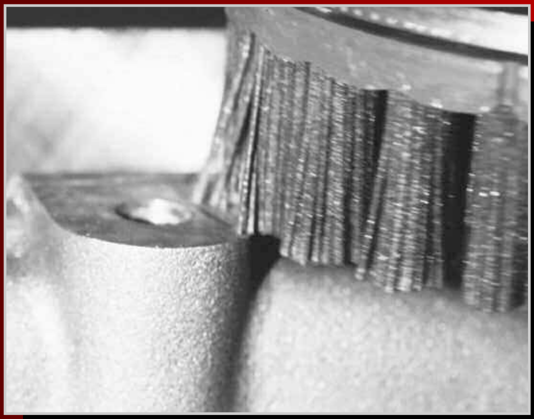
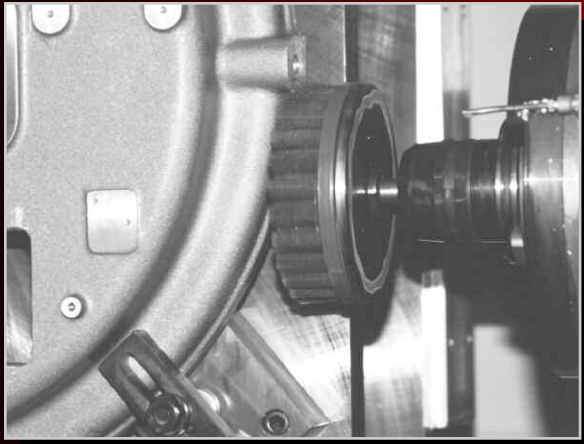
Anderlon® Applications:

Large diameter wheel brushes are used to focus significant deburring energy on targeted edges. The steel inserts in this aluminum engine component have a severe burr condition requiring the aggression of wheel brushes.



Disc brushes are ideal for deburring flat surfaces after face milling. On such parts, all burred edges are on the same plane and are easily deburred.

Anderson's Application Lab is equipped with manual and CNC equipment for conducting deburring trials on a wide variety of parts. The lab helps customers evaluate the advantages of alternative deburring processes.



CNC equipment allows disc brushes to be used for in-machine deburring. In such situations, secondary deburring operations can be completely eliminated.

Deburring Flat Parts

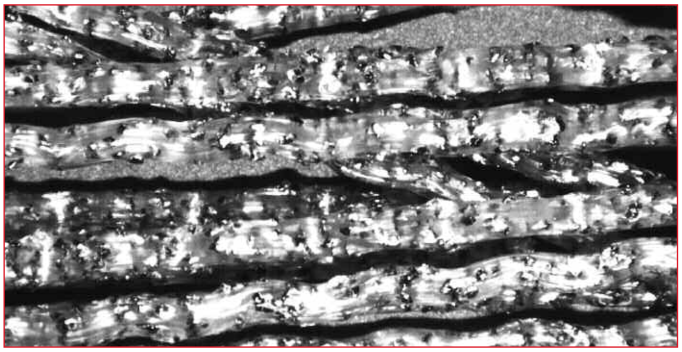
Parts containing many edges on the same plane are easily deburred with Anderlon Disc brushes. These brushes are often used in CNC machines to eliminate hand deburring. They can also be used in dedicated equipment in order to maximize throughput.

Edge Radiusing

Many part specifications require the production edge radii within certain tolerance bands. Anderlon brushes can be used to produce edge radii from 0.001 to 0.030 depending on the work material.

Surface Finishing

Anderlon brushes will refine surface finishes on most machined and ground parts. The filaments in the brush reduce the peaks in the surface roughness without affecting the valleys. This results in a lower rms level without changing part dimensions.



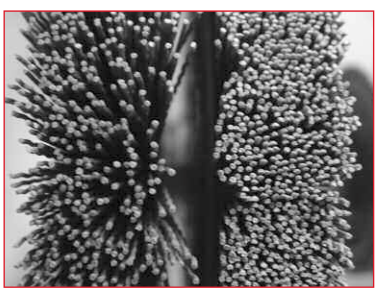
A close-up of Anderlon filaments shows the abrasive grains that are consistently distributed throughout the material.

Anderlon® brushes are compliant deburring and finishing tools that offer both aggressiveness and conformability in off-hand production, CNC, robotic and automated processes. Anderlon brushes can be used to deburr, finish and edge blend both metallic and non-metallic production parts. Their aggressiveness makes them cost-effective tools for demanding applications like deburring steel edges after machining or grinding. At the same time, their conformability allows them to be used in the finishing of complex shapes on softer materials like aluminum heat sinks.

Anderlon brushes are made from nylon filaments with abrasive grains impregnated throughout. As the filaments wear, old dull abrasive grains are released, exposing new sharp abrasive grains, thereby providing consistent performance throughout the life of the brush.

Anderson offers both a composite hub construction and a metal hub construction. With this broad range of configurations, Anderson is sure to meet all your application needs.

Filament Density vs. Trim Length



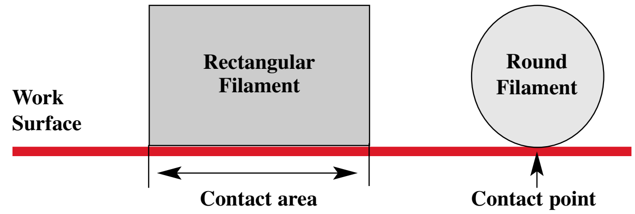
Proper selection of brush density and trim length is a critical element in optimizing the output of a brushing operation. While high density/short trim brushes offer better cycle times and longer brush life, they are not effective in operations requiring a high degree of brush conformability. The following illustration highlights the differences between 10" x 2" arbor hole wheel brushes versus the 10" x 5-1/4" arbor hole version.

Low density/long trim wheel brushes are best suited for operations requiring a high degree of conformability.

High density/short trim wheel brushes are ideal for users who need minimum cycle times and maximum brush life.

Filament Shape Selection

Anderlon brushes are available in crimped round, straight round and rectangular filaments. Co-extruded with either aluminum oxide or silicon carbide abrasive grains, the abrasive nylon filaments are available in various grit sizes and diameters.



Rectangular filaments are stiffer and provide a greater contact area with the work surface. These filaments should be used in high aggression applications where less conformability is required.

Composite Hub vs. Metal Hub Construction

Composite Hub Construction

Permits up to 30% more useable fill material resulting in a high density brush face promoting aggressive deburring and finishing in minimal cycle times.

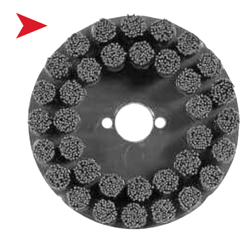
Metal Hub Construction

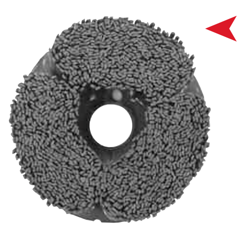
Provides a less dense and thinner face width for applications where aggression is a concern due to part delicacy and/or machine speed issues.

Disc Brush Product Construction

Tufted Disc Construction

Offers increased aggression due to added filament density. This enables processing of severe burrs or generating larger edge radii in shorter cycle times. Our longer trim length allows for greater conformability and increased life, producing more parts-per-brush.



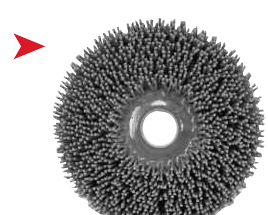


High Aggresion Disc Construction

Uniquely suited for demanding applications characterized by large burrs or rapid feed rates. The brush filaments are specially designed to maximize aggression, and the brushes are manufactured with a high packing density, which extends life.

Monofilament Disc Construction

Individual filament configuration reduces filament stiffness and density for applications where reduced brush aggression is desirable.



CNC Operating Parameter Selection

Anderson provides a broad range of deburring products which can be easily adapted to CNC equipment and other automated processes. By combining these products with Anderson's application experience, users are able to achieve better part-to-part consistency and lower direct labor costs without increasing maintenance or damaging CNC equipment.

Parameter Summary

Brush Diam.	Disc Brush Spindle Speed (RPM)	Wheel Brush Spindle Speed (RPM)	*Wheel Brush Depth of Penetration	◆Disc Brush Depth of Penetration
1-3/4 - 2	1750 - 2000	4000 - 6000	10% of trim length	.040 - .150
3 - 4	1500 - 1750	2000 - 4000	10% of trim length	.040 - .150
5 - 6	1250 - 1500	1500 - 2000	10% of trim length	.040 - .150
8	800 - 1000	1200 - 1500	10% of trim length	.040 - .150
10	700 - 800	1000 - 1200	10% of trim length	.040 - .150
12	600 - 700	800 - 1000	10% of trim length	.040 - .150
14	500 - 600	800 - 900	10% of trim length	.040 - .150

* Call Our Application Engineering Department at 800-553-2371 if this depth of penetration is not aggressive enough.

◆ Set depth of penetration when the brush is rotating at the operational speed. Use .100" depth of penetration as a starting point for all disc brush applications.

Increasing brush speed doesn't always result in more aggressive action. If more aggression is required, the following steps can be used to achieve the desired results:

- Reduce RPM and increase depth of penetration
- Increase the filament diameter and the grit size
- Reduce the feed rate
- Use a brush with a shorter trim length
- Use rectangular filaments

NOTE: For Operating Parameters for High Aggression Disc Brushes, see page 33.
For Operating Parameters for Crosshole Deburring Brushes, see page 38.

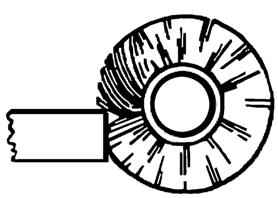
Feed Rate Recommendations

Feed rate is determined by the amount of deburring, edge radiusing or surface finishing required, and the type of material that is being processed. It is generally application specific. Slower feeds result in a more aggressive brushing action. Based on the brushing action desired for a specific application, the feed rate can be increased or decreased.

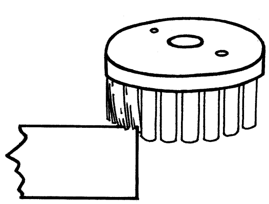
Material	Feed Rate
Non-Ferrous	50 in./min.
Cast Iron	30 in./min.
Mild Steel and Ductile Iron	25 in./min.
Stainless and Alloy Steels	15 in./min.

Wheel Brush Penetration

When using Anderlon wheel brushes, optimum aggression is obtained and wheel life is maximized when the work-piece penetrates into the face of the brush approximately 10% of the trim length. The sides of the Anderlon filament actually do the work. To achieve a maximum edge radius and complete burr removal, parts should be buried into a slow running brush face.



Disc Brush Penetration



When using Anderlon disc brushes, a good starting point for a depth of penetration between the brush face and work surface is 0.100". This depth of interference produces the best compromise between aggression and brush life. The feed rate starting point of Anderlon disc brushes is 18"/minute. This feed rate should then be adjusted faster or slower to achieve optimum operating conditions. On soft materials and parts with small burrs, higher feed rates can normally be achieved.

Tool Path

The ideal tool path for a Disc brush is very similar to the path of the face mill that produced the burr. However, three differences exist:

- The rotation direction of the brush should be opposite of the cutting tool that created the burr.
- The length of the path must be longer than the part. Unlike a cutter path that can stop when the leading edge of the cutter reaches the end of the part, the tool path of a brush should continue until the trailing edge of the brush reaches the end of the part.
- The centerline of the brush may need to be off-set from the center of the part in order to maximize the number of filaments that strike the burred edge at a perpendicular angle. This is especially important when the diameter of the brush is similar to the width of the part.

Coolants

Anderlon brushes can be run dry, without coolants. However, certain deburring conditions, such as higher speeds, material properties and greater depth of penetration can create excessive heat buildup, causing the nylon filaments to melt and smear on the work surface. If the speed or depth of penetration cannot be changed, coolants are recommended to overcome heat smear. Coolants will also help produce finer finishes.