Abrasive Papers - types and their uses

The term 'sandpaper' is used these days to cover abrasive grit on flexible backing sheets used to smooth many types of material. True 'sandpaper' (i.e. backing paper covered with grains of sand) is no longer available commercially but has been replaced by backing sheet covered with glass, aluminium oxide, silicon carbide, garnet or other specialist grit. Each type of grit has different characteristics which make each most suitable for specific applications, an understanding of the types of grit is essential so that the right type is chosen for a particular job.

In simple terms, the abrasive grit is fixed by an adhesive to a backing sheet - the type and size of grit, the type of adhesive and the type of backing material all have an effect on the suitability of a sandpaper for a particular job.

General characteristics

Grit size

Various sizes of grit are available for all types of grit material, the size is referred to by a number which represents the number of holes per square inch in a sieve screen – they range from 40 (very coarse) to over 400 (very fine). Good quality sandpaper will have universal sized grit. The size of grit is used to classify the sandpaper by 'grade' as follows:

<table>
<thead>
<tr>
<th>Grit Guide</th>
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<tbody>
<tr>
<td>Very Fine (220)</td>
<td>For light sanding between stain and sealer</td>
</tr>
<tr>
<td>Fine (150-180)</td>
<td>For final sanding or cleaning of wood surfaces</td>
</tr>
<tr>
<td>Medium (100-120)</td>
<td>For moderate removal of surface imperfections</td>
</tr>
<tr>
<td>Coarse (60-80)</td>
<td>For heavy removal of wood and coatings</td>
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The individual sheets of sandpaper are normally marked on the reverse with the grit size (i.e. 120) and/or with the grade (i.e. medium).

Most commonly, sandpaper are available as 'closed coat' (i.e. completely covered with grit) however 'open coat' (where only 50 to 70 per cent of the backing is covered) is available for most types of sandpaper although only a specialist supplier may stock them. Closed-coat sandpapers cut faster, but are more likely to clog (i.e. the intergrain space become clogged with the waste from the material being sanded) than open-coat sandpapers.

Backing materials

Three types of backing materials are commonly available:

- Ordinary paper - Although relatively a cheap backing, ordinary paper is an adequate material for most sandpapers. The quality of paper varies depending upon the intended method of use (and price).

  The papers are divided into five grades: A, C, D, E and F weights.

<table>
<thead>
<tr>
<th>“A” weight</th>
<th>A light weight paper coated with fine mineral grains and known as finishing paper</th>
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<tbody>
<tr>
<td>“C” &amp; “D” weight</td>
<td>Intermediate weight papers with medium mineral grains and known as cabinet papers.</td>
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<tr>
<td>“E” weight</td>
<td>A strong, durable, heavy paper coated in a complete range of grits primarily used for mechanical sanding operations.</td>
</tr>
<tr>
<td>“F” weight</td>
<td>Higher tensile strength than “E” weight. Higher tear resistance with similar applications</td>
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• **Waterproof paper** - Water proof paper is essential where the sandpaper is to be used with a lubricant. The back of this type of paper usually has a darker, glossier appearance.

• **Cloth** - Generally used where a high degree of flexibility is required when using the sandpaper.

**Backing adhesives**

Adhesives may be water soluble or waterproof. Most common sandpapers use a water-soluble adhesive; this is quite satisfactory, as most sandpapers are not intended for use with a lubricant.

Wet-and-dry sandpapers and others designed to be used with a lubricant, use a waterproof adhesive.

No matter which of these types of adhesive is used, it is important that the bond between the grit and the backing material is strong enough to prevent excessive separation when being used.

Sandpapers produced for power tools tend to have a stronger grit/paper bond than sandpapers made for hand use.

**Forms**

Sandpaper is available in a number of forms, each form being available in a number of grades:

• **Sheets** - normally about 280 x 230 mm, often sold for the DIY market in packs of 4 or more sheets, either of the same or mixed grades. Usually only suitable for hand sanding.

• **Rolls** - available in a number of widths (e.g. 50, 115mm), each roll is of a single grade and normally is sold by linear length. Although it is produced for use with power tools (e.g. orbital sanders), it can be used for hand sanding.

  • **Discs** - for use with rotary sanders or other power tools. The discs are used with a stiff but flexible backing disc. The sanding disc is fitted to the backing disc either by a central securing screw/dished washer or by a self-adhesive backing.

    Various diameters of disc are available; the diameter of the sandpaper should match the diameter of the backing disc.

• **Belts** - for use with belt sanders. Various widths and lengths are available to suit each belt sander on the market.

  • **Specials** - A number of power sanding tools are now available with non-standard 'foot prints', these require 'special' pre-cut shapes. Generally, the sandpaper is attached to the tool by a self-adhesive backing.

    Sandpapers sold for power tool use are generally more robust than most types sold for hand sanding. While sandpapers for power tool use can be used for hand
sanding, the reverse does not apply - hand sandpapers will not last very long if used with a power tool.

**Types of grit**

**Glasspaper**
Generally composed of quartz granules on a paper backing, this is an inexpensive, relatively soft abrasive for sanding painted or natural timber, metal, and other materials. It wears relatively quickly and is best suited to provide a roughish finish before a really smooth surface is attempted. Normally only available with non-waterproof paper.

**Aluminium Oxide**
This man-made material is suitable for shaping, sanding and polishing hard metal such as iron and steel, but also effective on timber. Aluminium oxide cuts much faster and lasts longer than glass or garnet.

It is available on non-waterproof, cloth or waterproof backings. Cloth backing offers flexibility and is suitable for heavy-duty applications, such as rust removal and metal shaping.

**Silicon Carbide (wet and dry)**
Silicon carbide paper, also known as 'wet and dry' paper, is suitable for both dry and wet sanding. It is suitable for sanding hardwood and plywood, soft metal like brass and aluminium, and plastic; also used for smoothing glass edges and frosting glass surfaces. It is fast-cutting and almost as hard as diamond, but it is brittle so the coarser grades will wear fast if used on hard metal.

When used with water, it gives a very fine sanding of paint or varnish between coats. It can be used with mineral oil for smoothing and polishing metals. The lubricant helps to keep both the abrasive and the surface cool and floats away sanding waste; an additional advantage is that it prevents the formation of fine air-bourne dust. The wet slurry which forms will need to be wiped away during and after smoothing.

'Wet and dry' is extensively used during vehicle body painting as, with water, it can give a very smooth surface to each coat of paint - generally we expect higher quality paint finishes on Automobiles than on household fitments.

**Garnet Paper**
This is a natural crushed rock and is an excellent abrasive for general wood sanding, either by hand or with a power tool - it is recognised by its distinctive reddish-brown colour.

The natural garnet grit lasts about twice as long as the quartz chips used on glasspaper but it is not as long lasting as Aluminium Oxide.

Garnet is also available with a cloth backing; in this form, it is used for work requiring more durability and flexibility.

Garnet Paper is a good all round abrasive, but particularly useful for smoothing hardwoods and for fine finishing work.
Steel Wool

Although not a sandpaper, Steel Wool is used for fine 'sanding'. It is much used by the serious cabinetmaker as it has a much finer abrasive effect than grit materials on sandpaper. The fine steel strands cut rather than abrades the surface, producing very fine finishes; as the wool is used, small pieces of it break off and mix in with the sanding dust.

Steel Wool is graded starting at a very coarse 5 through to a series of noughts – 0000 being the finest. Although excellent on timber and metal, steel wool should not be used for smoothing plasterwork or other surfaces where the fragments of steel may become embedded and could rust stains.

Steel wool can be used to 'sand' complicated shapes such as metal castings or wooden mouldings.

Using Abrasive Paper

For best results:
- Tear sheets of abrasive paper into convenient strips over the edge of the bench.
- Use a cork sanding block to ensure a flat surface.
- Always sand along the grain, never across the grain.
- Take care not to round over edges.
- To remove the arris (the sharp “line” where two surfaces meet) sand a chamfer using the cork block.
- When abrasive paper becomes clogged with wood dust, tap it against the work bench to clear it.
- When sanding end grain rub your finger along the surface before sanding, it will feel rougher in one direction and relatively smooth in the other. Sand in the smoother direction for a superior finish.
- Sand with successively finer grades of sandpaper skipping one grade between sanding steps. Since you have pre-determined the final sanding grade for you project by using your test block determine your starting grade for sanding by testing to see if that final grit size effectively removes the surface defects. If it doesn't, then use the next coarsest grit in the grade sequence and start again.

Remember you are trying to minimize the number of sanding steps to achieve the desired result. The coarser you start, the more sanding you have to do between the coarse grade and finish grade to get an acceptable finish. Do not skip more than one grade between sanding steps. For example if you started with 100 grit and that is not your last sanding grade then you can skip 120 grit and go to 150 grit to complete the job.
- Let the abrasive grit do the work, do not use undue pressure it will only clog the paper or cause the paper to wear out unnecessarily quickly. When power sanding, very little pressure is necessary, just guiding the tool is normally sufficient.
- Always sand in the direction of the grain. Be extra careful when sanding face frames or assembled pieces where the grain direction changes at the joint between the two pieces. Cross grain scratches are difficult to remove without extra sanding and will show through your final finish.