

GLOSSARY

Please note that this webpage is under construction. Expect it to be temporarily incomplete and with a few typographical errors. In developing this glossary, it became apparent that many terms are simply names for tools and methods which have evolved over time and from a scientific perspective are very similar. The result is a lack of clear distinction between processes such as honing, lapping, grinding, and superfinishing. As new methods and products evolve, unfortunately, the distinction becomes even less clear. If you see errors or think other terms should be included, send us an **e-mail** message.

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Abrasive

Technically any material can be used to abrade another materials. For industrial application, however, abrasives are minerals from a select group of very hard minerals used to shape, finish, or polish other materials. In processes that grind, finish, polish, lap, or hone, abrasives are typically limited to synthetic minerals with the exception to diamond and **garnet**. Common abrasive minerals appear in a various crystalline forms of **aluminum oxide**, **silicon carbide**, **zirconium oxide**, **diamond** and **cubic boron nitride**. As used in polishing or blast cleaning, an abrasive can be any substance used to remove material including ice, solid carbon dioxide, walnut shells, plastic, sand or aluminum oxide. Abrasives such as aluminum oxide, silicon carbide and zirconia are typically called conventional abrasives due to their long history of use. The leading US manufacturer of conventional abrasives and related products is **Washington Mills** , Niagara Falls, NY.

Abrasive Belt

A closed loop of coated abrasives used on tools that range from small handheld equipment to very large machines that use belts five feet wide. Made by joining a strip of coated abrasive.

Abrasive Blast Cleaning

A process that uses a high-pressure stream of air or water to propel abrasive particles at the surface of a workpiece. Purposes vary from cleaning to removal of coating or surface contaminants to preparation for painting or some other surface treatment. Abrasives range from silica or sand to garnet or aluminum oxide abrasives depending upon applications. Density, relative hardness, cost, and friability are important characteristics that determine the usefulness of a particular abrasive. Some recycled materials such as glass beads are made from recycled glass have special applications. Other material such as dry ice (solid carbon dioxide) are used because they level no residue of the finished part.

Precision from abrasive blasting can range from process used to remove stencil lettering on semi conductor components to removing rust and paint from ships or bridge structures.

Abrasive Cut Off Saw

A thin resin bonded, reinforced grinding wheel used to saw or cut off metal from bar stock.

Abrasive Grains

The individual grits of abrasive mineral, also called grit, or abrasive mineral.

Alumina

Another term for aluminum oxide

Aluminum Oxide

The most common industrial mineral in use today. A synthetic form of the natural mineral mineral corundum. Although natural corundum was important historically, modern industrial abrasives use aluminum oxide produced synthetically by refining bauxite ore in a variety processes. In one process crude aluminum oxide is made by melting bauxite to form a fused aluminum oxide, which is later crushed and sized. The various types of fused aluminum oxides are distinguished by levels of chemical impurities remaining in the fused mineral (Titanium and Chromium oxides are typical). Other techniques to make industrial abrasive start with treating bauxite ore with a sol gel process to create alumina that is sintered to produce with an extremely fine crystalline structure typical of the sol gel products available by Saint Gobain Abrasives. The many variations in products and related tradenames arise from variations in the manufacture and processing of bauxite ore and crude fused or sintered minerals.

Arc of Contact

The small portion of a grinding wheel where abrasives grains actually contact with the work piece. This is the region where heat is generated during grinding and the effects of coolant critical.

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Backing

The flexible material to which abrasive grain is adhered to make coated abrasives and similar products. Typical backing materials are cloth/fabric, polyester film or paper. Other materials include sponges, rubbers, and foam.

Blending

A process of smoothing rough areas on a workpiece to ensure that their entire surface has close to the same plane or roundness and/or the same surface finish.

Blotter

A disc of compressible material used to cushion the contact between the slides a grinding wheel and the flanges between which it is mounted to reduce slippage. Maximum safe operation speed, original wheel size and wheel formulations are typically printed on a blotter.

Bond

In grinding wheels the material used to hold abrasive grains in place giving shape to the grinding wheel, abrasive stick, hone, or similar products. Bonding materials can be resins, epoxy, rubber, metal, and vitrified materials. Bonds are critical component of grinding wheels that helps to distinguish one manufacturer from another. For coated abrasives bond refers to the resin used to attach abrasive grains to the backing material.

Boron Carbide

A very hard material close in hardness to diamond. However because boron carbide is very friable it has limited application in bonded and coated abrasive products. However it has application as loose abrasive for finishing very hard materials such as tungsten carbide in molds or dies and is commonly used in nozzles for abrasive water jet or sandblasting applications.

Buffing

The process of obtaining a very fine surface finish, having a "grainless" appearance on metal objects. Buffing typically uses a cloth wheel and very fine abrasive (often a natural abrasives such as tripoli, rouge, etc.). A thin layer of abrasive is applied to the plyable perimeter of the cloth wheel using a compound which can be applied as a liquid or solid. For wax-based compounds, heat generated by friction melts the wax, exposes the abrasive grains and provides an adhesive to keep the abrasive in place. There are stages in the buffing process - typically coarse, medium and fine-- each using a style of buffing wheel and different types of compounds. Generally progressive steps of cutting, coloring and finishing in buffing follow the trend of using progressively finer abrasives and lighter forces. The term "buffing" is often used interchangeably with "polishing". Without a clear material science foundation, buffing continues more as an art than science and success often relies upon the skills of the operator. Contact AES for other materials on the topic.

Burn

Thermal damage and physical changes in a workpiece caused excessive temperatures during grinding. Causes are typically improper use or selection of metalworking fluid, incorrect wheel formulations, or improper speeds for the work material are typical causes for workpiece burn. Burning is usually associated with changes in metallurgical properties and other physical characteristics such as discoloration of the workpiece. Contact [AES](#) for resources on this subject.

Burnishing

A glazed surface finishing usually resulting from using a dull or loaded grinding wheel or coated abrasive. Also a finishing process that relies upon ductile movement of workpiece materials to achieve the desired surface characteristics.

Bushing

A soft metal like lead, babitt, or aluminum used to line the arbor holes of some grinding wheels. Also a removable ring, usually steel, used to adapt a grinding wheel to a smaller spindle.

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Chatter

A phenomena that produces periodic marks on the workpiece and sometimes associated with audible sounds during grinding. Caused by vibrations that originate with the rotating grinding wheel, spindles, slides or other components of the machine tools. Surfaces of workpieces often have regularly spaced patterns that can correspond directly to wheel rotation or marks on the grinding wheels produced by wheel dressers. Solutions include changing dressing processes, variation of wheels speeds, addition of damping materials, changing of process parameters such as infeed rates and excitation of machine components to cancel chatter-causing vibrations. Contact [AES](#) for a list of technical resources on chatter.

Coated Abrasive

Abrasive products made by adhering a thin layer of abrasive grains to a cloth, paper, or film backing. Produced initially as large "jumbo rolls" that are later converted into belts, sheets, discs, etc by [converters](#) .

CBN

Cubic Boron Nitride (also written as cBN). Boron nitride with a cubic crystalline structure which with diamond comprise the class of abrasives known as superabrasives. With a hardness second to diamond and no equivalent natural mineral, CBN is produced synthetically in a high temperature, high pressure process similar to synthetic diamond. Used as an abrasive mineral, a hard coating material, and machining insert, CBN's primary value in grinding is for machining of ferrous materials which chemically reaction with diamond.

Centerless Grinding

A grinding process named for a machine tool on which cylindrical workpieces are placed between a grinding wheel and regulating wheels. The latter causes the part to rotate to produce precision cylindrical parts. Parts sit on a work rest rather than on centers for faster and easier insertion and removal of the workpiece. Primarily used in high production applications, centerless grinding has various forms that include thru feed and plunge grinding.

Closed coat

A characteristic of coated abrasives. A product is labelled as close coated if abrasive grains cover more than 70 percent of the surface. Contrast with an open coated which has 50-75 percent coverage. Closed coat products cut faster but can easily become **loaded** when used on soft materials.

Cone Wheel

A small bonded abrasives wheel mounted on a pin or mandrel, typically cone- or bullet-shaped, or a similarly wheel made of a coated abrasive strips wrapped around a mandrel. Both are used primarily on portable grinders.

Contact Wheel

An essential component of machine tools designed for coated abrasives belts. The wheels are typically made with a hard rubber wheel or steel which provides support of the coated abrasive belt at the point of contact with the workpiece. Contact wheels may have surfaces divided into alternating grooves, slots, and lands in variety of patterns to alter grinding characteristics of the coated abrasive belt.

Conventional Abrasive

A group of abrasives first introduced in the early 1900s to become the most common abrasive used in wheels and coated abrasives. These include **aluminum oxide** and **silicon carbide** as well as aluminum oxide-zirconia abrasives. Ceramic abrasives, which are a recent innovation in abrasives, are sintered microcrystalline form of aluminum oxide. Conventional abrasives contrast with superabrasives (**CBN** and **diamond**), abrasives that were developed and introduced to manufacturing during the second half of the 20th century.

Converter

A manufacturer that uses large jumbo rolls of coated abrasives as raw materials to make products such as belts, discs, sheets, etc. Also includes companies that make cones, plugs, and other specialty coated abrasive products. This segment of the abrasives industry is served by the Coated Abrasives Fabricators Association ... [link](#).

Coolant

A traditional name for **metalworking fluids** used in grinding. Once thought as primarily a means to cool a workpiece to prevent burn, research showed that fluids have other functions such as lubrication, which may be equally or more important than cooling. Hence the preference for the use the terms metalworking fluids to refer to fluids used in grinding processes.

Corundum

A natural mineral whose principle composition is **aluminum oxide**. Historically a mineral mined in the Middle East and India for use in grinding wheels, Corundum has been replaced by synthetic abrasive minerals, which offer more uniform and consistent physical properties.

Creep Feed Grinding

A technique of plunge grinding with a specially designed machine involving very slow table travel speeds. The total amount of stock to be removed from the workpiece is accomplished in one or two passes instead of numerous lighter passes with conventional surface grinding. See also [HEDG](#)

Crush Dressing

The process to dress and shape a grinding wheel by forcing it against a steel roll containing a desired profile. Most effective for vitrified bond grinding wheels, the process has received considerable attention as a significant improvement in performance for creep feed grinding .

Cryolite

A mineral containing sodium, aluminum, and fluorine that is added to some grinding wheels and coated abrasives as a solid lubricant grinding aid.

Cup Wheel

One of the standard wheel shapes standardized as types 6 and 11 in ANSI B7.1 Standards. With the shape of a cup, the products are designed for grinding on the rim or wall of the wheel rather than its periphery.

Cushioned Abrasive

Usually classed as a coated abrasive because it has a thin layer of abrasive on a flexible backing, this type of abrasive product contains a resilient layer of material added between the backing and abrasive grain. This highly flexible and conformable product is used in finishing and polishing metals and plastics such as Plexoglass. A manufacturer for these unusual products is [Micro-Surface Finishing Products, Inc.](#)

Cut Off Wheel

A common thin reinforced grinding wheel made with resin bond used for quick and efficient sawing of metal or masonry products. Smaller wheels are made for small electric hand tools, while large diameter wheels are made for large stationary machines. The wheels, which is used for rough cutting of metals, is designed for quick and efficient sawing of bar stock or other materials. These wheels are typically made with [conventional abrasives](#).

Cutting Fluid

see [Metalworking Fluids](#)

Cylindrical Grinding

One of several standard grinding processes used in industry. Grinding to remove material from the OD of cylindrical parts that have been mounted on centers. See also surface grinding, internal grinding, centerless grinding, Distinguished from centerless grinding which grinds the OD without center mounting

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Deburring

A process to remove burrs --undesirable protusions and metal edges that result from machining operations. Methods include hand and automated processes that use files, rasps, bonded abrasives, coated abrasives, and other tools. Coated abrasives, nonwoven products and stones are typically used for deburring.

Diamond

A natural and sythetic mineral composed of carbon atoms in a specific crystalline structure. Industrial diamonds include natural stones for tools to dress grinding wheels. Synthetic diamond is manufactured in a special high temperature, high pressure process and subsequently treated to make a variety of abrasive grains for use in grinding of nonferrous materials and ceramics. In its polycrystalline form, diamond also has a variety of uses including cutting tool inserts.

Disc Grinding

Grinding machines and process using the face of a large wheel to produce flat and parallel surfaces in high volume production. Single wheel machines usually have vertical spindle. Doublesdisc grinding passes parts between two independent grinding wheels.

Dressing

As distinct from **truing**, dressing is a process to remove bond materials and worn abrasive grains and expose fresh abrasive using a variety of tools. Though some coated abrasives have sufficient abrasive and bond to allow for dressing, dressing is primarily used with bonded abrasives. Diamond tools or a bonded abrasive stone of aluminum oxide or silicon carbide are the most common devices used for dressing grinding wheels. Dressing is important for maintaining control finishes, thermal damage and dimensional accuracy of workpieces.

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ELID

Electrolytic In-process dressing. A method to dress fine grained superabrasives grinding wheels using an electrolytic method to dress metalbonded on grinding wheels. The process is an important new method to improve the efficiency of grinding ceramic and composite materials.

Emery

A natural abrasive that contains aluminum oxide and small amounts of iron oxide and is noted for its red color. Once used extensively by industry, it is

used today only in coated abrasives for home workshops. Consistency a low hardness of the mineral limits its usefulness in industrial applications.

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Fine Grinding

Machine tools and a grinding process for precision grinding of flat and parallel surfaces. A relatively recent development, fine grinding grew out of lapping technology and free abrasive machining with the replacement of loose abrasive and lapping compounds with a bonded grinding wheel. Like disc grinding cutting takes place on the face of either one or two grinding wheels. The grinding wheels may be monolithic bonded wheel or wheel composed of small pellets of bonded superabrasive grains.

Finish

A measurement of surface characteristics of a workpiece. Historically a visual characteristic, finish has become also a functional property of the surface. In common practices finish is a measure of the average roughness Ra as determined with a surface profilometer. Contemporary metrology includes a large number of other parameters that are statistically derived to describe peaks, valleys, lay, bearing area, etc. of the surface profile. For detail discussion see [Surfaces and Their Measurement](#). AES also offers other resources on metrology.

Firing

The last step in manufacturing a vitrified or resin bond grinding wheel. Heating clay-based bond materials in vitrified bonds over 2000° F or the resins in resin bonds over 500 °F fuses the materials into a single monolithic structure.

Flint

An abrasive made from the natural mineral high in silicates. With a hardness much less than [garnet](#) or aluminum oxide, flint has no applications in metalworking and only a few in woodworking for the companies that still use old finishing techniques.

Form Grinding

Any grinding process where the surface of the grinding wheel is shaped by dressing to create a specific profile. By dressing an inverse profile of the desired component surface onto a grinding wheel, complex sequencing of multiple steps can be avoided. Form grinding is also possible with coated abrasives and nonwoven products using specialized accessories.

Free Abrasive Machining

Similar to a lapping process where loose abrasives are used to prepare precision flat surfaces. Abrasive machining uses coarser abrasives and harder plates to achieve greater stock removal. With advent of superabrasives, the process is being replaced by fine grinding when justified. Disc grinding is a similar but

less precise machining process. Contact [AES](#) for technical literature on the topic.

Friability

A characteristic of abrasives grains that describes their tendency to fracture or break apart when hit or placed under pressure. Highly friable abrasive cut more easily, but wear faster than other abrasives. Friable abrasives are usually chosen for soft, gummy materials or where heat produced by worn grits must be carefully controlled. Friability is usually related to the levels on impurities in the manufactured abrasive mineral.

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G Ratio

The ratio of the volume of material removed from the workpiece to the volume grinding wheel lost during the process. The ratio is more meaningful for conventional abrasives where wheel wear is greater and easier to determine.

Garnet

A natural mineral found either igneous mineral deposits or in concentrated pockets of alluvial deposits of old river beds. Once a standard abrasive for grinding wheels and coated abrasives, garnet today is used in abrasive waterjet applications and a few coated abrasives products.

Grade

Part of the standard grinding wheel marking indicating the relative hardness of the wheel bond structure. Though a universal standard has been established by ISO, there is no generally accepted measure of hardness in the United States. Manufacturers indicate wheel grade with letters ranging from "A" for very soft to "Z" for very hard. Since grade depends upon properties of bond materials, hardness values for one manufacturer may not correspond directly with similar values from another manufacturer.

Grain Size

The second element in standard grinding wheel marking system or, in a more general meaning, the average size of abrasive grains used to make a wheel, coated abrasive or other product. Traditional sizing is based on mesh sizes where a number indicates openings per inch of screening mesh. However, a number of other measurement systems are also common such as measurements for very small grit size in units of millionth of a meter, or micron. Special sizing systems established by ANSI, CAMI, FEPA and others are used for coated abrasives where the average size of elongated abrasives is difficult to determine. Contact [AES](#) for size conversion tables.

Grinding

Machining with removing material from a workpiece by using abrasive minerals in a wheel, stone, belt, paste, sheet, compound, slurry, or other abrasive product.

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HEDG

Like **creep feed grinding** this process removes material from a workpiece in one or two passes using very slow table infeed rates. HEDG differs by using considerably higher wheel speeds that bring enhancements in wheel life and process efficiency. Contact **AES** for technical literature on the topic.

Honing

Historically, honing meant to achieve fine finishing. Though no clear definitions exist to distinguish one type of abrasive process from another, honing is defined by common practices. In that sense, honing is a specific machining and finishing process usually applied to internal cylindrical surfaces using small bonded abrasive stones. Using a fixture that rotates and reciprocates, honing is used to correct the geometry and alignment of holes as well as apply a special surface such as that needed in automobile engines. Force per unit area vary from 10 to 100 times less than grinding with wheels, and the abrasive grains remain in contact with the workpiece for considerably longer times. Comparable processes include superfinishing where small stones and light pressures are applied on both ID and OD portions of cylindrical parts.

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ID Grinding

A grinding process and machinery for grinding the inner diameter of holes or profiles using a very small, high speed grinding wheel. A specialized grinding technology requiring special grinding wheels and machine tools.

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Jig Grinder

A grinding machine tool for grinding molds and die where the positioning, shaping and finishing of holes and other surface is needed.

Jumbo Roll

The initial product from the manufacture of **coated abrasives**. A typical roll may be five feet wide and 50 yards long. These coated abrasive materials are used as raw materials by **converters** to manufacture belts, discs, sheets and other coated abrasive items.

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Lap Joint

Property coated abrasives: a type of joint used to make a belt. The two ends of the belt material overlap and are attached with adhesives creating a joint with double thickness of the belt material.

Lapping

A material removal process using loose abrasives and a fluid where parts are processed between two large flat lap plates to achieve very flat surfaces and extreme fine finishes. In contrast to grinding and **honing**, lapping is minimal material removal, forces are very light and parts move freely between lap plates. Finishes are measured in micron and nanometer ranges. The term is also commonly used for processes that produce very fine finishes using loose abrasive grains. Historically lapping means a process for the ultimate refinement of geometry or surface finishes using very fine abrasives to produce extremely accurate components. The process is being replaced by **fine grinding**.

Loading

Deposits of workpiece material on the surface of a grinding wheel or coated abrasives that reduces contact between abrasives and workpiece. Loading typically leads to workpiece burn from frictional heating and loss of cutting efficiency. Load is reduced or eliminated by altering parameters such as feed rate, wheel speed, type of abrasive, etc. Dressing also is used to remove material accumulated on the wheel or coated abrasive.

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Make Coat

The first layer of resin or adhesive applied to a flexible backing in the manufacture of **coated abrasives**. The make coat gives a smooth, uniform surface for deposition of abrasive grains and provides the adhesive to bond abrasive grain to the backing. See also **size coat**.

Mass Finishing

A group of processes that use small stones of abrasives to remove burrs or apply a finish to small workpieces. Though not limited to the specifics, mass finishing tumbles workpieces in barrel of small loose bonded abrasive stones to remove burrs or create a specified surface finish. Variations of the process use vibrating drums, spinning drums or other containers along with one of several types of media and finishing compounds that may include surfactants, lubricants and other materials.

Media

The abrasive pellets, stones or other materials used in mass finishing.

Micron

A unit of measure of length equal to one millionth of a meter.

Micro Inch

A unit of measure of length equal to one millionth of an inch, smaller than a micron since one inch is approximately 1/39th of a meter.

Mounted wheel or mounted point

A group of small abrasive wheel or cylindrical abrasive products whose shapes are defined by ANSI Standards. The abrasive products are made with a permanent a shaft or mandrel and are typically bonded products, though some can be made with cotton or nonwoven fabric. Typically mounted points are used in **internal grinding** or **deburring** processes. See **Grier Abrasive Products** for examples.

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Nonwoven abrasive

A product made with fine abrasive grains dispersed throughout a nonwoven fabric and adhered with resin. These products are typified by 3M's Scotchbrite. Industrial nonwoven products are related to floor scrub pads but have greater uniformity and consistency in performance. Like **coated abrasives** nonwoven products are made in jumbo rolls that are converted by others into belts, sheets, pads, etc. Made into convolute or unitized wheels, the products are typically called surface conditioning products.

--O--

OD Grinding

Grinding of the outside diameter of cylindrical parts.

Off hand grinding

Using handheld tools to grind. Also called freehand grinding.

Open coat

A class coated abrasive products with 50 to 70% of the product surface covered with abrasive grains. Open coats are less likely to load when grinding soft materials though they are less efficient in material removal.

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Pedestal Grinder

A grinder with a motor and one or two grinding wheels on a floor pedestal.

Plunge Grinding

Grinding of cylindrical parts in cylindrical or centerless grinding where the infeed of the grinding wheel is limited to radial movements and no cross slide movement.

Polishing

A process using very fine abrasive minerals for little or no material removal where visual appearance is the primary purpose. Typically, polishing is an art using special compounds and abrasive products, recent advancements in very fine grained coated abrasives can produce some polished surface. Force per unit area for polishing are the lightest of all processes that use abrasives.

Polyester Film

A backing material for fine grained coated abrasives. The uniform thickness of synthetic films has made possible a group of micro finishing products that can effectively compete with bond products for finishing parts to submicron surface finish levels.

Porosity

Open voids intentionally created in grinding wheels to provide pocket to carry **swarf** and metalworking fluids during grinding. Some wheel have induce porosity through the use of small hollow spheres of alumina or the use of chemicals (moth balls) that are easily vaporized during firing of the grinding wheel. Recently, porosity on vitrified superabrasives wheels has allows significant improvements in **creep feed grinding** processes.

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Resin Bond

A synthetic resin that can be cured by thermal, ultraviolet light or other methods. Resin bonds are typically identified in the standard wheel marking by the letter B, derived from Bakelite, one of the first common resin bond materials. Resins are the most common type of bond for both coated abrasives and bonded abrasives.

Rubber Bond

A bond of synthetic or natural rubber used for grinding wheels and identified by the letter R in standard wheel markings. It is used in regulating wheels for centerless grinders and in the manufacture of very thin cutoff wheels.

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"S" Joint

A type of butt joint used to make a coated abrasive belt. The two ends of the belt material are cut in a "sine wave" pattern for more joint contact area.

Sandpaper

A traditional name for coated abrasives that refers to early forms that used sand glued to paper. Most products now use synthetic minerals of aluminum oxide or silicon carbide applied to fabric backings. More appropriately called coated abrasive.

Segments

Bonded wheel structures that can be assembled on a special form to create a large grinding wheel.

Silicon Carbide

A synthetic abrasive first developed in in the late 1800s, which is harder than aluminum oxide. Originally thought to be form of corundum many product were name carboundum, a name used by many grinding wheel companies. The green and black forms are distinguished by levels of purity, and silicon carbide is typically applied to nonferrous applications. The sharp and easily fractured abrasive grains are also used in nonmetal applications such as the wood and leather industries.

Surface Grinding

A process and machine tool to grind flat and/or square surfaces. In a common machine tool, the workpiece is mounted to a table that sweeps back and forth in a pendulum-like motion.

Size Coat

A second coating of resin or adhesive applied during the manufacture of coated abrasives to improve adhesion of abrasive grain. The size coat may include grind aids such as [cryolite](#).

Specialty Coated Abrasives

A group of small converted coated abrasives that include cylinders, cones, pugs, flap wheels, etc. Typically these items are applied with hand held tools for a variety of finishing and deburring applications.

Superabrasives

Diamond and CBN abrasives, so called super because of the extreme hardness, "super" performance, and long life. These premium abrasives contrast with more traditional "conventional" abrasives. The name, however, does not denote superior abrasive that can applied universally. Conventional abrasives are clearly better for some applications.

Surface Conditioning Abrasive

Products made with nonwoven abrasives. Formed into cleaning, unitized, or convolute wheels, surface conditioning abrasives can be made with various hardness and grit densities. See [Nonwoven](#)

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Truing

A process to correct the concentricity and shape of a grinding wheel. As distinguished from dressing, which removes bond material to expose fresh abrasive grains, truing is designed to reduce vibration and produce a uniform cutting rate for the grinding wheel.

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Zirconia

An oxide of zirconium that has use as an abrasive. Rarely used alone, it is usually applied in 40% or 60% mixtures with aluminum oxide.
