



supporting educational outcomes

Laser Cutter Buying Guide

The ultimate guide for education

Introduction

If your school has begun or is considering the integration of a laser cutter into its Design & Technology workshop, this guide is for you!



Laser cutters are a great addition to a D&T workshop, encouraging students to familiarise themselves with different manufacturing techniques and how to combine multiple materials and components within finished products.

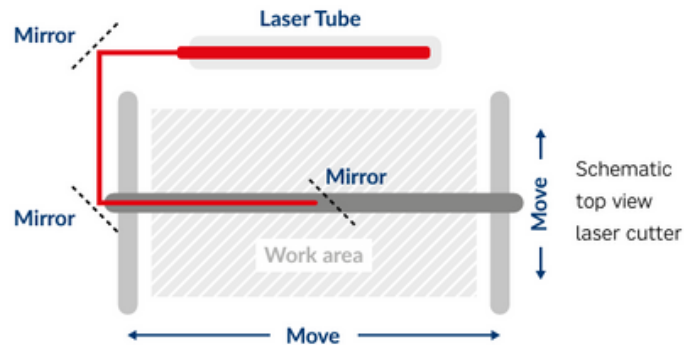
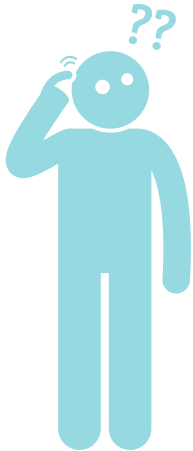
A laser cutter is a significant investment, so this guide is designed to help you make an informed decision based on your requirements. It covers the key features you need to consider when looking through all of the available laser cutters on the market today.

What is a laser cutter?

Laser cutting is a technology that uses a laser to cut and engrave materials. Due to its widespread use in industrial and commercial environments, it has become widely adopted in education over the past 15 years. Many educational institutions have integrated laser cutting into their curricula to teach students about design, engineering, and manufacturing processes.

How does it work?

The laser beam is generated by 'exciting' CO2 gas within a laser tube by electrical discharge. As the gas is excited, the beam is reflected internally by a mirror, until it achieves sufficient energy. Mirrors direct the coherent light to a lens, which focuses the light at the work area, enabling the laser cutting operation.



What can students make with a laser cutter?



Introducing a laser cutter allows your students to explore new technologies and a wide variety of techniques and materials to produce remarkable work. Much used in industry, it's an excellent way to get students thinking about these technologies and the outputs they can create – with a little creativity!

Below, we've compiled a list of ideas to inspire, but the only limit is the bounds of imagination when it comes to the possibilities of a laser cutter. From cost-effective materials to the funkiest product development around. Inspire your students with 21st Century technology and industry favourites by making their designs come to life with a laser cutter.

Cardboard Based Projects

Recycling cardboard such as cereal boxes and pizza boxes is a great way of creating excellent projects on a smaller budget.

Lighting Projects

Excellent for engraving and cutting a range of materials to bring your students innovative lighting projects to life.

Prototyping

From the prototyping of miniature furniture, newly designed buildings to statues, bridges, and other iconic landmarks. The laser cutter will help students use their imagination and a range of techniques to prototype endless options for their projects.

Storage Solutions

From a simple storage box and magical treasure chests to toolboxes and complex storage furniture. Let your students' imaginations do the thinking and work out how to bring their designs to life.

What can students make with a laser cutter?



Useful holders

From mobile phone holders to headphone stands, why not get your students thinking about how they can make their technological devices better secured, and even enhance usability!

Why not try a range of techniques:

- Finger joints
- Living hinges
- Engraving

Although the favourite materials for cutting in schools are MDF, Acrylic, Cardboard and Plywood, many materials can be cut or engraved using a laser cutter. Here are some that are safe and widely used in schools...



Clocks

A somewhat 'timeless' and much loved project for school children learning Design & Technology. Again, using a range of materials and techniques and learning the mechanics of the traditional 'clock', students will have fun designing and making these with the laser cutter.

Try a range of materials to cut and engrave:

- Wood – natural timber and especially MDF and Plywood Cork
- Acrylic
- ABS
- HIPS
- HDPE
- Paper
- Cardboard
- Leather Cotton
- Polyester
- Glass (engrave only)
- Slate (engrave only)
- Painted metals i.e. anodised aluminium (engrave only)

Browse our range of materials

Browse

Glass tubes and metal tubes

High-end glass laser tube typically last around 8,000 hours, while smaller, cheaper variants may last as little as 2,000 hours. In comparison, metal tubes can last up to 40,000 hours of use. Despite the cost-effectiveness of glass tube replacements, you may need to replace them up to 20 times throughout the lifespan of a metal tube.*

Hybrid laser cutters are available, which use both types of tube, allowing you to cut a variety of materials but also engrave at high quality.

*Based on the estimated lifespan provided by tube manufacturers.

Which type should you choose?

Laser cutters can be loosely put into two camps: those powered by glass tubes and those powered by metal tubes. Each method offers its own advantages and disadvantages. Glass tube machines are more affordable initially and offer a budget-friendly solution for laser cutting. However, they have a shorter lifespan compared to their metal counterparts and will need replacing much sooner.

Glass tube	vs	Metal tube
<ul style="list-style-type: none">✓ Cheaper initial cost✓ Many machines using glass tubes are currently available on the market✓ Cheaper to replace the tube✓ Large work areas available		<ul style="list-style-type: none">✓ Tube will last much longer✓ Lower wattage machine are much more capable✓ Industrial-quality machines✓ No additional chillers required as the tube is air-cooled✓ Power depletion is gradual✓ Quicker more accurate engraving✓ Large work areas available
<ul style="list-style-type: none">✗ Tube doesn't last as long✗ Power depletion is instant✗ Manufacturer support can be an issue✗ Quality is not the same as higher-end metal tube lasers✗ Requires an additional chiller unit to cool the tube		<ul style="list-style-type: none">✗ Higher initial cost✗ Tube replacement is more expensive

Laser power

The same power does not mean the same cutting capabilities!

It can be tempting to use the power rating of a laser cutter as a direct comparison between machines and manufacturers, a bit like a horsepower rating, but this isn't necessarily correct.

Cutting capabilities will not be the same from a glass tube machine to a metal tube machine with the same power tube. The glass tube will end up working similarly to a much lower-powered metal tube machine, as a metal tube requires much less wattage to perform the same tasks as a glass tube.



Top Tip!

Even comparing machines with the same tube type across manufacturers can vary.

This is due to the quality of the mirrors and lenses, as well as the overall build of the machine. Remember, use your own materials on each demonstration to give you a direct comparison between different suppliers' machines.

[View the range](#)

Bed size

What size laser cutter do you really need?

Consider how you'll utilise your laser cutter. Bed sizes vary from A4 to A0. While larger beds can be costly, it's advisable to invest in the largest bed size within your budget without compromising machine quality.

Keep in mind that there might be a slight reduction in cutting capability at the extremes of the bed. It's important to note that you can't increase your bed size in the future without purchasing another laser cutter.

Additionally, consider material buying sizes to minimise wastage.



Top Tip!

When cutting out work for a whole class, consider 'nesting'.

This means moving components into all of the available material space to ensure you get the most out of your bed size and your material, reducing set-up time between projects.

[View the range](#)

Extraction

Extraction isn't an option – it is a requirement

Various materials commonly used with a laser cutter produce fumes when being cut and engraved. All fumes should be efficiently extracted from the laser through a suitable extraction system. If no extraction is used, the fumes are a health risk and will also affect the running of your laser cutter.



Look out for the following in your extraction unit

Are you looking to ventilate externally? Or are you considering a filtered extraction system? We recommend a filtered extraction because they are easier to use, more portable and are less expensive.

- You will need an air compressor (ideally built-in) used for air assist (your primary fire-prevention system, blowing a variable flow of air onto your workpiece as it's being cut).
- Filter-monitoring system.
- Interlocked with laser – your laser should only turn on when the extraction is also on.

How often filters are changed depends on how often the machine is used and with what materials. As a rule, though, the average use in education would mean you should budget for new filters every 12 months. Some laser cutters are supplied with a simple blower fan and a hose to vent fumes through a wall or window. This is not an adequate filtered extraction system and isn't recommended for use in a school. Ensure your extraction system is BS4163:2014 compliant.

Remember!

Someone, maybe you, is responsible by law for the health of the students and employees around you and you must take adequate steps to control substances that are hazardous to health. This is according to HSE258 guidelines and code of practice.

Top Tip!



Look out for additional safety features

Check for features such as an auto cut off, which ensures that the connected laser cutter won't start if the extraction system isn't switched on. Intelligent software built into the extractor can accurately tell you when filters need to be replaced, increasing the efficiency of your laser and extractor.

Space and access

Make sure you have room

Laser cutters vary in size from small desktop machines to larger floor-standing industrial machines. When considering which laser cutter to go for, it's important to think about the physical space in which it will be situated and consider the following:

- Getting the laser cutter through a standard doorway.
- Obstacles such as stairs.
- Separate chiller and extraction units.
- Positioning it approximately 30cm from a wall.
- Positioning it away from heat sources.
- Ensuring you can easily access parts for maintenance.



Top Tip!

Laser cutters are big machines, so carefully consider where you want yours sited.

It may not be that easy to move the laser cutter once it is in place. Note that some suppliers may need to dismantle parts of the machine to get them through doors and up stairs, which may incur an extra cost.

Software



Is your software compatible?

Most laser cutters are compatible with many popular 2D drawing packages. Check if your current software is compatible by asking the following questions:

- Does the software produce vector line drawings, and can you modify the width and colour of lines?
- Can it handle 'bitmap' images, which are used for raster engraving?
- Can the software output through a printer driver?
- Does the software allow you to nest drawings, optimising your laser-cutting processes?
- The laser should point directly from the software, without the need to go through 3rd party intermediary software.

Popular software includes

- CorelDraw
- 2D Design
- Serif DrawPlus
- Adobe Illustrator

Top Tip!



Ensure you are comfortable with how the laser cutter outputs from your software.

Are you limited to using a proprietary piece of software, where you have to produce your designs in another program and then import them to output to the laser? This can add to production time and compromise your designs. During their demonstration, ask the supplier to use the same software that you use in your school or college.

Other features

Top Tip!

Something as simple as the motor can make a significant difference to the performance of the laser cutter.

Servo motors help you engrave quicker and cut more accurately when compared to the stepper motors found in cheaper machines.

There are various other features and additional accessories that you should consider when looking at laser cutters.

Autofocus feature

This accurately focuses your material by moving the bed height up and down towards the beam, ensuring the best cut and engrave.

Rotary attachment

This allows you to cut and engrave cylindrical parts such as glasses. It is often an optional extra.

Servo motor

This is a higher-quality motor option that significantly improves the speed and accuracy of cuts and engravings.

Interlock system

This ensures the laser beam will not fire, unless safe to do so.

Air assist

This provides a constant and variable air flow to your workpiece, extinguishing small fires before they spread.

Fire-detection systems

This is a system such as SmartGuard, which drops the bed and moves the laser head in the event of a fire, reducing damage to your machine.

Financials



Packages and deals

What do you get for your money?

With a high initial cost and some additional equipment requirements, it's important to be clear on what is included in the advertised price. Some suppliers will advertise an attractively low price – in most cases, this is just for the laser cutter itself.



Top Tip!

When comparing costs, ensure the quotations you get are as clear as possible.

Look to get everything itemised, even if they are part of a package, and watch out for hidden costs.

Things you will need to consider in your purchase are:

- Extraction unit
- Grid/honeycomb bed
- Chiller unit (essential for glass tubes)
- Interface cables
- Software
- Delivery
- Installation and training
- Lifetime support and aftercare

Warranty and maintenance



Maintenance

Regular maintenance is also very important to ensuring your laser cutter runs at an optimal level for as long as possible. It's a good idea to have one person in your institution who is responsible for the maintenance of the laser cutter who will understand the optics and why it is important to keep it cleaned and maintained.

What is covered, and how long for?

As with any large equipment purchase, warranties offer security throughout the life of your product, but remember that different suppliers and manufacturers will have different warranty structures.

Consider the following questions:

- What does the warranty cover? The machine and laser tube usually have separate warranties, where the tube warranty is shorter.
- How easy will it be for you to raise a warranty claim with your chosen supplier?
- Is a dedicated, UK-based support team available when you need them to be?
- Are parts available in the UK and are you expected to fit any of them yourself?
- Outside of the warranty, are there any additional call-out charges? Extra costs can quickly mount up.
- Is regular servicing available, and at what cost?
- Is any maintenance that is to be undertaken by you, the user, fully covered in any available training sessions?



Top Tip!

Always check what warranty and support you have for the tube from your chosen supplier.

Some cheaper glass tube machines rely on extensive maintenance from the end user, even when replacing the tube.

Funding



Top Tip!

There are many laser cutters that seem extremely cheap to buy outright.

Use the information in this guide to ensure you make an informed decision and find the laser cutter that suits you, so you don't buy cheap and buy twice!



Can you afford it? Keep an eye out for different payment options!

A laser cutter is probably more affordable than you think. There are now more models on the market as they are no longer used exclusively in industry, making them a realistic option for many schools.

Even so, it is still a significant purchase and it's important to consider the information in this guide before buying a substandard machine that you will have to renew before long. There are many ways to raise funds. For example, some schools have strong links with local businesses and apprenticeship programmes, which can lead to sponsorship of equipment.

As a laser cutter can be used across the school in many different departments, why not put budgets together and share the use of the laser cutter? (see next page for our mobile solution - Akira™ Laser Cutting WorkStation)

An alternative to purchasing outright is leasing, which means you can have a package tailored to your requirements with flexible payments and an upgrade path at the end. This enables you to renew the technology while keeping the costs down.

Some suppliers who also offer rental options, which give you the flexibility of running a laser cutter in the short term at a minimal cost, which gives you the use of a machine and may, in turn, help you justify your bid to own one.

Discover additional funding opportunities with our guide!

Download

akira™

By WF Education Group

Akira™ Laser Cutting WorkStation

Frame Guarantee
25
YEAR



Versatile educational workstation

This WorkStation offers **cross-curricular investment** opportunities, **allowing sharing among various departments for diverse projects**, making it a cost-effective choice. With mobility in mind, it's perfect for educational settings, enabling laser cutting lessons and projects to be conducted *anywhere*.

One unit - one plug!

Preassembled by WF engineers, the unit is ready for use as soon as it is positioned in the work room, plugged in, and the laser cutter set up.


Browse our range of mobile WorkStations

[View the range](#)



A close-up photograph of a metal plate mounted on a dark desk. The plate is engraved with the word "akira" in a lowercase, sans-serif font, followed by a trademark symbol (TM). Above the main logo, the text "v.2 | fs.2" is visible. Two screws are used to secure the plate. In the background, a portion of a chair with the "akira" logo is visible.

akira™

By  WF Education Group

Uncompromising quality

All Akira™ frames carry a 25 year guarantee.

Coupled with a modular design, where individual components can be replaced at end of life, not only does the Akira™ system have an excellent lifetime value, but also provides a sustainable option for your spaces.

Other services

Design Consultancy & Installations

From all-encompassing 'Innovation Spaces' to Design & Technology and Library installations including FF&E; our projects team offer a comprehensive, bespoke service from design consultancy and planning through to installation and training covering refurbishments and new builds. We have a team of experienced, in-house designers and education specialists offering a consultancy, design-led solution that will equip your school with next generation, innovative learning environments for your pupils.

Servicing & Maintenance

We also offer comprehensive servicing and maintenance contracts carried out by our qualified engineers on all workshop equipment, including laser cutters.

D&T Supplies

Every year in the UK, 3.5 million pupils are taught using consumables that have been sourced from TSL. We have everything you need for Design & Technology with thousands of products across materials, engineering, electronics, graphics and more.



From design to installation to aftercare and maintenance, work with one friendly team.

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