

# Technology Profile



Value  
to  
Wood

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## Sanding Abrasives for Wood

### Introduction

This Technology Profile provides an overview of the different types of abrasives commonly used when sanding wood. The Profile also focuses on common issues associated with using wide belt sanders, as well as outlining best practices on how to achieve the maximum life from an abrasive product.

### Purposes of Sanding

The main purposes of sanding wooden components are to:

- calibrate wooden components to eliminate thickness variations and unevenness of wooden surfaces
- improve the surface properties created by previous wood processing machinery (e.g., planer knife marks)
- equalise and improve the overall surface appearance, to create a visually appealing surface
- sand surfaces between subsequent coats of finishes to enhance the adhesion and to smooth the surface prior to the application of the next coat
- ease sharp edges to enhance the adhesion of stains and other finishes.

### Types of Abrasives used for Wood Processing

Abrasive papers are made in a range of different grades or grids. Each grade refers to the coarseness of the abrasive and is marked as such on the back of the abrasive paper.

The higher the numbers, the finer the particles are on the sheet. Selecting the most appropriate abrasive will depend on the desired result. This chart shows the different sanding-sheet grids and their most appropriate use.

Abrasive grades

Grade	Number								Use
Very coarse	6	8	10	12	16	20	24	Abrasive planing	
Coarse	30	36	46	54	60			Very rough sanding	
Fine	70	80	90	100	120	150	180	Fine sanding	
Very fine	220	240	280	320	400	500	600 800	Sanding finished surfaces	



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The table below summarises the main abrasives used in the woodworking industry, and the most appropriate application for them.

*Abrasives and their uses*

Abrasive	Feature	Appearance	Use
Glass-paper	Small particles of fine ground glass are bound with adhesive to a sheet of paper or cloth		Not widely used in the industry as the glass particles dull relatively fast in comparison to other abrasive materials
Aluminum Oxide	Very durable and tough with an excellent cutting performance	The color of the paper is normally white, brown or gray	Widely used in the industry to prepare rough and finished wooden surfaces
Garnet	Durable and long lasting		Commonly used to sand half-finished surfaces or any kind of solid wood
Silicon Carbide	Extremely hard and waterproof. Commonly used for wet sanding with lubricants such as oil or water.	The color of the paper is usually black or dark gray	Often used for sanding finishes between subsequent coats

## Abrasive Backings

Abrasive grains are most often bonded to two backings—cloth or paper. Paper backings are available in various thicknesses and weights. The thinner papers are not as strong but have the advantage of being more flexible and less expensive. The advantage of cloth backings are that they are stronger and more durable, although more expensive than paper-backed abrasives.

## Open- and Closed-Coated Papers

Abrasive particles are spread on to the backing paper using two different methods. On open-coated papers, the particles are widely spaced and cover only 40 to 70% of the paper. These abrasives have a thick backing and are best suited for machine sanding. In contrast, the abrasive particles on closed-coated papers are closely spaced and cover 100% of the paper. These abrasives have a thin backing and are best suited for hand sanding.

Closed-coated papers are mostly used for fast, general purpose sanding while open-coated papers are used mainly for sanding resinous softwoods that have a tendency to clog the paper quickly.

## Weight of the Abrasive Paper

The weight of the paper used in the industry is determined by the thickness of the backing paper. The weight is expressed by the letters A, B, C, D, E and F. The letter A indicates the lightest weight while F stands for the heaviest. E and F papers are normally used for industrial sanding applications, such as with abrasive planers, while A to D are used for fine woodworking.

## Steel Wool

Steel wool can be used for polishing or sanding between subsequent coats. It comes in seven different grades that have distinct sanding applications.

**« WARNING: Do not use steel wool for oak. The steel will react with the oak and heavily stain the surface of the wood. »**

## Types of Sanding Equipment

The surface requirements and the properties of the product will vary depending on the final use of the wood product and the quality expectations of the consumer. For example, components that are hidden and are used for construction purposes will not require a finish as fine as that needed for an executive desk. To achieve these various service requirements, machine manufacturers offer a wide range of sanding machinery. The table below provides an overview of the most common abrasive sanders used by the industry and their application.

*Common sanding equipment*

Application	Common Equipment Types
Flat sanding	Stroke sander Wide-belt sander Cross-belt sander
Profile sanding	Profile-belt sander Moulder sander for CNC machinery Edge sander Edge brush sander Spool sander
Hand sanding	Orbital sander Belt sander
Other sanding	Disc sander Brush-backed sander

## Wide-belt Sanders

The wide-belt sander is one of the most common pieces of sanding equipment used to surface flat components made from particleboard or MDF for example. These types of sanders allow high throughput of material in a relatively short time compared to conventional sanding machines.

## Edge Sanders

An edge sander is used to sand straight or curved edges. The sanding belt is mounted at right angles to the support table so that the stock can be rested on the table with its edge against the belt. The edge sander table may be tilted up to 45 degrees for sanding beveled edges and be adjusted vertically to make use of the belt's entire surface. On some models, the endless belt oscillates up and down during the operation, a feature that significantly increases the life of the belt.

## Best Practices for Sanding Wooden Surfaces

In general, higher cutting speeds result in the removal of more material, a finer surface, but a shorter belt lifespan. The table below summarises the general operating parameters for sanding a variety of materials.

*Cutting and feed speeds using sanding belts*

Material	Cutting Speed		Feed Speed	
	(ft/sec)	(m/sec)	(ft/min)	(m/min)
MDF / Plywood / Particleboard	65 – 131	20 – 40	82 – 98	25 – 30
Solid Wood	32 – 82	10 – 25	16 – 98	5 – 30
Veneer	65 – 82	20 – 25	16 – 65	5 – 20
Lacquer (between coats)	16 – 49	5 – 15	49 – 65	15 – 20
Fine Sanding	32 – 49	10 – 15	16 – 32	5 – 10

## Care and Maintenance of Abrasives

### Storage of Abrasives

Ideally, abrasives should be stored at a temperature between 15 and 20°C and in a humidity between 50 and 60%. If the temperature or the humidity is too high or too low, it can cause irregularities in the shape and dimension of the paper. It is also advisable to store large abrasive belts by hanging them, as this will avoid the belts absorbing moisture from the ground. Never store abrasives directly on the plant floor.



*Proper belt storage*

## Cleaning Abrasive Belts

Whenever abrasives become dull or contaminated with resin or other debris, it is essential to dispose of them or clean them immediately. This practice can avoid sanding defects such as scratch or burn marks. Since abrasives can be very costly, companies will often try to clean and reuse belts. There are a number of ways to clean abrasive belts in order to extend their life. These include:

### Pressure washing

Common pressure washers can be used to clean contaminated belts only if the backing of the belt is made out of cloth. After washing the belt, it is important to hang it where it can dry. Reused belts are often used for rough sanding, where the sanding quality isn't as important as sanding to achieve a superior surface.

### Cleaning belts with a rubber cleaning block

Another method to clean abrasive belts is with the use of a rubber cleaning block. After the machine is started, a rubber block is carefully pressed against the rotating belt. This clears the contaminated sections and extends the lifespan of the belt.

### Cleaning belts using compressed air

Wide-belt sanders are often equipped with a belt-cleaning device. The device consists of a steel tube with multiple nozzles that oscillates back and forth across the belt. Air is blown evenly against the belt ensuring that fine wood particles are blown clear.



*Cleaning a large belt using compressed air*

## Common Belt Issues with Using Wide-belt Sanders

Belt rotation marks are common visible marks extending across the work piece appearing at regular intervals. In most cases, these marks are caused by faulty belt splices, contamination between the sanding belt and the contact roller, or the erratic speed of the feed belt.

To avoid rotation marks, operators should check to see that the rotation of the belt, identified on the back of the belt, matches the rotation of the contact roller of the machine. Adjustments to the feed speed to fit the material being sanded may also be required.

Streak marks along the work piece are often a sign that the sanding belts are clogged with pitch or other contaminants. This is often a symptom of an inadequate dust collection system. It can also be caused by minor surface damage to the abrasive belt as a result of staples, nails, etc.

To avoid streak marks, it is essential to ensure proper maintenance and cleaning of the belts and contact rollers. Modern sanding machinery often comes equipped with an "oscillating air cleaning unit". Rubber cleaning sticks can also be used to manually clean contaminated belts.

## Checklist for Using Sanding Belts

Before starting the sanding process	Check the belt for cracks and clogged sections  Calibrate the abrasive sander to the thickness of the belt used  Always ensure that the arrow printed on the back of an abrasive belt is pointing in the direction of the rotation of the belt to avoid damaging the belt
During the sanding process	Apply minimal pressure on the sanding belt to guarantee an optimal sanding result
After the sanding process	Clean the belts with compressed air and make sure that the dust removal system is sufficient to avoid burn and scratch marks  Release the pressure of the tension roller after usage to enhance the lifetime of the belts

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