# Buying a Chinese laser cutter

Unmodified 40 watt laser engraver/cutters can be purchased on eBay, Amazon or directly from the manufacture or reseller in China. There are two main laser types, one with analog control of the laser current and a digital control. The analog current model has a larger electronics compartment making it easier for future upgrades. Both analog and digital models come with either the Moshi or Corel Draw software and control board. Corel software cannot be run on a Moshi unit or Moshi on a Corel. Both units use the same size x-y platform of 200 x 300 mm cutting/engraving area. The cutting area can be increased in both units with upgrades. The digital unit has a smaller case and the output of the tube is only 34 watts but is advertised as a 40 watt unit. Laser tube length determines the output wattage.

Lasers over 40 watts already have the upgraded controllers and use different software. Ask what software is included with your machine. Ask if you will be required to purchase additional software. Corel is not included with all lasers.

There are a lot of options when buying a larger format Chinese laser cutter. In the USA, you can buy a unit from [RedSail](http://www.hflaser.com/), [Rabbit Laser](http://www.rabbitlaserusa.com/), [Light Object](http://www.lightobject.com/), [Micro-Mark](http://www.micromark.com/), [Boss Laser](https://www.bosslaser.com/), and, [Full Spectrum Laser](https://fslaser.com/), in the UK there is [HPC Laser](http://hpclaser.co.uk/). These companies are resellers of Chinese laser cutters. Some resellers will buy the Chinese machines, upgrade components and, provide local support. The core (and sometimes the whole machine) of all these Chinese [laser cutters](http://www.wklaser.com/index.php?m=content&c=index&f=lists&catid=123&l=2&page=1) is made by [G.Weike](http://www.wklaser.com/).

### Tips

There are several advantages to buying directly from G.Weike. Chiefly, you will save yourself a considerable amount of money. You can also customize the laser cutter to your exact specification and needs. The downside of course is support is likely to be half a world and several time zones away.

Buy the biggest machine (cutting bed) you can afford. The cheaper laser cutters like the K40 can be a good buy, if your needs are modest and you don’t mind doing a few upgrades. Replacing the exhaust fan, changing the focus lens and adding air assist are reasonable priced upgrades. Replacing the controller (DSP) will allow gray scale engraving as well as many other features, but cost as much as the K40.

When you communicate with your sales rep, don’t be afraid to ask lots of questions. Your sales person will be more than happy to answer your questions, no matter how detailed! I exchanged 50+ emails going over every detail of my laser cutter, all the way down to the color!

### Shipping and importing directly from China:

At first glance, it is very overwhelming importing a laser cutter from China. You have shipping, customs and import duties to worry about. If you’re buying a larger unit (bigger than a K40), the shipping crate is HUGE, and heavy! Expect a crate between 380 and 400 kg (840 - 882 lbs.), and 192x143x133cm (6.3x4.7x4.4 ft.).

If you live near a major port, you can expect your shipping costs from China to be in the range of $300-$350. If you don’t live near a major port, your sales rep can arrange transportation and customs brokerage for you. But you are usually better off arranging transportation from the port to your destination yourself.

For customs, you will need to have the customs paperwork processed at the destination port. You can handle the paperwork yourself, but in my opinion you are much better off hiring a customs broker. You can expect to pay between $350 and $500 for customs fees, broker fees, FDA clearance fees, and import duties. To find a customs broker, search for the destination port city name plus customs broker, ex “Tacoma customs broker”.

Sadly, most of the customs brokers are not very friendly or helpful to newbies. I ended up choosing a customs broker that was more expensive because they were friendly, and responded to my many questions with more than one word answers.

### Laser tubes and what wattage to choose

There are a few manufactures of laser tubes Puri, GSI, Reci and, EFR. As to which is better, I can’t answer that (yet). The price difference between a 30w, 35w, 40w, 50w is pretty negligible (<$20 between steps). The price difference between an 80w tube and a 130w tube is almost double!

Higher power lasers aren’t necessarily better. If your main goal is to engrave and cut thinner material, you will be much better off with a 40-60w tube. Tubes over 60 watts are used mainly for cutting, not engraving because the focal point is larger so it is not possible to engrave with finer detail. If your goal is to primarily cut thicker material up to 12mm (0.5 in), you will be better off with an 80-100w tube.

### Controllers and software

Bluntly, the software that comes with the Chinese laser cutters can be frustrating, and downright crude. The two main software packages that come with the K40 are Moshi or Corel Laser. Each has different features and problems. To add features and correct the problems, a lot of people replace the stock controller with the AWC608 or [X7](http://www.lightobject.com/X7-DSP-Controller-card-for-CO2-Laser-Engraving-Cutter-with-color-screen-P940.aspx) from Light Object. On larger format laser cutters, the stock controllers’ options are Leetro, Ruida, Anywells, and use LaserCut, RDMark, and LaserCAD respectively.

According to my sales rep, the Leetro controllers are better at engraving, while the Ruida controllers are better at cutting. However the control software for the Leetro controllers requires a USB dongle. While the Ruida controllers have a hidden Ethernet port! If you get a Leetro controller, you do not want the 6535 controller. It has issues with larger designs. Thankfully, the 6535 controller has been deprecated!

### Cooling

Laser tubes get hot, and the output power goes down the hotter the tube gets. A 40 watt laser will not usually require a chiller unless you live in a hot climate and run at maximum power. A 5 gallon bucket of water and antifreeze mix is usually all that is required.

For lasers over 40 watts you will need a chiller, with the CW5000, and CW5200 being your usual options. The CW5000 and CW5200 have temperature and flow alarms and, weigh in at 43 kg (95 lbs.)! The CW5000 is good for tubes between 60 and 120 watts, while the CW5200 is ideal for tubes between 130 and 180 watt single tube setups, or 100 – 130 watt dual tube setups. I’ve only found anecdotal evidence, but people say the CW5200 is more reliable than the CW5000.

The optimum water temperature for a C02 laser is 22° - 25° C (72° – 77° F). Be careful of thermal shock when adding water for coolant. Water temperature greater than 10° C (18° F) from ambient temperature can cause thermal shock that can break the laser tube. Add the water slowly while the pump is running and the laser is turned off. High water temperature will shorten the life of the laser tube and water temperature too cold will lower the output wattage.

Despite what you might have seen on the internet, **do not** dump ice in the reservoir, unless you would like to purchase a new tube. The thermal shock will cause the tube to crack!

### Cutting bed

Honeycomb beds are better if you are going to be cutting very small material, or very flimsy material like paper that needs a lot of support. The down side to honeycomb is soot can build up on the cells, and you can get flashback — when the laser strikes the cells and the laser beam reflects burning the underside of the work piece.

If you plan on primarily cutting larger materials, you will be better off getting a slat bed. You will end up with less cross contamination between cuts because there is minimal contact area between the piece to be cut, and the bed.

### Red dot

How do you know where the laser is going to cut? Easy, red dot – think keychain laser pointer! There are two different ways the red dot works. The most accurate method is with a beam combiner. With this method, the red dot laser is combined with the CO2 laser so they both exit out the same lens. With a beam combiner, the red dot will be accurate no matter the focal length of the lens you have installed. The downside is there is a small reduction in power of the CO2 laser.

The other method is with a 45 degree aiming laser. The upside is there is no power loss. The downside is the red dot will have to be readjusted if you change your lens to a different focal length.

### Bed height, lens selection and motorized Z

The focal lens you have determines how far away the item to be cut/engraved needs to be from the lens. Lasers under 50 watts have 3 main focal lengths. The 38.1mm is used for engraving and can be focused down to .003 mm. The 50.8 mm is a combination lens used for engraving/cutting and can be focused down to .005 mm. The 63.5 mm lens is used mainly for cutting due to its larger [depth of field](http://www.coherent.com/downloads/Copy%20of%20UnderstandingLaserBeamParameters.pdf), but can only focus down to .007mm

For lasers over 50 watts, the lens sizes are 68.5 mm, 75.0 mm and, 100 mm.

The lens material and mirror coating also varies, ZnSe and GaAs are the two main choices for the focus lens. Gold plating or high-quality Si (Silicon) is used for the mirrors.

Zinc Selenide (ZnSe) has the lowest absorption of the common CO2 transmitting materials and is, therefore, the material of choice for high-power applications. It is also the only material that transmits visible light, a requirement for the use of a HeNe alignment laser (red dot beam combiner).

Gallium Arsenide (GaAs) is the material of choice in dirty or high- splatter environments. It has relatively high hardness which helps repel debris particles. It also has high thermal conductivity which helps transmit heat away from imbedded particles.

Auto focus is used to automatically control the height of the bed and is primarily found on larger or more expensive machines used in a production environment. If you upgrade your laser cutter to a motorized Z axis (typically $200), if you get lucky your sales rep will throw in auto-focus! Otherwise, it’s about a $150 add-on.

Air Assist

Air assist is one of the most recommended features both in new machines and as an upgrade. A small compressor blows a constant stream of air from a special lens holder. This helps keep smoke and debris away from the focus lens as well as assisting in cutting. The air flow will also help to prevent flame-up by blowing out the flame.

### Spare parts

A laser cutter has a few consumables. The biggest consumables are the mirrors and, lenses (optics). How can the optics go bad? If the optics aren’t clean, when the laser strikes the contaminants, it causes localized heating of the contaminants which will destroy your mirrors and lenses in very short order. This is why it is critical to [clean your optics](http://www.newport.com/How-to-Clean-Optics/141176/1033/content.aspx) using denatured alcohol or a 60/40 mix of acetone and methanol and, lens paper.

The easiest way to keep your focal lens clean is with air assist. This is an air pump that creates positive pressure inside the lens tube assembly, which prevents smoke from coating the lens.

A laser tube sitting on the shelf will eventually go bad due to loss of the CO2 leaking from the seals. Because of this, purchasing a spare tube is not recommended. When your tube does fail, you can usually have a new one delivered in less than 1 week.

### Payment

So you have your laser cutter all spec’d out, how do you pay? If you are purchasing from eBay or Amazon, using PayPal will help with payment protection. If you are purchasing directly from the Manufacture or a reseller, PayPal may not be an option. Because of the cost of credit card processing fees, every reseller I’ve contacted only accepts payment via wire transfer, also known as TT (Telegraphic Transfer). The downside for you is you have absolutely no payment protection, and your bank will change you a wire transfer fee. In my case the bank fee was $50.

Because you have no payment protection, it is critical you do research on the company you are buying the laser cutter from. There have been several [fly-by-night operations](http://www.cnczone.com/forums/hurricane-laser/143439-sketchiness-surrounding-hurricane-lasers-post1405682.html#post1405682) where people have been out over $13,000. Companies like G.Weike, Rabbit Laser and Light Object have been around for a long time, and will more than likely continue to be around. Ordering thru [Alibaba](http://www.alibaba.com/)/[Aliexpress](http://www.aliexpress.com/) is one way to get payment and product protection.