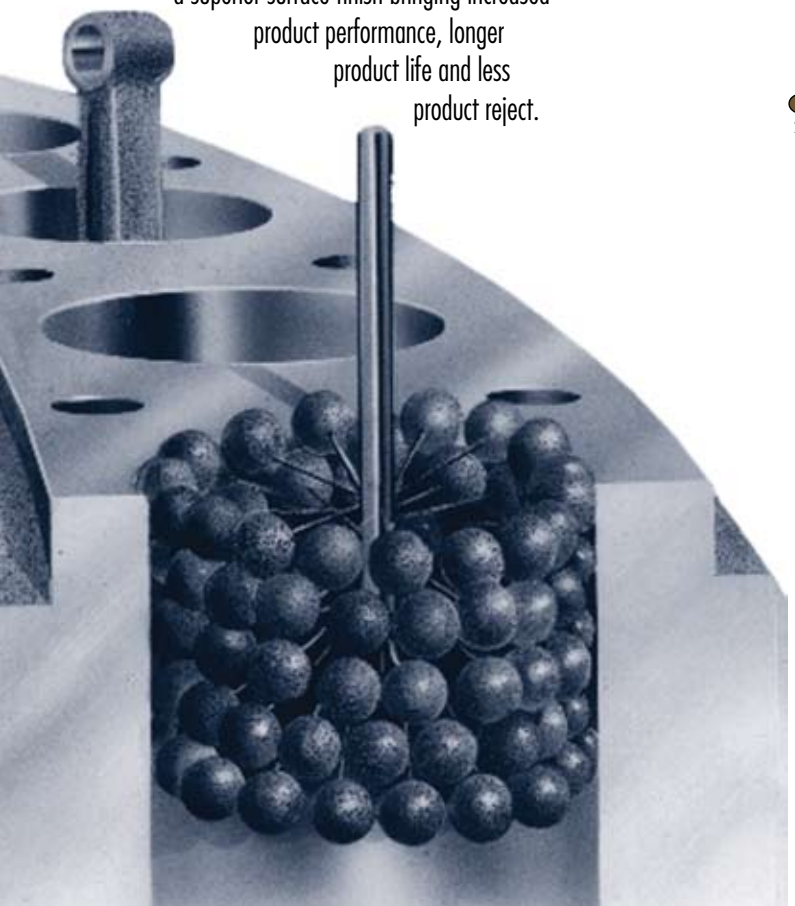
USA Patent Numbers 3384915, 3871139, 5211725, 5353553, US & Foreign Patents Allowed or Pending

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

Specifically, the process is a low-temperature, low-pressure abrading system that exposes the undisturbed base metal structure to produce a long wearing surface; one that is metallurgically free of fragmented, amorphous or smeared metal from previous machining operations. A nondirectional or crosshatched pattern is created on the surface that contains valuable valleys between the plateaus for oil retention.

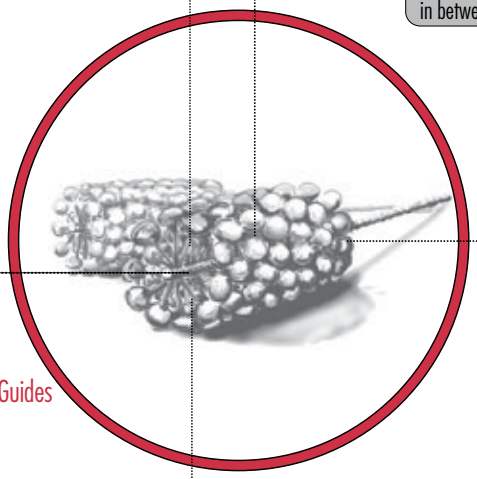
The Flex-Hone® Tool is a resilient, flexible honing tool with a soft cutting action. It's unique construction allows the abrasive globules or "stones" to float, assuring the tool will be self-centering, self-aligning to the bore and self-compensating for wear.

Whether your need is cross hole deburring, surface finishing or edge blending there is a Flex- Hone® Tool designed for you. In Automotive, Hydraulic, Pneumatic or Industrial applications, the Flex-Hone® Tool will provide a superior surface finish bringing increased product performance, longer product life and less product reject.



Each abrasive globule is attached to high density nylon filament to enhance durability

Flex-Hones come in sizes ranging from from 4mm to 36 inches and every size in between

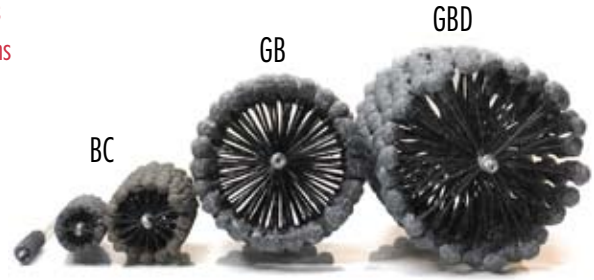


Special over-all lengths can be custom made

8 different abrasive types and 11 different grit are available to cater to each users specific application

## Flex-Hone Applications

- Air Compressors
- Hydraulic Ram Cylinders
- Hydraulic Valve Bodies & Valve Guides
- Hydraulic Motor Bodies
- Pneumatic Cylinders
- Surface Finishing of Boiler Components
- Compressed Air Tool Bodies
- Brake Cylinders (Wheel)
- Clutch and Brake Master Cylinders
- Finishing of Stainless Steel Tubing
- Brake Rotors
- Engine Cylinders and Block Liners
- Barrels and Chambers for Firearms
- Musical Instruments
- And Many More




Grit Type


Color Marked on Tip of Hone

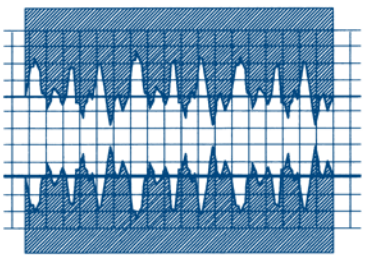
Abrasive Type


Color Marked on Stem of Hone

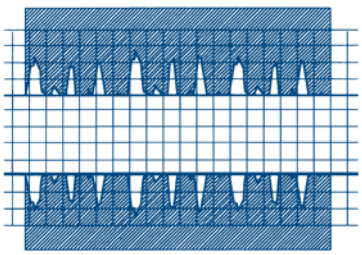
The Flex-Hone® Tool removes peaks and other imperfections in cylinder walls, creating a desirable plateaued finish.

The result is reduction in localized heat and friction and improved performance.

Before Flex-Hone



After 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.

## Abrasive/Grit Options

| | Grit Sizes | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **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 |
| WC = Tungsten Carbide (either 100% or 50/50) | 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 | X | | | |
| Levigated Alumina | Available in extra fine grit only | | | | | | | | | | |

## 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.

## NEED HELP SELECTING THE RIGHT FLEX-HONE®?

We have technical assistance available during our regular business hours. Please call (323)261-2193 or email technical@brushresearch.com to get assistance with any of your applications. Also, see our How to Order a Flex-Hone® section on the www.brushresearch.com website.

# Instructions For Use

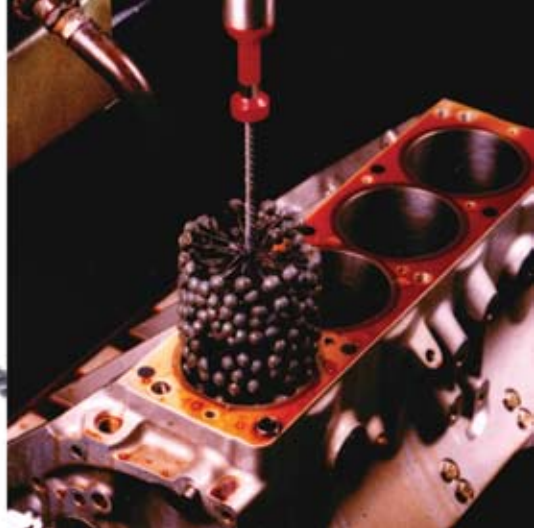
Honing | Deburring | Finishing

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. 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 60 to 1200 RPM, depending on tool diameter. The smaller the 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 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. 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 10-25 seconds, (5-15 strokes). 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.





## BC Flex-Hone®

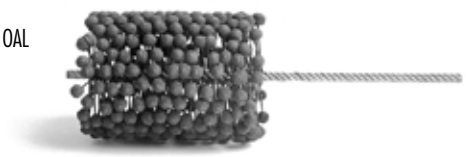
Standard Duty
8″ OAL

Order by Bore Size

| Catalog Number | Catalog Number | Catalog Number |
|---|---|---|
| BC 4mm (.157") | BC ½" (12.7 mm) | BC 1 5/8" (41 mm) |
| BC 4.5mm (.177") | BC 14mm (.552") | BC 1 ¾" (45 mm) |
| BC 3/16" (4.75mm) | BC 5/8" (16 mm) | BC 1 7/8" (48 mm) |
| BC 5mm (.197") | BC 18mm (.709") | BC 2" (51 mm) |
| BC 5.5mm (.217") | BC ¾" (19 mm) | BC 2 1/8" (54 mm) |
| BC 6.4mm (.250") | BC 20mm (.787") | BC 2 ¼" (57 mm) |
| BC 7mm (.276") | BC 7/8" (22 mm) | BC 2 3/8" (60 mm) |
| BC 8mm (.315") | BC 15/16" (23.8 mm) | BC 2 ½" (64 mm) |
| BC 9mm (.354") | BC 1" (25.4 mm) | BC 2 5/8" (67 mm) |
| BC 9.5mm (.375") | BC 1 1/8" (29 mm) | BC 2 ¾" (70 mm) |
| BC 10mm (.394") | BC 1 ¼" (31.8 mm) | BC 2 7/8" (73 mm) |
| BC 11mm (.433") | BC 1 3/8" (35 mm) | BC 3" (76 mm) |
| BC 12mm (.472") | BC 1 ½" (38 mm) | |

## GBD Flex-Hone®

Heavy Duty
3 - 4 ½″ dia. are 13 ½″ OAL
Bal. 17 ½″ OAL



Order by Bore Size

| Catalog Number | Catalog Number |
|---|---|
| GBD 3" (76mm) | GBD 5" (127 mm) |
| GBD 3 ¼" (83mm) | GBD 5 ½" (140 mm) |
| GBD 3 ½" (89mm) | GBD 6" (152mm) |
| GBD 3 ¾" (95mm) | GBD 6 ½" (165mm) |
| GBD 4" (101mm) | GBD 7" (178 mm) |
| GBD 4 ¼" (108mm) | GBD 7 ½" (190mm) |
| GBD 4 ½" (114 mm) | GBD 8" (203mm) |

Available in standard sizes up to 36″

## DBC Flex-Hone®

Standard Duty
5″ OAL

Order by Bore Size

| Catalog Number | Catalog Number |
|---|---|
| DBC 1 ½" (38 mm) | DBC 2 ½" (64 mm) |
| DBC 1 ¾" (45 mm) | DBC 2 ¾" (70 mm) |
| DBC 2 1/8" (54 mm) | DBC 3 1/8" (79 mm) |

## GB Flex-Hone®

Standard Duty
13 ½″ OAL

Order by Bore Size

| Catalog Number | Catalog Number |
|---|---|
| GB 3 ¼" (83 mm) | GB 4 1/8" (105 mm) |
| GB 3 ½" (89 mm) | GB 4 5/8" (118 mm) |
| GB 3 ¾" (95 mm) | |

## Flex-Hone® for Rotors

| Catalog Number | Grit |
|---|---|
| RMFH240Z25 | Fine |
| RMFH120Z25 | Medium |
| RMFH60Z25 | Coarse |

Flex-Hone® for Rotors utilizes the patented Flex-Hone® technology to produce the ideal surface finish on automotive and motorcycle disc brake rotors, automotive fly wheels and clutch plates. More rotors per hone than abrasive pads.

**Benefits:**
**Lowers harmonic vibrations, produces a non-directional pattern, and is ideal for new and re-turned rotors and flywheels.**


## BRUSH RESEARCH MANUFACTURING CO., INC.

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