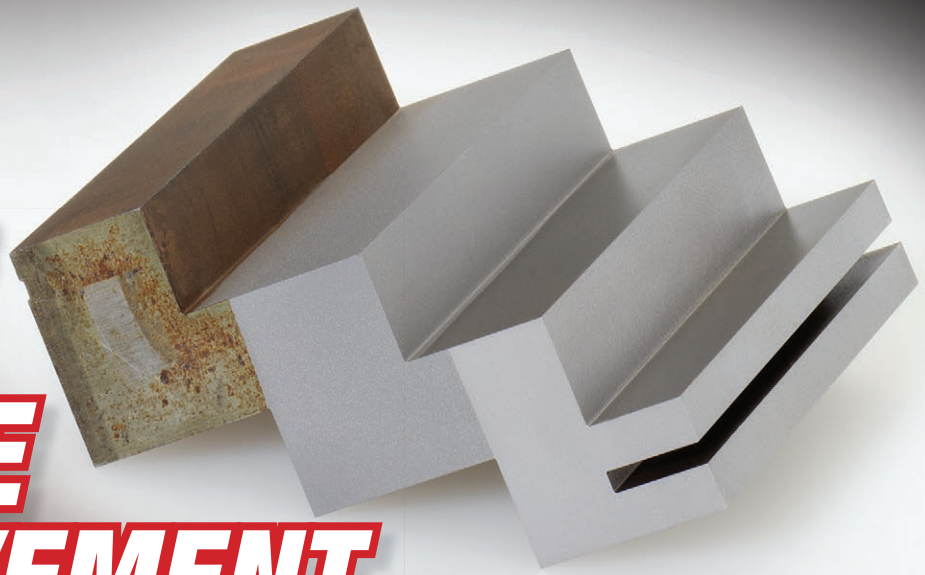


INNOVATIONS in EDM SURFACE IMPROVEMENT



The Holy Grail for both Wire and Sinker EDM is producing the best possible finish in the least amount of time. For most folks, that means time consuming extra skims, additional orbit sequences, or secondary finishing operations. But, what if you could substantially improve the EDM finish in just minutes without damaging corners or changing critical dimensions?

The HGH Micro Blasting Fine Finishing system from Germany is a revolutionary solution to improving EDM surfaces quickly, without damaging any fine details like sharp edges on a punch or die, or intricate surface detail on a mold or coining die surface. The process has been used extensively in Europe for over 20 years with outstanding results, but it is new to the US. HGH and EDM Network are teaming up to introduce this process to our EDM community.

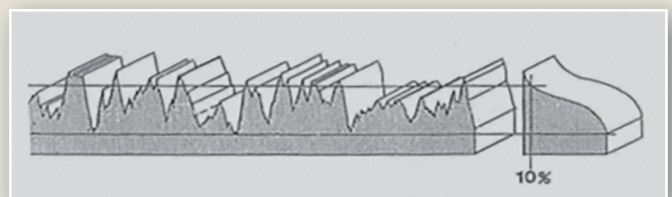
What is Micro Blasting?

The Micro Blast process utilizes a patented selection of ceramic blasting media that, combined with a unique two-step processing system, achieves improved finish results in small detail areas such as thin ribs or small holes as well as on larger surfaces, thus treating the entire EDM surface, QUICKLY! The process improves the EDM surface by removing recast debris and compressing the surface, substantially improving the surface finish, improving the bearing area, and improving the fatigue life.

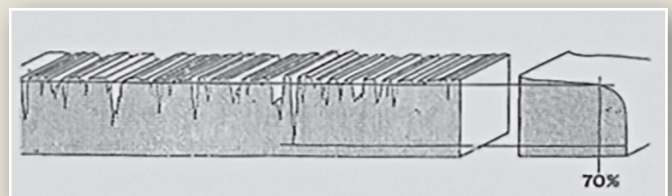
How Does it Work?

The Micro Blast process can be compared to high precision "Shot Peening" where you are compressing the high "peaks," left by the EDM process, into the EDM "valleys." (See Fig #1a and Fig #1b) It is a two-step process:

- The first step, performed in one chamber of the system, removes the rough recast layer from the EDM process using a larger size ceramic media.
- The second step, performed in a second separate chamber, utilizes a media that is much smaller along with reduced air pressure.



Fig# 1a



Fig# 1b

Does the Micro Blast Process Affect the Part Accuracy?

This process will change the dimensions on the surface minutely. For example:

When improving a rough cut 2.4uRa surface finish to a 1.2uRa surface finish, we measured a dimensional step of .00025". However, after one or two skim cuts, the dimensional change was less than .00006". After four skims, it was barely measurable.

Does the Micro Blast Process Adversely Affect Sharp Corners or Parting Line Edges?

After three passes on the Wire EDM, an outside corner with a .001" radius showed no measureable change after blasting.

Does it Work on All EDM'd Material?

There are specifically designed media for different materials. Processing technology such as air pressure, part-to-nozzle distance, and other finishing techniques vary as well. Hardened tool steels, carbide, copper tungsten, or any EDM'd surface will be greatly improved utilizing the Micro Blast process, QUICKLY, and AFFORDABLY!

OK, How is Micro Blasting Different Than Traditional Sand Blasting or Glass Bead Blasting?

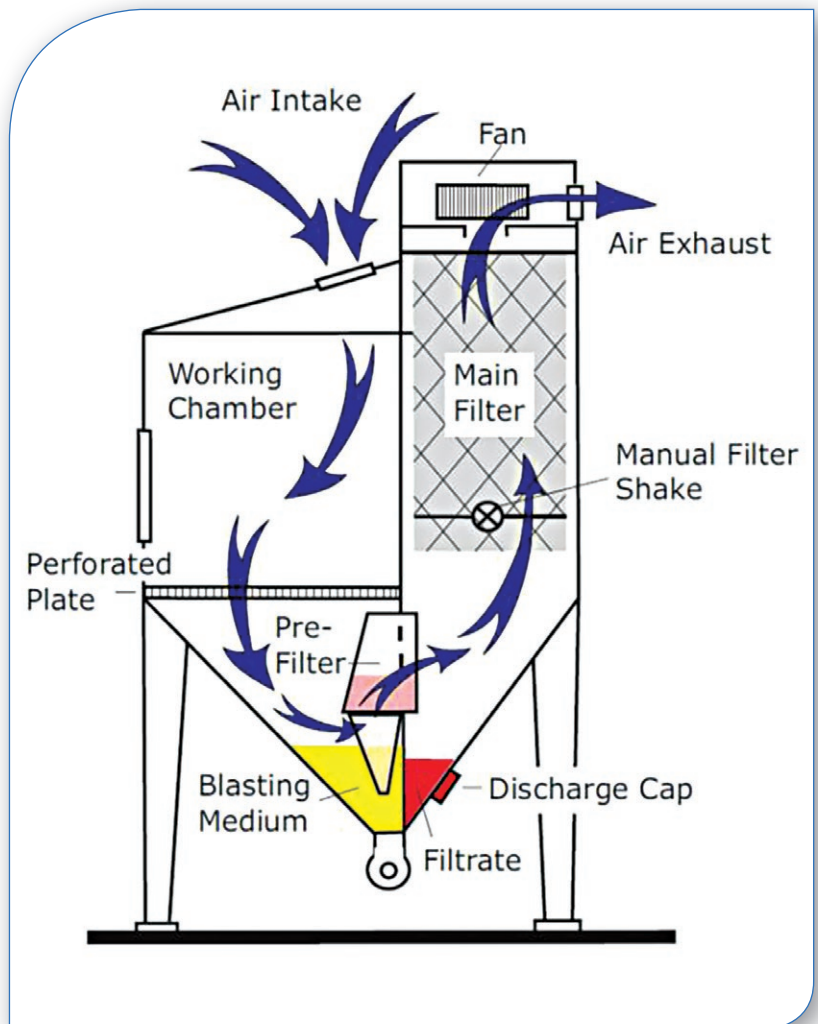
Micro Blasting is fundamentally different from traditional methods in a number of ways:

- The controlled geometry and composition of the patented media are fundamental to the success of the Micro Blasting process. (See Fig #2)



Fig# 2

- The design of the equipment includes a cyclonic media recovery and recycling system that separates undamaged media from fractured media and debris to assure that only virgin media is applied in the process. (See Fig #3) The design also includes a special secondary filter to preclude any particle discharge from the unit's exhaust air entering the working environment.

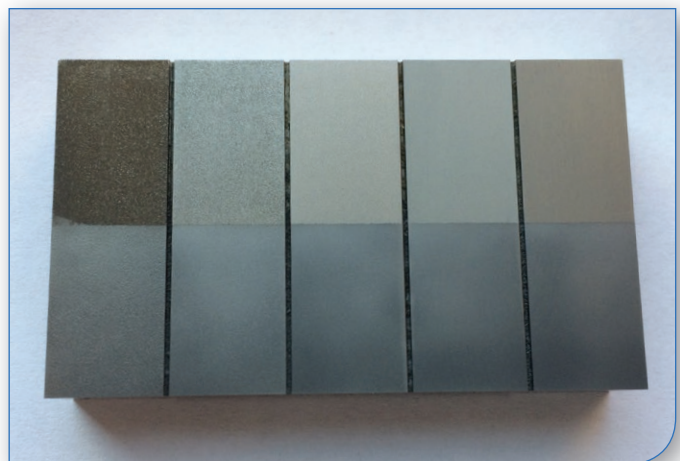


Fig# 3

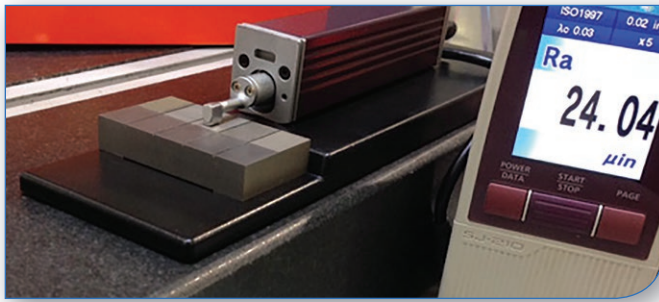
- A specially designed gun and wand with proprietary nozzles assures pin point process application accuracy.

The Proof is in the Pudding!

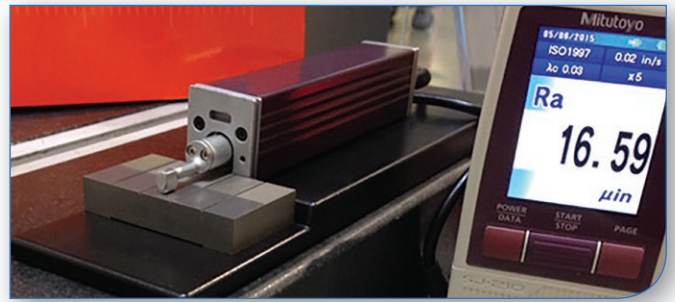
Fig #4 is a test piece of hardened tool steel with five wire cut surface areas, cut under different conditions. One half of the thickness of the block was then masked off,



Fig# 4



Fig# 5a

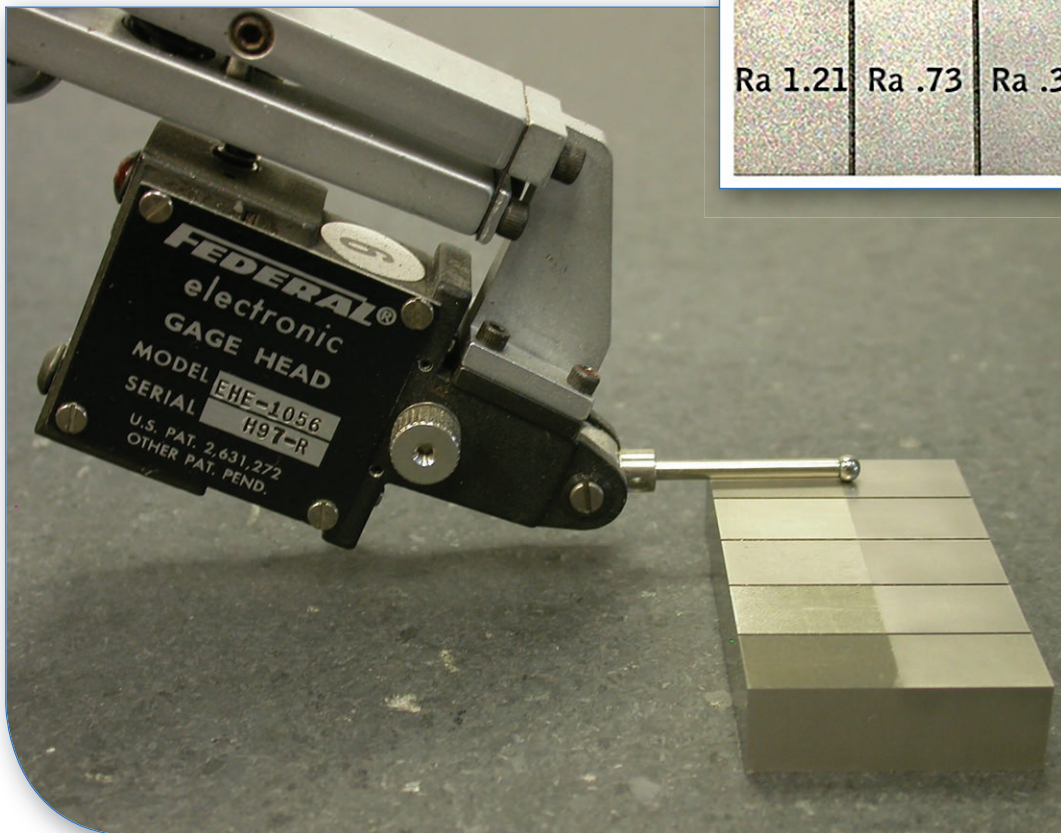


Fig# 5b

and the areas were treated using the two-step Micro Blast process. The areas were then directly compared for surface finish utilizing a Mitutoyo Surface Roughness Tester. (See Fig #5a and Fig #5b) The results of the comparison are superimposed on the image of the test block in Fig #6. The test patches were also compared to obtain process

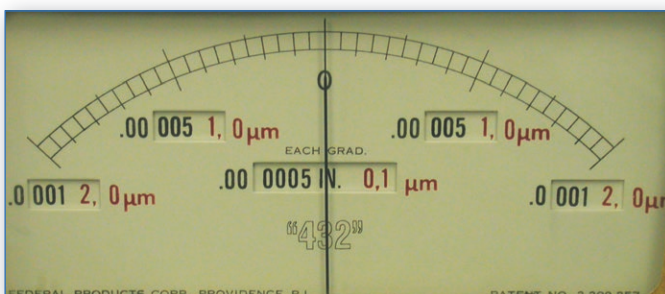
ROUGH	+1 SKIM	+2 SKIMS	+3 SKIMS	+4 SKIMS
Ra 2.4	Ra 2.0	Ra .62	Ra .28	Ra .20
Ra 1.21	Ra .73	Ra .33	Ra .17	Ra .15

Fig# 6

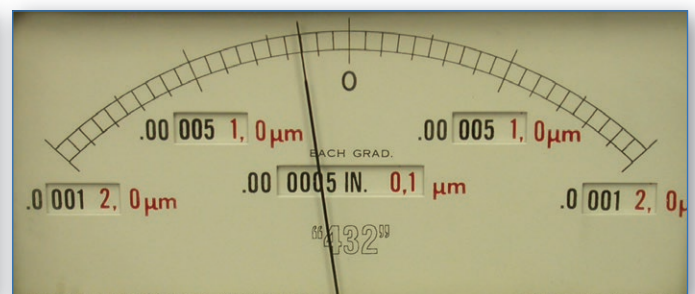


Fig# 7a

material removal utilizing a calibrated five millionths of an inch resolution Federal Electronic Indicator. (See Fig #7a, Fig #7b, and Fig 7c) The results of both surface finish improvement and material removal are shown in the table in Fig #8.



Fig# 7b



Fig# 7c

OPERATION	Ra Before (µm)	Ra After (µm)	Ra Before (µin)	Ra After (µin)	Mat'l Removed (inches)
Rough	2.4	1.21	96	48	0.00025
Rough+1 Skim	2	0.73	80	29	0.00015
Rough+2 Skims	0.62	0.33	25	16	0.00006
Rough+3 Skims	0.28	0.17	11.2	11.2	0.00004
Rough+4 Skims	0.2	0.15	8	6	0.000015

Fig# 8

The Equipment

The standard Micro Blast unit is a two chamber model (see Fig #9), available in two sizes accommodating a variety of part sizes. In order to accommodate small parts or parts with intricate detail, HGH offers the optional Micro Lapp two chamber accessory unit (See Fig #10) with nozzle sizes as small as 0.8mm for the pin-point blasting and processing of small slots, deep ribs, or blind holes. Both units are of robust and high quality construction, designed, developed and manufactured in Germany.

About HGH

HGH is a Total Service technology company located in Lüdenscheld, Germany. HGH provides a wide variety of high- quality equipment to industrial customers including: Wire, Sinker, and Small Hole EDM; Lapp Blasting technology; Ultrasonic and Spray-cleaning technology; EDM consumables and accessories, and pre-processed and precision ground tool steel.

About EDM Network

EDM Network, headquartered in the Chicago suburb of Sugar Grove, has been the exclusive importer and service provider for Chmer since 2000. Over the last 15 years, they have installed over 600 Chmer machines in the U.S. in addition to taking over the service of more than 400 Chmer machines sold previously. The U.S. installed customer base includes many Fortune 500 companies. For the last ten years, EDM Network has been Chmer's "Top Export Dealer" in the world! EDM Network has been selling and supporting EDM's since November, 1992, however its founder, Ron Vogel's EDM roots go back even further to the early development of America's first Wire EDM at the Andrew Engineering Company in 1972. In addition to the new Chmer EDM's and machining centers, EDM Network offers fully refurbished EDM's, EDM consumables, tooling, parts, and service.

EDM Network has recently established a new subsidiary, EDMMAX, which distributes and supports an economy line of EDM Hole Drillers, a line of Tap Extractors, and the HGH line of Surface Finish Technology products.



Fig# 9



Fig# 10

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