WHAT TO CONSIDER WHEN BUYING A CUTTING MACHINE FOR SIGN-MAKING

CAN IT HANDLE MY MATERIALS?

This is a pretty important one. If you can't cut all the materials you want to offer to your customers then that will mean outsourcing and losing control over production.

However, there is always a balance, and the occasional particularly messy or painstaking job may potentially be better sent to a specialist while you do the rest in-house.

Getting advice on your particular scenario will help you decide what is better for you.

WHAT CUTTING OPTIONS ARE AVAILABLE?

1. Knife Cutting

An important consideration is whether the material can be knife cut on a machine or not. If you can cut it with a Keencut or similar, or by hand with a Stanley knife, even if it takes a few goes, and the result is acceptable, then a knife cutting machine is likely to do the job.

You may already have a vinyl knife cutter, but sheet materials normally need a dedicated cutting machine with greater cutting capability.

A huge range of signs and graphic materials can be knife cut with the right tooling, just a few examples are shown below:

- Foamed PVC (Foamex, Forex, Palight, Foamalux, etc)
- Foamcore sandwich boards (KAPA, etc.)
- Honeycomb (Xanita, Reboard, Swedboard, etc.)
- Corrugated Plastic (Correx, Coroplast, etc.)
- Corrugated card, including DISPA densely layered paperboard
- Rigid solid Displayboard
- Thinner Polycarbonate (Lexan, etc.) and HIPS
- Polypropylene (Priplak, etc.)
- Vinyl floor tiles
- Banner mesh
- Poster paper, Wallpaper and Self-adhesive Vinyl
- Soft signage textiles

and many more…

NOT ALL KNIFE CUTTING MACHINES ARE CREATED EQUAL...

To knife cut through tougher rigid substrates requires a lot of downforce to push the blade all the way through to the bottom of the material, as well as a lot of lateral force to pull the knife along.

Some machines don't have enough strength to knife cut through in one go and have to use multiple passes to get through tougher materials, considerably extending the processing time, as well as potentially giving inconsistent edges and accuracy. Pulling a blade along through a tough material also can be problematic with either the mechanics struggling to cope and giving poor results, or the vacuum hold that is applied to the material to be cut being overcome and allowing the sheet to move sideways during cutting, ruining the job.

Robustness of the machine and quality of the engineering and machining of parts during manufacture is important. Precision fitting parts that don't allow any "give" under load mean highest amounts of downforce and accuracy when cutting your materials. Some machines use lighter weight and insufficient aluminium extrusion gantries that can bend a little under pressure during cutting, and parts don't always fit snugly allowing "play" and resulting in lower force and lower accuracy.

Some machines are based on vinyl cutters that have been fitted with heavier tooling and can therefore struggle with achieving enough pressure and accuracy when cutting through tougher media and may distort curves in particular. A machine designed properly from ground-up for heavy duty cutting will always be superior in terms of performance and results, as well more durable - it will never be pushed beyond its limits.

2. Router Cutting

WHEN A KNIFE CAN'T CUT IT...

Some sign materials simply can't be cut with a knife, or, even if they can, the resulting edge will be poor and/or the blade will get damaged or wear out quickly.

Having the option of a high precision milling/routing tool on your machine lets you handle tougher, denser media that can't be cut well or at all with a knife.

Routing is often a very good indicator of router spindle design and machine construction. A less well made and designed machine will often produce poorer edges on tough materials such as Acrylic (Perspex) and Dibond Aluminium Composite Material (ACM) where the edges really matter. A poorly finished ACM sheet for example will often have raised aluminium lips that will not only affect the look of the finished items, but can also slice fingers when handling/fitting. Similarly Acrylic may look cloudy.

There are different approaches to the type of router to use for sign materials.

CNC machines are often used for woodworking and metal cutting (sheet aluminium and steel). And typically use low frequency (18,000-24,000rpm) routing spindles that have high torque (rotating power). They have the low down grunt required for those materials,

but often not the finesse for higher end sign media such as acrylic, Dibond ACM, etc. Lower rpm also typically means lower processing speeds so jobs will take longer to produce, dependant on the material. Most don't have knife cutting capability so you will be limited only to routing.

Another approach used on high-end cutting machines is a high frequency (50,000-60,000rpm) spindle which will generally give better quality edge finishing on materials like acrylic and Dibond ACM if the machine is designed accordingly.

STABILITY AND ENGINEERING MATTERS...

Even with a high frequency router, you may end up with poor edges due to "chatter" where the router bit does not move smoothly through the material and bounces along the edge slightly leaving tiny bumps and fissures so your nice shiny acrylic edge turns out to be slightly rough and not shiny and polished.

Inappropriately constructed, less stable, lower quality machines, and less smooth motion control systems all contribute to poorer edge finish, as well as using lower quality router bits that are not precisely matched to the application.

High rpm spindles may need specially balanced bits to avoid any additional vibration when spinning at high speeds. Cheaper carbide bits typically use low quality carbide and can be inconsistent diameters with flute geometry that is not designed properly to suit the material. Again, quality counts otherwise you will be changing bits all the time to avoid ruining your expensive printed materials, and eating into operator time that would be better used in other tasks such as prepping the next jobs, or operating a printer.

Suggestion: if you only work with materials that can all be knife cut then why would you pay a lot extra for a more expensive router cutting, water cooling, and waste extraction system in addition to knife cutting?

WHAT IF I ONLY WANT TO CUT SHEET MATERIALS?

Many cutting machines are sold only with conveyorised beds to enable roll media to be processed continuously. However, many signmakers already have a roll media cutter and are only looking for sheet cutting capabilities. Paying extra for the conveyorised bed doesn't make sense in that scenario. A dedicated static bed machine saves cost.

WHAT HAPPENS WHEN I NEED HELP?

Saving on upfront costs and picking up a cheap machine may sound like a good move, but will it pay off in reality? As anyone knows who has bought something from Temu, and increasingly on Amazon, there is a reason why some items cost a lot less than others. The phrase "buy once, buy well" is worth bearing in mind.

Also be aware of many UK companies (that you may already know and trust) just importing cheap Chinese machines, tweaking/rebranding them, and selling them on at a large mark-

up. How reliable are they going to be, how capable, and what level of support are you going to get when things go wrong? Chinese manufacturers have improved, of course, and some higher end options are not bad now, but there are plenty that still aren't being offered in the UK under various names.

The most obvious thing to think about when you are shopping around, other than price, is a machine's ability to cut your materials adequately. However, reliability and the capability to give you years and years of good service before needing to be replaced or upgraded are also vital, and that is often unknown with many newer and cheaper brands.

One of the most important considerations that often only becomes critical after you already have your machine, is back-up. Buying cheap doesn't make up for a machine that isn't working properly for you, whether that is because there's a fault, you just need a bit of extra guidance, you have new operators that need training, or you simply don't know or have the right blade or bit for the job in hand.

Back up encompasses many things:

- Dealing with problems, quick diagnosis of faults and quick resolution
- Timely advice and guidance on choice of cutting method, blade/router bit and cutting speeds for your materials, particularly when you have a new material to process. -
- Availability and fast despatch of suitable consumables to keep you cutting
- Servicing and maintaining your machine quickly and efficiently
- Having replacement parts available off the shelf in the UK
- Experienced, knowledgeable UK engineers on hand to visit you within sensible timelines when you need something fixing
- On site operator training courses
- Cutting software updates and machine firmware updates
- Additional advice and availability of tooling upgrades for the machine to add functionality and handle different media you hadn't originally intended to

These are all questions you should ask about when considering suppliers.

Having to wait several hours (sometimes days) for a call back, or to receive consumables, or an engineer on site when you are desperate to get work out damages your business

ARE MY STAFF AND I PROPERLY PROTECTED?

We all know how important health and safety is in the modern workplace. It is there to protect your staff as well as you as the business owner, ensuring your staff can work safely and you are properly covered.

Machine safety is vital to protect your operators as well as any other people that may come into proximity including untrained staff or even visitors. Modern cutting machines can move very quickly and use sharp cutting tools. Being cut, hit, pulled or crushed by the fast moving parts of these types of machine can severely injure, and potentially even kill.

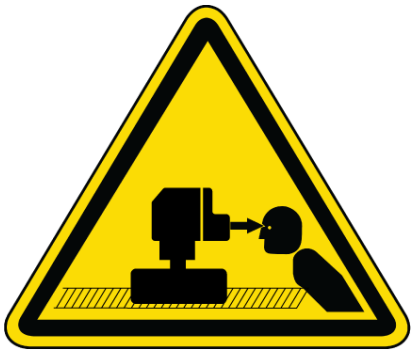
Many cutting machines are equipped with what claim to be safety features but often aren't designed in accordance with legal Machine Safety guidelines, leaving your staff vulnerable, and you liable for prosecution. It is very common for machines to be put in the market

proclaiming they meet CE or UKCA requirement without actually doing so. It is always the company owner/directors who are ultimately responsible for proving and ensuring that the equipment they use complies, regardless of any claims made by the equipment supplier.

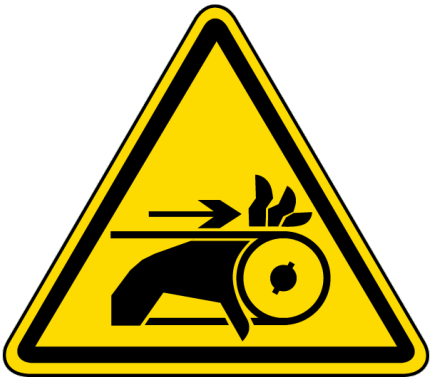
Even for those machines that utilise properly designed and implemented safety systems, there are often what are known as *Residual Risks* remaining.

Typically, a lot of machines have light sensors to guard certain areas to detect that they have been blocked by something (like a hand) and therefore stop the machine, but where these are physically positioned often means that risks remain, for example:

- Sliding a hand into the danger areas under or over the localised protective sensors (exposing people to severe cutting and crushing of fingers/hands/wrists)



- Leaning over the machine above the sensors (exposing people to high-speed heavy strikes to the head by the moving cross-beam / tool head – potentially fatal)



- Getting a hand pulled in by unguarded conveyor belts and their rollers (exposing people to crushing, skin tearing and broken bones)

When you look at a machine in action, check for these types of risk, they could literally be the difference between life and death, not to mention heavy fines and even imprisonment!

Best practice now is to have an all-round invisible safety curtain, and/or physical barriers to stop anyone getting anywhere near the dangerous parts of a machine while it is moving.

Note that some machines use a very simple all-round system that just has a sensor at a certain height surrounding the machine. These are easily bypassed by reaching an arm over or under, and even by ducking under to approach the machine.

Multiple sensors a few cm apart going from near ground level to full body height are the only real protection, other than full laser scanners that use lidar detection to detect people (or other objects approaching the machine).

The smaller the distance between sensors the higher the level of protection and the nearer the light curtain can therefore be to the hazard. 14mm finger pitch is the gold standard.

14mm PITCH
FINGER PROTECTION

20-25mm PITCH
PALM PROTECTION

30-40mm PITCH
WRIST PROTECTION

Properly designed and implemented all-round, full height detection systems, or laser scanners connected to a dedicated safety controller are expensive, the latter even more so, adding significantly to the overall machine cost, but pay dividends over the years in terms of ongoing protection of staff, and peace of mind.

(See next page for key takeaways…)

SUMMARY – KEY TAKEAWAYS

- **Material compatibility matters**: The machine needs to handle the materials and quality you want to offer customers.
- **Knife cutting vs router cutting**:
  - **Knife cutting** is suitable for many sign materials, but machine strength, downforce, rigidity, and accuracy are critical.
  - **Router cutting** is needed for tougher or denser materials where knives are unsuitable or produce poor edges.
- **Machine build quality is important**: Heavier, more robust machines with better engineering provide more accuracy, cleaner cuts, and longer durability.
- **Router/spindle quality affects finish**: High-frequency precision spindles and stable machine design can improve edge quality, especially on acrylic and Dibond ACM.
- **Choose features based on actual needs**: If you only cut sheet materials, a static bed will be more cost-effective than a conveyorised bed.
- **Support and backup are essential**: Good service, fast access to parts and consumables, operator training, software updates, and technical help are just as important, if not more compared to the machine itself.
- **Cheap machines can cost you more in the long run**: Lower-cost machines may lack capability, reliability, precision, durability, and support.
- **Safety is critical.** Cheaper, and sometimes even expensive, machines don't always meet legislation or fully protect your staff, leaving risks that can potentially injure or kill them, as well as expose you to liability for prosecution.