

# SUPER-POWER, FOR THICK AND THIN PLATES

## High Power Laser Cutting Machine - S 4020



### High Power Laser Cutting Machine - S 4020

Equipped with high/super power laser device, efficient thick plate cutting is no longer a dream, thin plate cutting is more speed; BODOR database of cutting process will provide you with data support of performance and energy saving to save your cutting cost.

#### Product parameters

Model	S4020
Working area	4000*2000mm
Laser power	12000W/10000W/8000W/6000W
Max. simultaneous positioning speed	140m/min
X/Y-axis positioning accuracy	0.05mm
X/Y-axis repositioning accuracy	0.03mm

# A CAST IRON BED LASTS FOREVER.

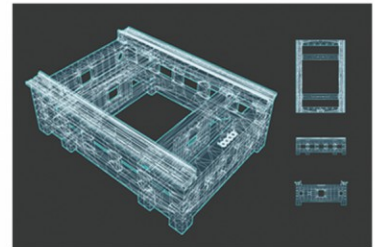
No deformation in a life cycle



Material is more suitable



Technique is more suitable



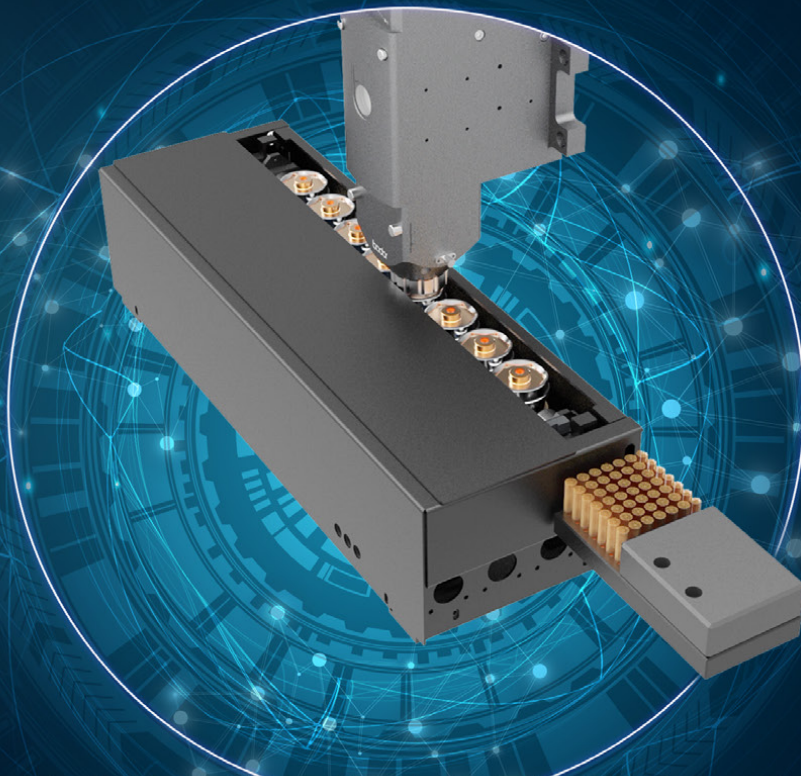
Structure is more reasonable

## Clone

Mold pouring, clone production; integrally formed, reject splicing

## Durable

Using flake graphite cast iron, the lowest tensile strength of which is 200MPa. High carbon content, high compressive strength and high hardness. Strong shock absorption and wear resistance. Low thermal sensitivity and bed gap sensitivity reduce the loss of equipment in using, so the machine accuracy could maintain for a long time, and no deformation in a life cycle.



# AUTOMATIC-REPLACEMENT NOZZLE



**Automatic Cleaning**



**Automatic Replacement**



**Automatic Calibration**

## Automatic-replacement Nozzle, Let Machine Know More About You

Adopting abundant and accurate control system can realize automatic replacement of nozzles according to different materials and thicknesses, saving manual replacement time and improving processing efficiency, smart and convenient; Newest automatic calibration and cleaning functions can achieve fully automatic laser head calibration and nozzle cleaning, reducing the repetitive manual work; High-precision drive system provides a reliable replacement precision and stability to ensure that every replacement can be perfectly safe. Fully enclosed protection of the whole part improves the safety of parts and personal.

# ENVIRONMENT FRIENDLY AND HEALTHY FULL PROTECTION COVER

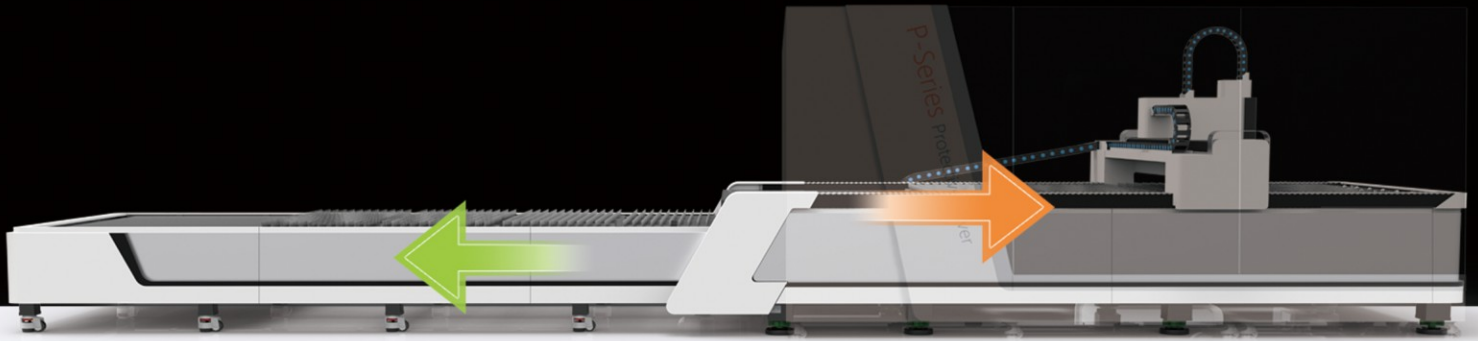


## All Cover Exchange Platform Laser Cutting Machine — S 4020

Full closed protection improves using security; laser protection glass isolates laser radiation to human beings; automatic collection system of smokes and dusts is environment friendly; intelligent monitoring system reduces accident rate, making us enjoy beauty and health in cutting process.

# TIME-SAVING AND EFFORT-REDUCING

## TWO AUTOMATIC EXCHANGE PLATFORMS SYSTEM



### All Cover Exchange Platform Laser Cutting Machine — S4020

Rapid exchanging between two platforms greatly improve work efficiency. Rack and pinion transmission system has better rigidity and higher accuracy, saving feeding time, making operation more efficient.



## **WIFI Remote Intelligent Assistance**

Global real-time feedback, Providing real-time fault analysis and troubleshooting.

# BECKHOFF SYSTEM

## The beckhoff system owns the following advantages

### Simple

1. Simple to connect, the master slave station connection is through the network cable, and the whole structure is compact;
2. Simple to debug, server parameters are set by TwinCat, the settings with same configurations are imported configuration files directly;
3. Faults are simple to remove, all the faults will be displayed in the TwinCat;
4. Simple to integrate, supporting 90 percent field bus on the market, it can protocol integrate different buses into a controller, making configuration more flexible.

### Open

It supports software developing to remotely monitor the equipment running condition.

### High performance

EtherCat bus controlling, signal transmission speed is fast, and the control cycle of beckhoff system is less than 125us, this high synchronization accuracy is especially suitable for high-speed cutting.

## PRECITEC AUTO FOCUS LASER HEAD

Manual or motorized focal position adjustment | Flexible focal length (Zoom) | Various monitoring  
System status portable via Bluetooth | Straight and angled version

Dynamic laser cutting machines require lightweight, intelligent cutting heads. Even installed in the smallest possible space, the ProCutter offers a fully-integrated sensor system that monitors the cutting process and provides the user with relevant information. The head ensures a processing with up to 12 kW and that each component can be reproducibly manufactured at a high standard of quality.

The ProCutter offers a complete solution for the laser-based fusion cutting of thin and medium material thicknesses in the wavelength range around 1  $\mu\text{m}$ . In flame cutting, greater material thicknesses can also be processed while maintaining high standards of quality. The potential of the cutting head is optimally converted into productivity, especially in the case of flatbed and pipe cutting machines, where innovative technologies are combined with proven concepts, providing the best possible performance, range of flexibility and degree of reliability.





### Germany Beckhoff Servo Motor

Featuring integrated, high-speed control technology with a current control cycle of down to 62.5  $\mu$ s, drives support fast and highly dynamic positioning tasks.



### Japan NSK Bearings

These bearing housings have square flange which can be easily attached to a machine with four bolts. With its simple mounting face, this bearing unit is widely used.



### Japan SMC pneumatic components

Stepless control of air pressure proportional to an electrical signal. Serial communications specifications. Compact/lightweight (Integrated communication parts).



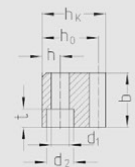
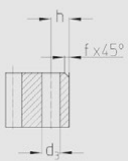
## Germany Neugart Decelerator

Adopted standardized flange interface, our PSFN can be installed easily and reliably, saving time and energy. The PSFN runs particularly quiet. You need not think about noise absorption measures for your machine. This saves you money. With high tilting moment, you can subject the PSFN to the highest radial and axial forces. This can improve the cutting performance.

## Germany Rexroth Guideway

- △ The same high load capacities in all four main directions of loading
- △ Very low noise level and best travel performance
- △ Lube ports with metal thread on all sides
- △ Optimum system rigidity through preloaded O-arrangement
- △ Optimum installation error compensation with Super ball runner block
- △ 60 % weight saving with aluminum ball runner block (compared to the steel version)





## Germany Atlanta High Precision Rack

### Technical Datas:

- △ Case hardening steel according ATLANTA-Standard (29 xx xx0)
- △ Heat-treatable steel according ATLANTA-Standard (29 xx xx5)
- △ Teeth hardened with the ATLANTA high performance hardening process and ground
- △ Ground on all sides after hardening
- △ Total pitch error GTf 1000  $\leq$  0,036mm
- △ 19°31'42" helical and straight tooth system
- △ Module 2 to 4
- △ Length up to 2000mm
- △ Max. feed force per pinion contact up to 409,0 kN

# Bodor Nest



Bodor Nest

Bodor Nest supports the import of various graphics, generates NC code automatically, and optimizes the cutting sequence. Simple and fast system operation, efficient and accurate cutting instructions, improve plate utilization and reduce waste.



# Auxiliary gas low pressure alarm function

## **Auxiliary gas low pressure alarm function**

Providing real-time pressure detection, pushing abnormal information when pressure value is lower than optimal cutting effect and precision. Ensure the cutting performance, accuracy and timeliness of gas replacement.



# OPERATING SYSTEM DISPLAY

## Operating system display

### Touch screen

The first one to use UI design in the world which lets display respond to processing table, making processing more intuitive. Elegant curves precisely fit machine body. Strong waterproof breathable system creates the best space, making operation more convenient. Diamond cutting process and HD plasma tempered glass make screen more exquisite and comfortable to use.

### Double HD Cameras

Partitioning monitoring, no blind corner in machining region, to monitor every point at any time, intuitive machining, secure operation and controllable process.



# CAST ALUMINUM CROSSBEAM



## Cast aluminum crossbeam

Integral steel mold pressure casting, light, flexible and efficient

After artificial aging, solution treatment and finishing, crossbeam owns good integrity, rigidity, surface quality, toughness and ductility. Aluminum alloy's metal characteristics of light weight and strong rigidity are helpful to high speed movement in processing, and high flexibility is beneficial to high-speed cutting of various graphics based on high accuracy. Light crossbeam can give equipment a high operation speed, improving processing efficiency to ensure processing quality.



## Appearance design

Aesthetics was introduced to industrial ID, perfect combination of technology and aesthetics

Surrounded by baking paint silver decoration, coordinated with diamond cutting tempered glass and alpine white sheet metal design, the international design of the machine is accepted by global consumer groups.

The workplace is neat, orderly and space-saving.



## FUNCTIONS

The heavy bed makes the equipment more stable in working, the light crossbeam makes it work faster; perfect industrial design is more in line with man-machine engineering; high quality electrical software control system gives equipment higher cutting precision. The machine owns more comfortable operation, more stable performance, more durable quality, higher cutting efficiency and wider application scope.

### **Auxiliary feeding mechanism**

The promotion and demotion of subsidiary roller table reduces friction force between parts and working table, making loading and unloading more convenient.

### **Intelligent travel protection**

Automatically monitor operation range of crossbeam and cutting parts, keeping operation within machining range. Double guarantees of fixed limitation greatly improve equipment and personal safety, minimizing the using risks.

### **Automatic lubrication system**

Automatic lubrication system provides timing and ration lubricating oil for equipment to ensure its normal and high speed operation, and owns functions of abnormal alarm and liquid level alarm. The system greatly enhances cutting accuracy and effectively extends service life of transmission mechanism.

### **A new generation of safety following module**

Laser head keeping distance with work piece in cutting process can reduce collision risks. It will stop cutting when colliding plate. The safety following module reduces accident rate and improves cutting performance.

### **Intelligent alarm system**

The system will start full abnormal alarm and push it to the interface through control center when equipment is abnormal.

Finding equipment abnormal in advance and reducing hidden dangers can multiply improve the equipment troubleshooting efficiency.

Auxiliary gas low pressure alarm function

Providing real-time pressure detection, pushing abnormal information when pressure value is lower than optimal cutting effect and precision. Ensure the cutting performance, accuracy and timeliness of gas replacement.

# ADVANTAGES OF LASER CUTTING MACHINE

- 1, High speed, high efficiency and high performance
- 2, High precision, low cost and simple operation
- 3, Extensive processing materials, advanced processing technology and strong flexibility
- 4, Energy-saving and environmental protection, simple maintenance and low operating cost
- 5, High cost performance and standard after-service
- 6, Independently-developed software, simple operation, safety and stable performance
- 7, Reasonable framework, leading technology, superior performance, high speed operation and perfect functions
- 8, Reasonable structure, easy operation, laser source runs stable with low maintenance cost

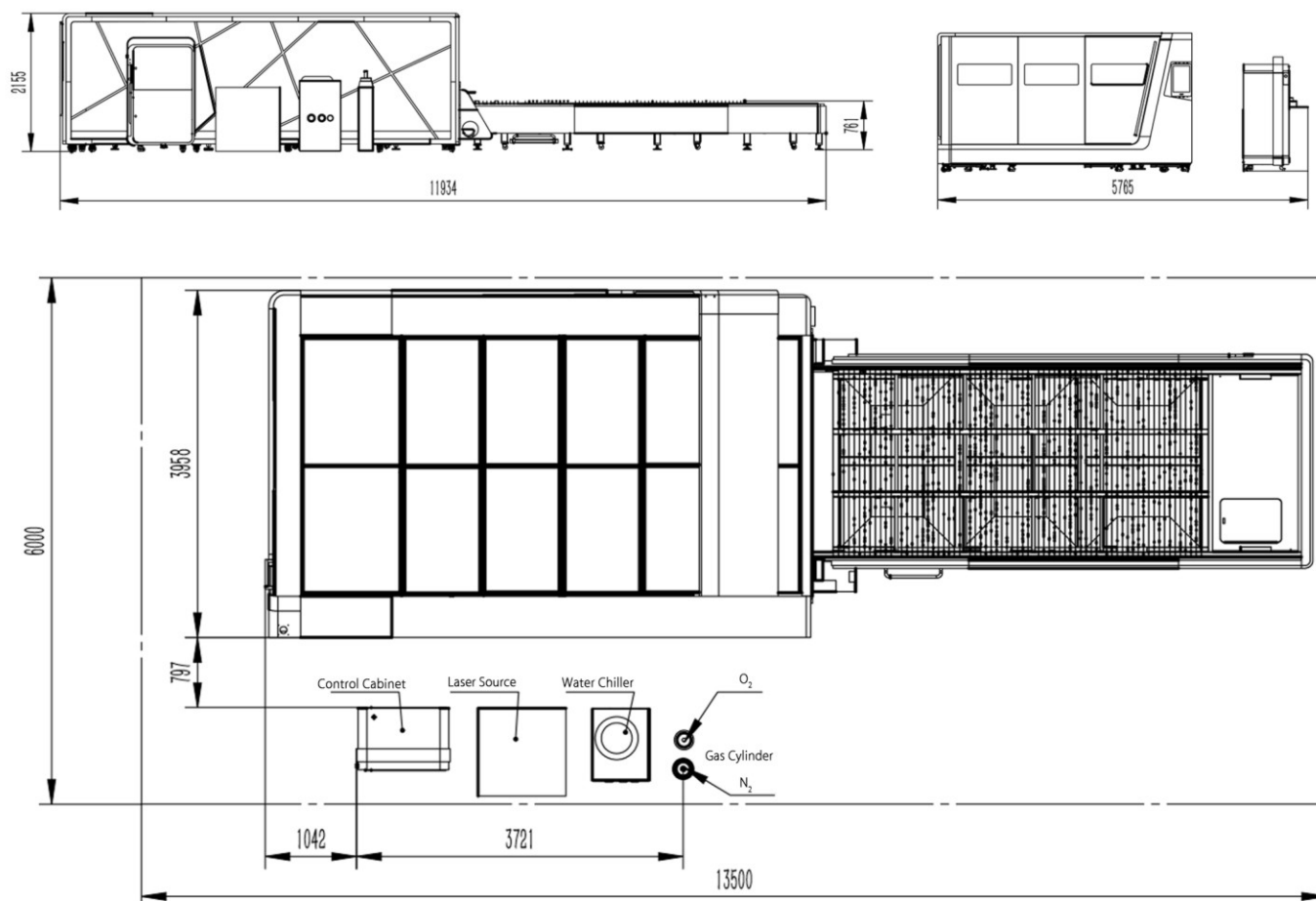
## The advantages of laser cutting compared with traditional cutting methods

1. High precision: Focusing accuracy is 0.05mm, repetition focusing accuracy is 0.02 mm
2. Narrow kerf: The laser beam is focused into a small spot, making the focus reach high power density, the material is quickly heated up to the gasification then evaporates to form holes. With the relative linear movement of the light beam to the material, the hole is continuously formed narrow gaps. Kerf width of the incision is usually 0.10 ~ 0.20mm.
3. Smooth section: Cutting surface without burrs, roughness of incision surface is generally controlled within Ra12.5.
4. Good cutting quality: Non contact cutting, cutting edge is less affected by heat, basically no thermal deformation of work piece, completely avoid down edge formed by material punching, in general, slit doesn't need secondary processing.
5. No damage to work piece: Laser cutting head won't contact surface of material to ensure no scratches to work piece.

## Advantages compared with other cutting methods

1. Wire cutting: High precision, difficult to perforate, low cutting speed. Low investment in equipment. The price range of a device is from tens of thousands to hundreds of thousands or so.
2. Laser cutting: High precision, cutting speed is influenced by plate thickness which is generally within 10 m / min. Not suitable for thick plate (only for 0~25mm plate), high investment in equipment is suitable for large batch processing.
3. Water jet cutting: High precision, low cutting speed. It is not suitable for large batch processing, and equipment investment is high.
4. Plasma cutting: High precision(The verticality of the product is not high), fast speed and consumption. Suitable for large batch processing, and equipment investment belongs to medium level.
5. Flame (oxygen) cutting: Accuracy(thermal deformation), low speed, suitable for large batch processing. Equipment investment is small and operation cost is cheap.
6. Punch: Difficult for processing various small-batch materials, suitable for few large batch processing. It is difficult to cut the thick plate. Equipment investment belongs to medium level.
7. Plate shearing machine: Not suitable for curvilinear cutting, straight line cutting is OK, difficult for thick plate cutting.

## S4020 • FLOOR PLAN



## PLACING REQUIREMENT

1. The whole machine should keep away from obstacles at least 1m.
2. The whole machine should be far away from the hypocenter.
3. The planeness of placing field should be less than 5mm.
4. Voltage fluctuation of the whole machine should be kept in  $\pm 5\%$ .

### 8000W FIBER LASER USING COST

Consumption		Assisted gas		
		Choosel:using air compressor Group as air supply to cutting stainless steel	Choosell:using O <sub>2</sub> cutting stainless steel	Chooselll:using N <sub>2</sub> cutting stainless steel
Power Consumption	Laser module	32kw	32kw	32kw
	Water Chiller Group	7.2kw	7.2kw	7.2kw
	Host Machine	10.5kw	10.5kw	10.5kw
	Dust Exhausting Equipment	3kw	3kw	3kw
Total Power		52.7kw	52.7kw	52.7kw
Average Power Consumption (Take 80% Cutting Efficiency)		52.7×80%=42.16kw	52.7×80%=42.16kw	52.7×80%=42.16kw
Gas Consumption		20×85%=17kw	About 20L/h( 1.45 \$)	About 50L/h(3.61 \$)
Quick-wear Part		0.43 \$/h	0.43 \$/h	0.43 \$/h
All Cost Reference 0.1 \$/kwh		4.216+1.7+0.43=6.3 \$/h	4.216+1.45+0.43=6.10 \$/h	4.216+3.61+0.43=8.26 \$/h

### 6000W FIBER LASER USING COST

Consumption		Assisted gas		
		Choosel:using air compressor Group as air supply to cutting stainless steel	Choosell:using O <sub>2</sub> cutting stainless steel	Chooselll:using N <sub>2</sub> cutting stainless steel
Power Consumption	Laser module	24kw	24kw	24kw
	Water Chiller Group	7.2kw	7.2kw	7.2kw
	Host Machine	10.5kw	10.5kw	10.5kw
	Dust Exhausting Equipment	3kw	3kw	3kw
Total Power		44.7kw	44.7kw	44.7kw
Average Power Consumption (Take 80% Cutting Efficiency)		44.7×80%=35.76kw	44.7×80%=35.76kw	44.7×80%=35.76kw
Gas Consumption		20×85%=17kw	About 20L/h( 1.45 \$)	About 50L/h(3.61 \$)
Quick-wear Part		0.43 \$/h	0.43 \$/h	0.43 \$/h
All Cost Reference 0.1 \$/kwh		3.576+1.7+0.43=5.71 \$/h	3.576+1.45+0.43=5.46 \$/h	3.576+3.61+0.43=7.62 \$/h

Above data is only for reference

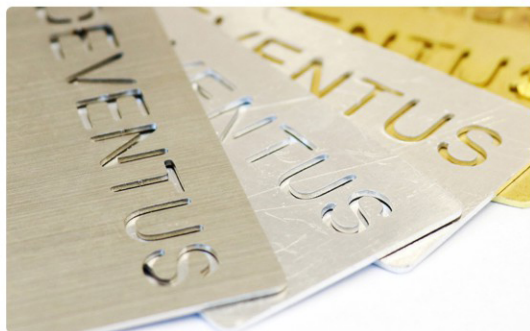
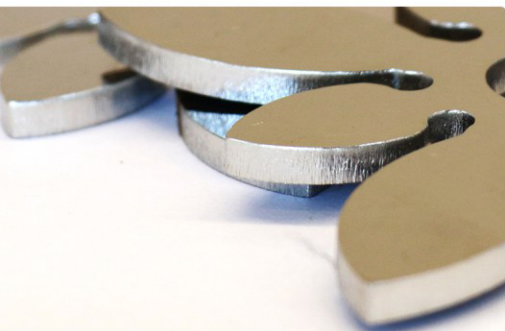
## Fiber Laser Cutting Process Parameters

		500W	1000W	1500W	2000W	3000W	4000W	6000W	8000W	10000W	12000W
Material	Thickness	speed m/min	speed m/min	speed m/min	speed m/min	speed m/min	speed m/min	speed m/min	speed m/min	speed m/min	speed m/min
Carbon steel ( Q235A )	1	7.0--9.0	8.0--10	15--26	24--30	30--40	33--43	35--44	40--50	42--52	45--55
	2	3.0--4.5	4.0--6.5	4.5--6.5	4.7--6.5	4.8--7.5	15--25	20--28.0	26--33	28--35	28--40
	3	1.8--3.0	2.4--3.0	2.6--4.0	3.0--4.8	3.3--5.0	7.0--12	13--17	15--19	16--25	18--30
	4	1.3--1.5	2.0--2.4	2.5--3.0	2.8--3.5	3.0--4.2	3.0--4.0	3.0--4.5	3.0--4.5	3.5--5.5	3.5--5.5
	5	0.9--1.1	1.5--2.0	2.0--2.5	2.2--3.0	2.6--3.5	2.7--3.6	3.0--4.2	3.0--4.2	3.3--4.5	3.3--4.8
	6	0.6--0.9	1.4--1.6	1.6--2.2	1.8--2.6	2.3--3.2	2.5--3.4	2.5--3.5	2.6--3.7	3.0--4.2	3.0--4.2
	8		0.8--1.2	1.0--1.4	1.2--1.8	1.8--2.6	2.0--3.0	2.2--3.2	2.3--3.5	2.5--3.5	2.5--3.5
	10		0.6--1.0	0.8--1.1	1.1--1.3	1.2--2.0	1.5--2.4	1.8--2.5	2--2.7	2.2--2.7	2.2--2.7
	12		0.5--0.8	0.7--1.0	0.9--1.2	1.0--1.6	1.2--1.8	1.2--2.0	1.5--2.1	1.2--2.1	1.2--2.1
	14			0.5--0.7	0.7--0.8	0.9--1.4	0.9--1.2	1.2--1.8	1.2--1.9	1.7--1.9	1.7--1.9
	16				0.6-0.7	0.7--1.0	0.8--1.0	0.8--1.3	0.8--1.5	0.9--1.7	0.9--1.7
	18				0.4--0.6	0.6--0.8	0.6--0.9	0.6--0.9	0.65--0.9	0.65--0.9	0.65--0.9
	20					0.5--0.8	0.5--0.8	0.5--0.8	0.6--0.9	0.6--0.9	0.6--0.9
	22						0.4--0.8	0.4--0.8	0.5--0.8	0.5--0.8	0.5--0.8
25							0.3--0.5	0.3--0.7	0.3--0.7	0.3--0.7	
Stainless steel ( 201 )	1	8.0--13	18--25	20--27	24--30	30--35	32--45	42--52	50--65	60--75	70--85
	2	2.4--5.0	5--7.5	8.0--12	9.0--15	13--21	16--28	20--33	30--40	40--55	50--66
	3	0.6--0.8	1.8--2.5	3.0--5.0	4.0--6.5	6.0--10	7.0--15	15--22	18--27	27--38	33--45
	4		1.2--1.3	1.5--2.4	3.0--4.5	4.0--6.0	5.0--8.0	10--15	12--16	18--25	22--32
	5		0.6--0.7	0.7--1.3	1.8-2.5	3.0--5.0	3.5--5.0	8.0--12	10--15	15--22	18--25
	6			0.7--1.0	1.2-2.0	2.0--4.0	2.5--4.5	4.8--8.0	6.0--10.0	12--15	15--21
	8				0.7-1.0	1.5--2.0	1.2--2.0	3.0--4.0	3.5--5.0	8.0--12.0	10--16
	10					0.6--0.8	0.8--1.2	1.6--2.5	2.0--2.7	6.0--8.0	8.0--12
	12					0.4--0.6	0.5--0.8	0.8--1.5	1.2--2.0	3.0--5.0	6.0--8.0
	14						0.4--0.6	0.6--0.8	1.2--1.8	1.8--3.0	3.0--5.0
	20							0.3--0.5	0.4--0.7	1.2--1.8	1.8--3.0
	25							0.2--0.4	0.3--0.5	0.6--0.7	1.2--1.8
30								0.2--0.4	0.5--0.6	0.6--0.7	
40									0.4--0.5	0.5--0.6	
Aluminum	1	4.0--5.5	6.0--10	10--20	15--25	25--38	35--45	42--55	48--65	60--75	70--85
	2	0.7--1.2	2.8--3.6	5.0--7.0	7--10	10--18	13--24	20--40	25--48	33--45	38--50
	3		0.7--1.5	2.0--4.0	4.0--6.0	6.5--8.0	7.0--13	15--25	20--33	25--35	30--40
	4			1.0--1.5	2.0--3.0	3.5--5.0	4.0--5.5	9.5--12	13--18	21--30	25--38
	5			0.7--1.0	1.2--1.8	2.5--3.5	3.0--4.5	5.0--8.0	9.0--12	13--20	15--25
	6				0.7--1.0	1.5--2.5	2.0--3.5	3.8--5.0	4.5--8.0	9.0--12	13--18
	8				0.6--0.8	0.7--1.0	0.9--1.6	2.0--2.5	4.0--5.5	4.5--8.0	9.0--12
	10					0.4--0.7	0.6--1.2	1.0--1.5	2.2--3.0	4.0--6.0	4.5--8.0
	12					0.3-0.45	0.4--0.6	0.8--1.0	1.5--1.8	2.2--3.0	4.0--6.0
	16						0.3--0.4	0.5--0.8	1.0--1.6	1.5--2.0	2.2--3.0
	20							0.5--0.7	0.7--1.0	1.0--1.6	1.5--2.0
	25							0.3--0.5	0.4--0.7	0.7--1.0	1.0--1.6
30								0.3--0.6	0.5--0.7	0.7--1.0	
Brass	1	4.0--5.5	6.0--10	8.0--13	10--16	20--35	25--35	35--45	40--55	65--75	75--85
	2	0.5--0.9	2.8--3.6	3.0--4.5	4.5--7.5	6.0--10	8.0--12	20--30	28--40	33--45	38--50
	3		0.5--1.0	1.5--2.5	2.5--4.0	4.0--6.0	5.0--8.0	12--18	20--30	25--40	30--50
	4			1.0--1.6	1.5--2.0	3.0-5.0	3.2--5.5	5.0--8.0	10--15	15--24	25--33
	5			0.5--0.7	0.9--1.2	1.5--2.0	2.0--3.0	4.5--6.0	6.0--9.0	9.0--15	15--24
	6				0.4--0.7	1.0--1.8	1.4--2.0	3.0--4.5	4.5--6.5	7.0--9.0	9.0--15
	8					0.5--0.7	0.7--1.2	1.6--2.2	2.4--4.0	4.5--6.5	7.0--9.0
	10						0.2--0.5	0.8--1.2	1.5--2.2	2.4--4.0	4.5--6.5
	12							0.2--0.4	0.8--1.2	1.5--2.2	2.4--4.0
	14								0.4--0.6	0.6--0.8	0.8--1.5
16											

The cutting parameters are only for oxygen and nitrogen

Above data is only for reference

For more information, please go to the website : [www.bodor.com](http://www.bodor.com)



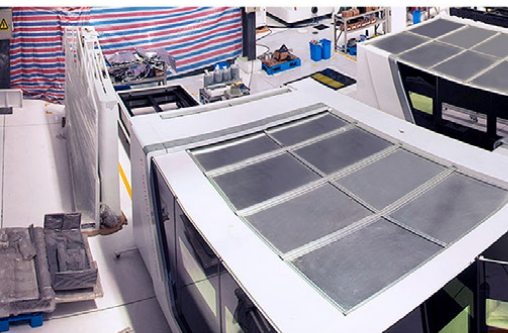
## Metal Samples

For more information, please go to the website : [www.bodor.com](http://www.bodor.com)



# OFFICE

For more information, please go to the website : [www.bodor.com](http://www.bodor.com)



# WORKSHOP

For more information, please go to the website : [www.bodor.com](http://www.bodor.com)