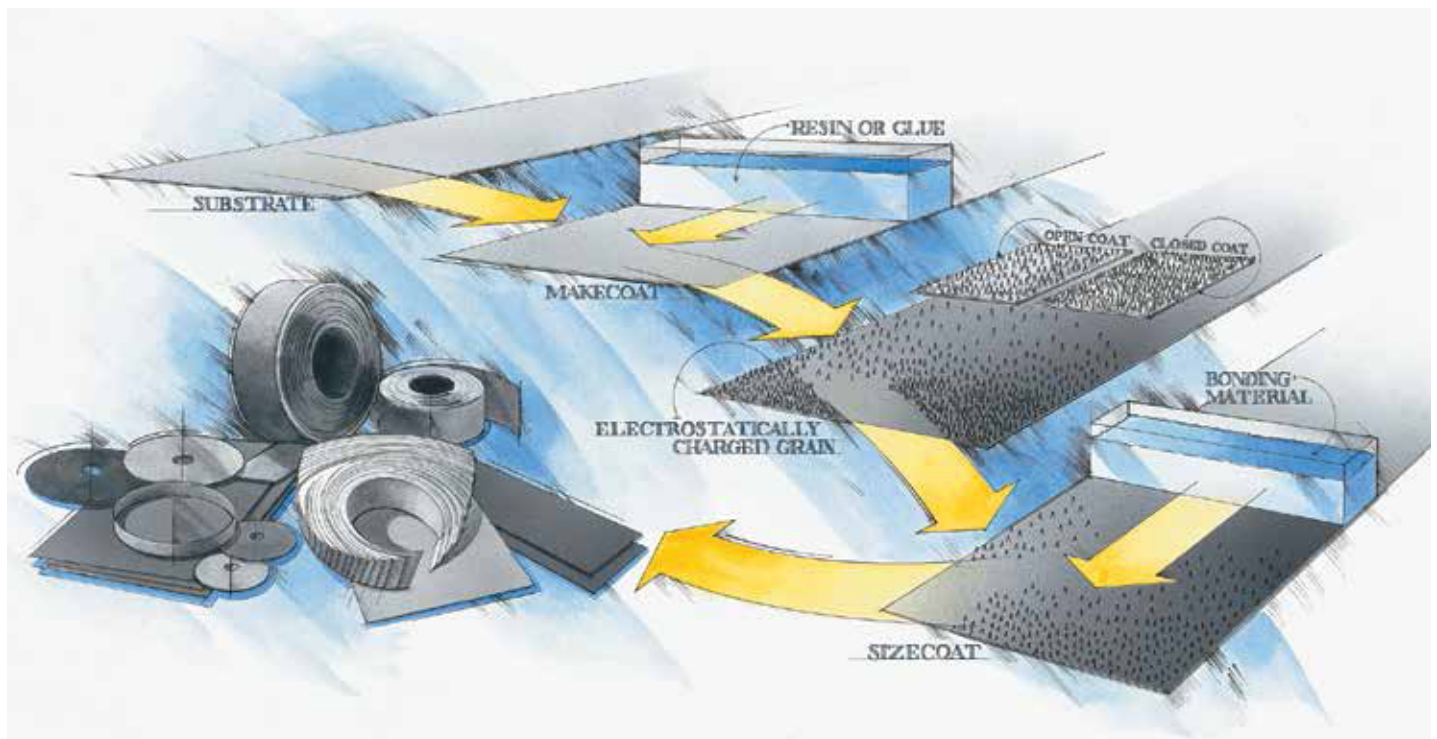


Making Coated Abrasives



- One of the world's most modern, **highly automated, and state-of-the-art** coated abrasives production facilities.
- We use only the **highest quality raw materials**, which are stored in an environmentally controlled area. These include grains, backings (such as paper, cotton, cotton-polyester and polyester materials) as well as resins and glues used in the process.
- Our coated abrasives are cured in the latest, most updated, temperature controlled ovens to ensure that we produce a **consistent and quality finished product**, which is rigorously monitored every step of the way by our world renowned quality control department.
- SAIT abrasives has been the world leader in producing the best quality coated abrasives for over 50 years!



Storage and Handling

Incorrect storage of coated abrasives will significantly affect performance. All types of backings are susceptible to variations in temperature and humidity during storage:

- Keep stockroom at constant levels of humidity (35-50%) and temperature (60-80° F)
- Keep cartons away from damp or cold walls and floors where they may absorb moisture
- Store coated abrasives away from any heat source
- Keep products in original packages for easy handling and stacking
- Flap wheels removed from the original packaging should be spread out on a clean shelf, always placed face down, never resting on edge
- Fiber discs removed from the original packaging should be stored in a suitable disc holder and kept under pressure
- Store bulk rolls flat on shelves or pallets, not on edge
- Belts removed from packing case should be rolled up and stood on edge on a clean shelf. They may be draped over a large cylinder but never hang a belt from a nail or peg (the backing will crease and the abrasive coat will crack)
- Precondition the coated abrasive products in a humidity and temperature controlled environment before use for maximum efficiency

BONDED ABRASIVES

INTRODUCTION

Anatomy of a Wheel

What is a Bonded Abrasive?

A resin bonded abrasive is a grinding or cutting tool composed of abrasive grains which are held tightly together by a bonding agent and typically reinforced with a woven material. Within the bonded abrasives category are grinding and cutting wheels, as well as “stones” in a variety of shapes and sizes.

3 Main Components of Resinoid Bonded Abrasives

① Abrasive Grains

Abrasive grains are particles of man-made abrasive compounds. While some manufacturers use recycled grains, **United Abrasives uses only first quality, premium grains that are made to our specifications.** The chemical structure of the grains determines the physical properties of the grains (i.e., shape, sharpness, hardness, friability). Common grain types used in making bonded abrasives include:

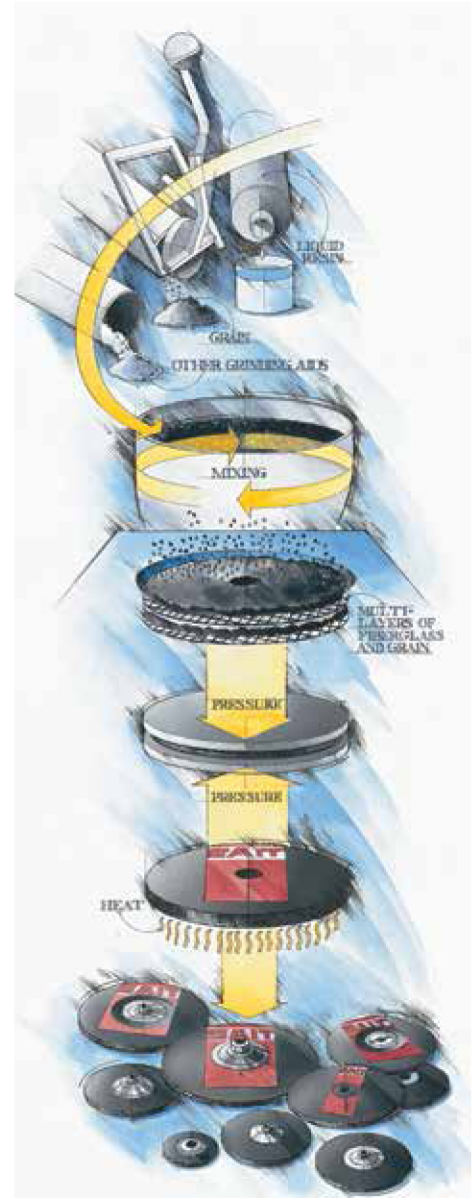
- **A - Aluminum Oxide**
A tough blocky shaped grain used for cutting metals and other high tensile strength materials without excessive fracturing
- **C - Silicon Carbide**
A very hard and very sharp abrasive suited for non-metallic materials such as concrete
- **Z - Alumina Zirconium** (also referred to as Zirconium)
A very fine, dense crystalline grain which can be used for rugged stock removal
- **SG - 3M™ Ceramic Abrasive Grain**
An exclusive patented ceramic aluminum oxide, two or three times tougher than standard aluminum oxide

② Bonding Agent

The bonding agent that holds the grains together determines the resistance of the wheel. United Abrasives uses the highest quality resinoid bond that is formulated to meet the unique specifications of each product. **Unlike many of our competitors, United Abrasives never uses inferior fillers or bonding agents.**

③ Reinforcement

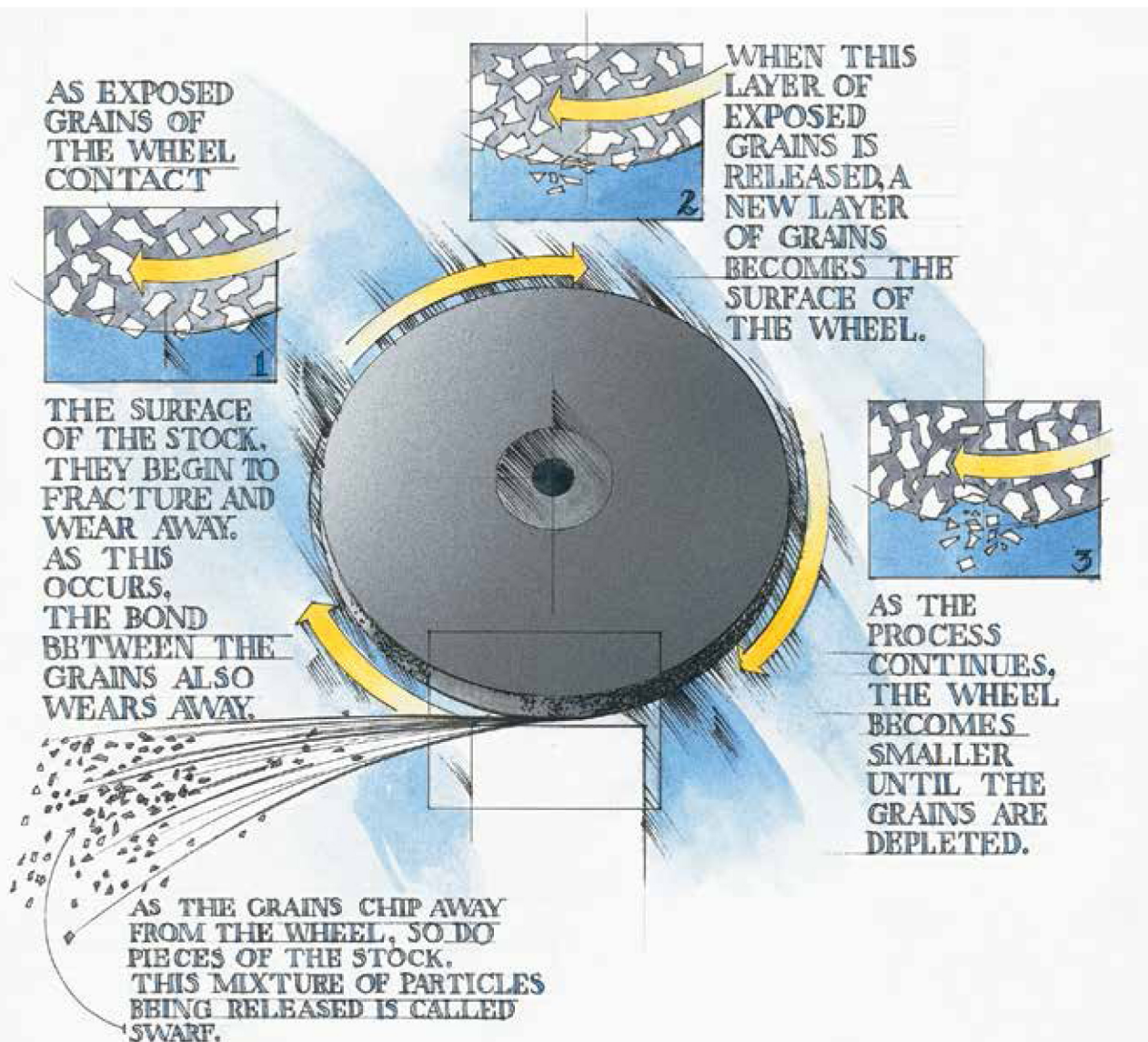
The reinforcement material provides extra strength to use the wheel at maximum RPMs and withstand lateral pressure that is applied during use. United Abrasives uses multiple layers of long stranded fiberglass, manufactured to our specification, which are woven to form an exceptionally strong reinforcement layer specific to the application. **This is a critical element in developing the structural strength of our wheel. Many competitors use less layers of reinforcement or inferior quality fiberglass which can affect the safety of the wheel...unseen to the naked eye!**



Combining the 3 Components

During the manufacturing process, these three components are combined to form a grinding wheel. The grains and bonding agents are measured, combined, and pressed in an automated hydraulic press then cured in temperature controlled ovens. **The entire manufacturing process, from start to finish, incorporates state-of-the-art manufacturing equipment, quality control analysis and compliance, and rigorous product evaluation to ensure that our customers receive one of the safest, most consistent and best performing wheels on the market.**

How a Wheel Works



Common Occurrences With Grinding/Cutting Applications

As a wheel is grinding and/or cutting, some situations may occur with the application such as glazing or loading. Here is a description of each of these occurrences and some possible solutions.

GLAZING

RATHER THAN EXPOSING NEW SHARP CUTTING EDGES OF GRAIN

THE WHEEL BECOMES DULL OR GLAZED

LOADING

THE STOCK BECOMES LODGED IN AND ON THE ABRASIVE GRAINS

Solutions to Glazing

- Dress the wheel for a temporary solution
- Use a softer bond and/or coarser grit wheel

Solutions to Loading

- Dress the wheel for a temporary solution
- Use the correct wheel for the application

Resin Bonded Abrasives

ANSI Standard Marking System

The following chart is an example of the ANSI standard marking system for identifying grinding wheels and other bonded abrasives.

A	24				R	BF
Primary grain used to make the wheel	Size of the abrasive grain				Hardness of the bond	Type of bond used
	Coarse	Medium	Fine	Very Fine	Soft Medium Hard	
A = Aluminum Oxide	8	30	70	220		B Resinoid
C = Silicon Carbide	10	36	80	240		BF Resinoid Reinforced
Z = Alumina Zirconium	12	46	90	280		E Shellac
SG = Seeded Gel	14	54	100	320		O Oxychloride
	16	60	120	400		R Rubber
	20		150	500		RF Rubber Reinforced
	24		180	600		S Silicate
						V Vitified

Wheel Configurations

Bonded abrasive wheels have different configurations depending upon the tool the wheel is used on and the desired end result. Below are the configurations that a wheel can have:

Each wheel configuration is shown on the pages throughout this catalog. The A, B, and C connotations represent the size of the wheel.

A = The diameter of the wheel
B = The width or thickness of the wheel
C = The bore of the wheel

Type 1 Straight Wheel

Type 27 Depressed Center Wheel

Type 28 Saucer-shaped Wheel

Type 29 Flexible Wheel

Type 11 Flaring Cup Wheel

Type 16 Rounded Cone

Type 17 Straight Sided Cone

Type 18 Plug

Type 18R Round Plug

Sample of Wheel Label

Below is an example of a label that can be found on United Abrasives' wheels. We feel it is important to include as much information as possible on our labels so the end user has the pertinent information needed to operate the wheel. All of our labels are baked on the wheels during the manufacturing process so the label remains intact throughout the life of the wheel.



Wheel Label Color Coding:

METAL
STAINLESS
ALUMINUM
CONCRETE

Storage and Handling

All abrasive wheels are breakable and therefore care shall be exercised in handling and storage to prevent damage.

The following rules, which are based on experience, shall be observed:

- Handle wheel carefully to prevent dropping or bumping
- Do not roll wheels (hoop fashion)
- Use trucks or other suitable conveyances to provide support and protection in transporting all wheels which cannot be carried by hand
- Suitable racks, bins, drawers or boxes shall be provided to store the various types of wheels used
- Abrasive wheels should be stored in a dry area not subject to extreme temperature changes since some bonds may be affected by excessive humidity and temperature differentials
- Racks should be located as near as practical to the grinding location, but never where there is danger of damage from passing trucks, crane handling equipment or excessive vibration
- Please refer to the Safety Guide accompanying the product and on page 162 of this catalog.

Exclusive Super-Lock™ Hub

Super-Lock™ combines a mechanically interlocked transversed key lock system with a unique two-part bonding system to give it superior performance capabilities. Other manufacturers use hubs that depend only on two-part epoxy which can fail in many instances due to poor surface preparation, improper curing conditions, incorrect ratio of catalyst and epoxy, or the quantity of epoxy material applied.

Unique in the industry

The United Abrasives Super-Lock™ system is our exclusive, fail-safe throw away hub assembly. This is a unique hubbing system that is used on Type 27 and Type 28 grinding and cutting wheels where hub mounting is preferred.

Unsurpassed Performance

The rotational torque placed upon wheels can vary based on material being removed and pressure that is applied. While the chemical bonds that other manufacturers use can fail, the Super-Lock™ Hub ensures the stability of the hub to wheel connection.

Millions sold - Not one Failure

Since 1983, United Abrasives has manufactured and sold millions of depressed center wheels with Super-Lock™ Hubs. Not a single one has ever been reported as a failure.

Patented

The Super-Lock™ Hub system is so safe that it was originally protected by United States patent #4,541,205. United Abrasives is the only manufacturer to utilize this outstanding hub system.

Use on Type 27 and Type 28 Wheels

The Super-Lock™ Hub System is available on 4-1/2", 5", 6", 7" and 9" Type 27 and Type 28 depressed center grinding and cutting wheels. Turbo 5" x 1/8", .045" wheels, .090" wheels, .095" wheels and flap discs do not have Super-Lock™ Hubs but use a non-keyway hub with the same unique two-part bonding system.

Look for this drawing throughout the catalog indicating the wheels that are available with the Super-Lock™ Hub.

Unique two part epoxy bonding system applied to the hub area



Before

Mechanical Locking System that fits into keyway



After

Exclusive Fail-Safe Hub



5/8-11 Super-Lock™ Hub

Safety Guide

Important:

The following information about safety should be used only as a guide. All products listed in this catalog shall be used in accordance with safety regulations set by OSHA and by the directive described by the American National Safety Institute B7.1, the Canadian Standard Association Safety Code B-173-5 and by the American Brush Manufacturers Association covering: Speed, Safety Guards, Flanges, Mounting Procedures, General Operating Rules, Handling, Storage, and Inspection of General Machine Conditions.

The information to the right is designed as a guide for the individual user of abrasive wheels, whether he be in the employ of a large corporation or in the confines of his home work shop. It is based on the premise that grinding/cutting is a safe operation when a few basic rules are followed. These rules are based on material contained in the American National Standards Institute Safety Requirements B7.1 - "Use, Care & Protection of Abrasive Wheels." Follow Them.



Warning:

Avoid inhalation of dust generated by grinding and cutting operations. Exposure to dust may cause respiratory ailments as well as irritation to eyes and skin. In most cases, a greater hazard is the exposure to the dust/fumes from the base material being ground or paint or coatings applied to it. Use approved NIOSH or MSHA respirators, safety glasses or face shields, gloves and protective clothing. Provide adequate ventilation to eliminate dust or to maintain dust levels below the permissible exposure level for nuisance dust as classified by OSHA. Refer to Material Safety Data Sheet for further information.

All operators must read and understand safety information thoroughly.

Follow Safety Instructions:

You must follow all operator and safety instructions, as well as all common safety practices which reduce the likelihood of physical injury.

Operate Wheels at Recommended Speeds:

It is imperative that abrasive wheels be operated at recommended safe speeds. For safety reasons no abrasive wheel shall be operated at a speed greater than that indicated on the blotter or wheel.

- Do always handle and store wheels in a careful manner.
- Do visually inspect all wheels before mounting for possible damage.
- Do make sure operating speed of machine does not exceed speed marked on wheel, its blotter or container.
- Do check mounting flanges for equal size, relieved as required & correct diameter.
- Do use mounting blotters as required by ANSI standards.
- Do be sure work rest is properly adjusted on bench, pedestal and floor stand grinders.
- Do always use safety guard that covers a minimum of one-half (1/2) the abrasive wheel.
- Do allow newly mounted wheels to run at operating speed, with guard in place, for at least one minute before grinding.
- Do always wear safety glasses or some type of approved eye protection while grinding or cutting.
- Do turn off coolant before stopping wheel to avoid creating an out-of-balance condition.
- Do follow common sense safety considerations.
- Do follow federal, state and local laws and regulations.
- Don't use a wheel that has been dropped or appears to have been abused.
- Don't force a wheel onto the machine or alter the size of the mounting hole. If wheel won't fit the machine, get one that will.
- Don't ever exceed maximum operating speed established for the wheel.
- Don't use mounting flanges on which the bearing surfaces are not clean, flat and smooth.
- Don't tighten the mounting nut excessively.
- Don't grind on the side of conventional, straight or Type 1 wheels.
- Don't use a wheel on any machine that is not properly designed for the specific application of the wheel.
- Don't start the machine until the safety guard is properly and securely in place.
- Don't jam work into the wheel.
- Don't stand directly in front of a grinding/cutting wheel whenever a machine is in operation.
- Don't grind or cut material for which the wheel is not designed.

A pamphlet including these Do's and Don'ts and other safety information is included in each box of wheels.