# Plasma cutting machine

# **USE'S MANUAL**



# **Plasma Cutting Machine Handbook**

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# Chapter 1 Packing List

Model	Name	Configuration	Quantity
		Plasma Generator 40A,60A120A for option	1set
		DSP Control Handle	1set
		Fastcam Software	1set
		Control Handle demon CD	1piece
	Attached parts:	Electrode(1.1,1.3)	5 sets
		Nozzle	5 piece
		Plasma Generatort	1piece
		Water Pump	1set
		Exhaust Fan	1 set
		Protective cap for nozzle	5 pieces
		Spanner	2 pieces
		Inner hexagon wrench	6 pieces
	Extra Parts		

## (Only for reference, each set of machine is different)

#### Chapter 2 LGK Plasma Generator Introductions

#### 2.1 Characteristics

LGK series of air plasma cutter is a new generated cutter with big power from our company. It has good characteristics as follows.

- The cutter is applied with thyristor rectified technique which is mature, reliable and efficient.
- Cutting current can be stepless adjustable and suitable for work pieces with different thickness.
- Outer and dynamic characteristics are significantly better than leakage-reactance typed cutter. Strike arc at a high success rate with stable cutting current. Arc is stiff with smooth incision.
- When cutting arc, it has function of ascending current slowly, which can effectively extend the life of wearing parts of cutting torch.
- The second secon
- The cutting current is very stable. Power voltage fluctuation does not affect cutting current.

#### 2.2 Usage

It is suitable for cutting kinds of metal materials like low carbon steel, alloy steel and non-ferrous metal and for the industries related to metal cutting, such as boiler pressure container manufacturing, chemical container manufacturing, industrial power station construction, metallurgy, chemicals, aviation and aerospace industry, automobiles and vehicle manufacturing, construction and so on.

Model Parameter	LGK-100	LGK-120	LGK-160	LGK-200	LGK-250
Shell shield rank			IP21S		
Rated input voltage		3	3~50Hz 380V		
Rated input capability	29.6KVA	36.2KVA	44KVA	KVA	86KVA
Rated output current	100A	120A	160A	200A	250A
Rated duty cycle	100%	100%	100%	100%	100%
Open circuit voltage	278VDC	290VDC	320VDC	320VDC	320VDC
Current adjusting range	40~100A	40~120A	40~160A	40~200A	50~250A
Insulation level	F	F	F	F	F
Quality cutting capability	0.3~22mm	0.3~25mm	1~35mm	1~45mm	1~60mm
Max cutting capability	40mm	45mm	55mm	65mm	80mm
Applying plasma air	Compressed air	Compressed air	Compressed air	Compressed air	Compressed air
Cooling mode	air	water	water	water	water
Arc striking method	Secondary arc striking with high voltage non-contact				
Dimension	900×440×690	900×440×690	960×520×740	960×520×740	1120×600×
(L×W×H)	(mm)	(mm)	(mm)	(mm)	790 (mm)
Weight	155Kg	171Kg	206Kg	225Kg	250Kg

#### 2.3Main technique parameters

#### 2.4 Panel and functions

#### Functions of front panel are shown as figure 3. Functions of back panel are shown as figure 4.

2.41 Digital voltmeter: Displaying cutting voltage

2.42 Digital amperemeter: Displaying cutting current

2.43 Cutting current adjusting knob: Adjusting cutting current

2.44 Slowly ascending current time adjusting knob: Adjusting ascending time of cutting current

2.45 Power indicator lamp: Indicating if the cutter is conducted.

2.46 Cutting indicator lamp: Indicating if cutting proceeds.

2.47 Air pressure indicator lamp: It is ON when the pressure of compressed air exceeds 0.3Mpa. It is OFF when the pressure is less than 0.2Mpa.

2.48 Water pressure indicator lamp: When connecting the water source of cooling torch, the lamp is ON. (The lamp is not available for LGK-100.)

2.49 Overload indicator lamp: It is ON when the cutter is overloaded (generally because cooling fan is damaged.)

2.410 Supply abnormality indicator lamp: It is ON when power source misses phase or it is less than 320VAC.



Figure 3 Front panel functions

2.411 Fuse: One of three-phase controlled power fuses

2.412 Fuse: The second one of three-phase controlled power fuses

2.413 Fuse: The third one of three-phase controlled power fuses

2.414 Gas control selection switch: When it turns on TEST, gas valve opens to test gas flux. When it turns on Cutting and cutting starts, the gas valve opens automatically.

2.415 Operation mode selection switch: When it turns on Non Self-lock, the torch switch should be pressed at the process of cutting. When it turns on Self-lock, press the torch switch and loosen it, the

cutting can proceed.

2.416 Cutting ground wire outlet: To connect cutting ground wire

2.417 Torch control outlet: To connect torch control signal line2.418 Torch arc striking terminal: To connect torch arc striking wire



Figure 4 back panel functions

2.419 Torch back-water connect: it is for connecting return water pipe of torch. (LGK-100 has not the connector.)

2.420 Output connector of gas and power: The current output connector is also water outlet which is used for connecting water cooling cable outlet of torch. (For LGK-100, the current output connector is also compressed gas outlet which is used for connecting gas cooling cable outlet of torch.)

- 2.421 Compressed air outlet: it is for connecting gas pipe connector. (It is not available for LGK-100.)
- 2.422 Cutting power supply cable: To connect switchboard of user
- 2.423 Grounding bolt: To connect ground wire prepared by user
- 2.424 Inhaler: To connect compressed gas
- 2.425 Control signal connector: To control automatic cutting equipment
- 2.426 Back-water tip: To connect back-water pipe of the user
- 2.427 Water inlet: To connect the power source of the use

#### 2.5Plasma gas conditions

- > Work pressure range:  $0.35MPa \sim 0.65MPa$
- ≻ Gas supply pipe voltage-withstand:  $\geq$ 1MPa

► Gas supply pipe internal dimension:  $\geq \Phi 8$ 

- ≻ Gas supply flux:  $\geq$ 180L/min
- > Filter water from gas and then put it into cutter.

#### 2.6The outer characteristic curve of the cutter is shown as figure 1.



Figure 1 Outer characteristic curve

## 2.7Trouble shooting

Trouble	Reasons	Solutions		
1. When the power is switched on, the lamp and the digital meter are not ON.	<ol> <li>Three-phase power misses phase</li> <li>Supply power is damaged</li> <li>Power control fuse is broken</li> </ol>	<ol> <li>Check three-phase power source</li> <li>Change power switch</li> <li>Change power control fuse</li> </ol>		
2. Supply abnormity indicator lamp is ON without arc striking	<ol> <li>Three-phase power misses phase</li> <li>Three-phase power is in low voltage.</li> </ol>	Check three-phase power source to ensure the supply voltage accords with the supply requirements.		
4. No arc striking or arc breaking during cutting. Overheat indicator lamp is ON	<ol> <li>The ambient temperature is too high.</li> <li>When cutting, cooling fan rotates slowly or do not rotate, so it cools badly</li> <li>Temperature relay is damaged.</li> </ol>	<ol> <li>Let the machine not work for a while</li> <li>Check fan power source or change cooling fan</li> <li>Change temperature relay</li> </ol>		
5. It cannot start. Gas pressure lamp is not ON.	<ol> <li>There is no gas pressure</li> <li>The pressure of gas supply is too low</li> </ol>	<ol> <li>Connect the gas source</li> <li>Adjust supply gas pressure</li> </ol>		
6. It cannot start. Water pressure lamp is not ON.	<ol> <li>Water cannot be supplied</li> <li>The pressure of water supply is too low</li> </ol>	<ol> <li>Connect the water source</li> <li>Increase the pressure of water supply</li> </ol>		
7. With no arc striking, cutting indicator lamp, gas pressure lamp and water pressure lamp are ON, and supply abnormity indicator lamp and overheat lamp are not ON.	<ol> <li>Cutting ground wire is not well connected.</li> <li>Gas pressure is too high.</li> <li>Torch electrode and nozzle are badly broken.</li> <li>Torch electrode and arc striking wire short-circuit, which cause the damage of torch.</li> </ol>	<ol> <li>Connect the cutting ground wire well</li> <li>Lower the pressure of gas supply</li> <li>Change the electrode and nozzle</li> <li>Change the torch</li> </ol>		
8. Cutting with low capacity	<ol> <li>Gas pressure is too high or too low.</li> <li>Work piece is too thick.</li> <li>Torch electrode and nozzle are broken.</li> <li>Plasma arc is not perpendicular to the work piece.</li> <li>Cutting is too fast or too slow.</li> </ol>	<ol> <li>Adjust gas pressure</li> <li>The thickness of work piece should be with the quality cutting range.</li> <li>Change electrode and nozzle</li> <li>Adjust torch angle</li> <li>Adjust cutting speed</li> </ol>		
9 . Electrode and nozzle is used for a short time	<ol> <li>Gas pressure is two low</li> <li>Nozzle is too near from the work piece. The distance is less than 2mm.</li> </ol>	<ol> <li>Adjust gas pressure</li> <li>The distance should be from 2mm to 5mm.</li> </ol>		

#### Chapter 3 Thermal ARC Plasma Generator Introductions

# Thermal Arc 500 Advangeed System Features

Dramatically illustrating Torch Standoff Control in action, the cover photograph is an actual time-exposure of the M200 Torch following the contour of the metal as it cuts. Small lights were attached to the torch to trace its motion. In the photograph at right, the torch is shown at the end of a cut.



#### Torch Standoff Control

The Thermal Arc 500 System can be fitted with a system that controls the torch standoff automatically by operating a customer supplied motorized torch lifter. The standoff control is available in two versions: one with "manual find height" and one with "automatic find height".

When the cut is started the torch automatically maintains the same height above the plate, moving up or down as necessary to compensate for any warpage or out of level condition of the plate. The standoff control is completely electronic — no bulky torch attachments. All torch movement can be controlled from one convenient operator station, or controlled by signals from NC or computer equipment.

#### Pilot Arc Starter

Thermal Arc's exclusive new pilot arc starter reduces the possibility of high frequency interference with electronic control equipment. The arc starter generates a pilot arc that consists of a series of pulses rather than the "conventional" high frequency stabilized pilot arc. The Thermal Arc 500 is the first plasma system to incorporate this important advance in machinemounted plasma cutting.

#### Thermal Arc 500 Operator Control Panel

The Thermal Arc 500 Cutting System features a small, lightweight Operator Control Panel for mounting at a convenient location on any shape-cutting machine. It is available as a self-enclosed unit or without enclosure, for mounting with the cutting machine controls. The Control Panel is tailored for remote control operations, containing all functions necessary for system operation: AC POWER light, system READY light,

ON/OFF switch, CURRENT ADJUST knob, DC ammeter, START and STOP buttons, NORMAL/ SOFT START/PIERCE and RUN/SET/PURGE switches. The Standoff Control panel is in the lower half of the Operator Control Panel.





#### **3.2 Mainly Components**



#### Reliable, Heavy-Duty Thermal Arc 500 **Power Supply**

The Thermal Arc 500 Power Supply is custom-designed for production cutting ap-plications. With current continuously varia-ble between 150 and 500 amperes, it provides ample cutting capacity for a variety of

thicknesses — up to a maximum of 2 inches. The Thermal Arc 500 power supply has a maximum rated output of 500 AMPS at 200 volts DC. Two Thermal Arc power supplies can be connected in parallel to obtain 1000 AMPS and the capability of cutting up to 4 inches thick.

The power factor of the 500 is over 85%. This results in reduced power costs.

The output amperage may be manually controlled by a dial on the remote Operator Control Panel or by signals from NC or com-

Control Panel or by signals from NC or com-puter equipment. The Thermal Arc 500 system control cir-cuitry, including the Standoff Control, is in the power supply. A feedback circuit stabi-lizes the cutting current against fluctua-tions in cutting speed, material thickness and primary input voltage.

The Thermal Arc 500 power supply can be set for automatic restart of the pilot arc if desired, permitting high speed interrupted cuts on material such as grating, expanded metal, or screens.

# **Thermal Arc** 500 System Components

#### Durable, Versatile M200 Torch

The M200 torch is specifically designed for heavy-duty, machine-mounted produc-tion cutting. Its exclusive Dual Flow® design permits use of a wide variety of plasma and secondary gases to obtain optimum cut quality on different materials. CO<sub>2</sub>, water, compressed air, nitrogen or argon/hydro-

gen can be used as the secondary gas. Dual Flow® is unique to Thermal Arc. With dual flow, the secondary gas surrounds the plasma arc, assisting in blowing molten metal out of the cut. Fast, clean, cuts result. The secondary gas also cools the front end of the torch, improves operating efficiency, prolongs consumable parts life and reduces buildup of spatter on the front end of the torch.

torch. With gas as a secondary, the M200 is ca-pable of cutting up to 4" (100mm) or pierc-ing up to 2" (50 mm). With water-shield (wa-ter as a secondary), production cutting ca-pacity is up to 3" (76 mm) thick and piercing up to 1.5" (38 mm). The M200 design affords easy assembly with no special tools required.



#### **3.4 Cutting speed**



#### Supply Console

The supply console is a separate cabinet for the gas and water connections and pow-er manifolding. The front panel has plasma and secondary gas pressure gauges, a cool-ant gauge, and water shield flowmeter. Torch leads and arc starter cable connec-tions are located on a bulkhead inside the supply console. The small, lightweight supply console is normally mounted on the cut-ting machine to minimize torch lead length.



#### HE200 Coolant Recirculator

The use of a closed loop coolant recircula-tor is an important feature of the system. There is no discharge of waste water and improved cooling of the torch greatly adds to parts life.

The HE200 recirculator features rustresistant construction throughout, a turbine pump, adjustable pressure and reusable fil-ter screen. It also includes a deionizer to prevent corrosion.



# **Thermal Arc 500** System **Cutting Speeds**

	MATERIAL		CUTTING SPEED MINIMUM SPEED	(INCHES PER MAXIMUM SPEED	MINUTE)
	THICKNESS AND TYPE	CURRENT* (AMPERES)	ACCEPTABLE QUALITY	ACCEPTABLE QUALITY	BEST
1⁄4"	Stainless Steel Mild Steel Aluminum	250	80 80 50	250 200 250	140 100 135
1/4 ''	Stainless Steel Mild Steel Aluminum	500	use 250 amperes	I I I	250 150 250
1⁄2"	Stainless Steel Mild Steel Aluminum	250	40 40 25	125 80 135	85 60 100
1⁄2"	Stainless Steel Mild Steel Aluminum	500	use 250 amperes	125 1	150 75 180
3/4"	Stainless Steel Mild Steel Aluminum	500	75 50 75	125 75 140	90 55 110
1"	Stainless Steel Mild Steel Aluminum	500	50 30 60	80 50 100	60 35 80
1½"	Stainless Steel Mild Steel Aluminum	500	30 15 40	50 30 60	40 20 50
2"	Stainless Steel Mild Steel Aluminum	500	20 15 25	30 25 45	25 15 35
		TWO 50	00 POWER SUPPL	IES	
/2"	Stainless Steel Mild Steel Aluminum	750	use 250 amperes	1 1 1	180 140 200
3/4"	Stainless Steel Mild Steel Aluminum	750		150 95 180	120 75 160
1"	Stainless Steel Mild Steel Aluminum	750		100 65 130	80 50 100
1 1⁄2 ''	Stainless Steel Mild Steel Aluminum	750		60 40 100	50 30 80
2"	Stainless Steel Mild Steel Aluminum	1000		65 35 75	50 30 60
21/2"	Stainless Steel	1000		50 70	35 55
	Stainless Steel	-		30	20
3"	Aluminum	1000		60	40
	Stainless Steel	1000			10
4"	Aluminum	1000			20

These are typical conditions for the current shown. Higher or lower current may be used with

corresponding adjustment of speeds.

‡ Exceeds maximum speed of most motorized torch carriers.

The charts above represent typical cutting speeds for various types and thick-nesses of material using one and two power supplies. Nitrogen was used as the plasma gas and carbon dioxide or water as the secondary for cutting up to 3 inches hick. A mixture of 65% argon and 35% hydrogen was used as the secondary gas and nitrogen as the plasma gas for material over 3 inches thick.

This information represents our best judgment but Thermal Dynamics Corporation assumes no liability for its use.

#### **3.5 Mainly Specifications**

# Thermal Arc 500 System Specifications

#### Thermal Arc 500 **Power Supply**

Rated Output: 500 amperes at 200 volts

Current Range: 150 amperes to 500 amperes at 200 volts Input: 3 phase AC-50/60 Hz. 208/230/460 volts\* 400/360/180 amperes Power factor — over 85%

Dimensions: Length: Width: Height: Weight:

#### Operator **Control Panel**

Dimensions: Width: Height: Depth: Weight:

8¼" (21 cm.) 9-5/8" (22 cm.) 5" (12.7 cm.) 10 lbs. (4.5 kg.)

42" (107 cm.) 32" (81 cm.) 45" (114 cm.)

1875 lbs. (841.3 kg.)

#### Standoff Control

Uses 115 VAC from power supply Relay contacts or 120 Dimensions:

#### Supply

Dimensions: Length: Width: Height: Weight:

Power:

Output:

Weight:

voits AC	
Control Panel Uni	t:
7"x4"x31/2"	
(18 cm. x 10 cm.	x 9 cm.)
Electronics locate	d in
power supply	
2 lbs. (.9 kg.)	
Concolo	
Console	

Optional HI-Flow Water Shield

To reduce smoke and fumes, noise and arc glare, Thermal Arc's HI-Flow Water Shield is recommended. The process produces a high flow of shielding water around the plasma cutting arc on the outside of the torch. A complete assembly consists of a water shield ring for installation on the torch a sumly hose and a

on the torch, a supply hose, and a pump assembly with filter. The water is recirculated from a user-supplied water table.

19" (48 cm.) 16-5/8" (42 cm.) 9¾" (25 cm.) 50 lbs. (22.7 kg.)

# M200 Torch

Current Rating:	1000 Amperes maximum — General Purpose 750 Amperes maximum — Water Shield DC Straight Polarity
Gas — Plasma:	Nitrogen: 140 SCFH (66 1pm) maximum
— Secondary:	Carbon Dioxide: 350 SCFI (165 1pm) maximum
or:	Water: 12 GPH (56 1ph)

#### **HE200 Coolant Recirculator**

Pump capacity: Capacity: Input power:

Dimensions:

5.2 GPM (23.6 1pm) 80,000 BTU/hr 230 V. 60 Hz. three phase 5.5 amps\* 460 V. 60 Hz. three phase 2.75 amps\* phase 2.75 amps" 38.5" (98 cm.) wide 28" (71 cm.) deep 28" (71 cm.) high 28" 28" Shipping weight: 263 lbs. (119.4 kg.)

\*User specified input power characteristics optional



Thermal Dynamics Corporation, specializing in plasma cutting and welding equipment, manufactures a full line of Thermal Arc plasma products designed for a wide variety of applications.



)ynamics hermal

82 Benning Drive West Lebanon, N.H. 03784 603/298-5711 Catalog no.0-0351

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#### Chapter 4 Machine Installation

Thank you very much for your right choice.

# Safety

Plasma Cutting Machine are designed and built with safety consideration.

However, proper installing and operating the machine can increase your safety.

DO NOT INSTALL, OPERATE OR REPAIR THIS EQUIPMENT CASUALLY WITHOUT READING THIS MANUAL THROUGHOUT.



Attention:

\*Before connect all the lines, please check all the switches in Power off position

\*Please check there is connector for 380V and 220V in your place.

1. Connect Lines



Photo 1.-Machine electric parts connecting



Photo 2.—Plasma Power connect



Photo 3- Material holder



Attention:

\* Ground function. Must touch with material when working

\* This holder can put any place of the material.

\*During working process, Do Not touch this holder.



Photo 4—Air compressor power connect



Photo 5-Air compressor connector with plasma power

Power on Air pump by air pressure 0.8 Mpa, Press Control panel button "Home" to test the machine come back home in normal position.



Photo 6- Air compressor connect with plasma power, 7-Water Pump connect with machine pipe



Photo 6- Air compressor connect with plasma power, 7-Water Pump connect with

#### machine pipe



Photo 9 -- Open Red and Green

Buttons on panel are as follows:



## **2** Control Handle Function

Button	Function
X+ 1 ▲	Positive movement of X axis, Menu upward, figure 1 inputting
Y+ 2	Positive movement of Y axis, accelerate process speed, figure 2 inputting, different property selecting in Menu
$\left[\begin{array}{c} Z+\\ 3\end{array}\right]$	Positive movement of Z axis, figure 3 inputting, rise spindle speed in process
$\left[ \begin{array}{c} XY-0\\4 \end{array}  ight]$	Working origin of X axis and Y axis setting, figure 4 inputting
X− 5 ▼	Negative movement of X axis; Menu downward, figure 5 inputting
Y− 6 ▽	Negative movement of Y axis; slowdown process speed; figure 6 inputting different property selecting in Menu
$\begin{bmatrix} Z-\\ 7 \end{bmatrix}$	Negative movement of Z axis, figure 7 inputting, spindle speed adjusting in process
Z- 0 8	Z axis origin setting ; figure 8 inputting
回零 HOME 9	Axes home to machine tool origin, figure 9 inputting
高速/低速 HIGH/LOW O	Manual moving mode, high speed or low speed selection, figure 0 inputting
轴启/轴停 ON/OFF	Manual control ARC start and stop
菜单 MENU 一	Menu setting entering, negative symbol inputting, multi process state checking,
归零 ORIGIN 确定 OK	All axes go working piece origin: confirm of motions /inputting/operating
手动模式 MODE	Manual move, continue, step and distance modes selection
运行/暂停 RUN/PAUSE 删除 DELETE	Search files/Inputted words delete
停止 STOP 取消 CANCEL	Stop working files

# **Chapter 5 Parameters Adjustment for Control Handle**

Name			D a t a		
	1	Equivalent Pulse/mm	X: 20.30 Y: 54.35/61.4 Z: 200/640		
Machina Satur	2	Table Size	X: 1300.00 Y: 2500.00 Z: 120.00		
Machine Setup	3	Motor Direction	X:-Dir Y:-Dir Z:-Dir		
	4	Home Setup	Home Speed:X:3000.00         Y:3000.00         Z:1800.00           Set Home Direction: X:-Dir Y:-Dir         Z: +Dir		
		Linear Accl	Linear Accel: unit mm/sec 2 1600		
		Curve Accl	Curve Accel: mm/second 2 2000		
		Process Speed	No need to change		
AUTO PRO SETUP		Travel Speed	No need to change		
		Z Up Height	Z Up Height unit mm 50.000		
		Arc Delay	Arc Delay,unitm/s:500 It can be changed according to the different materials.		

## Chapter 6 Adjustment

During work, there need adjust according different material.

First step : Adjusting Air Pressure



Photo 10. Air pressure adjusting



Attention:

\*Need pull button up then adjusting. When finish, please put down this button.

\*High thickness material need higher air pressure

Step 1.Power on Plasma power

Step 2.Press the button into Check Air(Photo 11th)

Step 3.Adjusting Air pressure on 0.5Mpa

Step 4. Press the button into INCISE (Photo 11) and start to work

## Second Step: Adjusting Current according to different



Photo 11--Current Adjusting

- Step 1.Power on Plasma power
- Step 2.Press the button into Incise
- Step 3.Adjusting current( See attachment suggestion)



Attention:

\*Adjusting current when working accourding to material.

\*Data setting is on the basic of material thickness



**Operation:** 

After adjusting, now let's start to operate.

Firstly, move plasma head to left bottom of working piece



# Chapter 7 Maintenance

#### **Change the Electrode**



Photo 12—Pull down the head of water pipe from plasma head



\*Press water pipe head then pull out.

Photo 13—Loosen yellow head





Photo 14—Loosen Big electrode by spanner.



Photo 15—Loosen small electrode by spanner then put it out by hand.



\*Direction same as Big electrode.

#### Other point need pay attention:

- 1. Put material flat before working
- 2. Cleaning Rail and insert oil before work off
- 3. Power off when change Nozzle and electrode
- 4. Fulfill water into water pump during work process
- 5. Adopt Pure water to keep electromagnetic valve in long life time
- 6. Check water pump in working process (Water out) before working.
- 7. Operator DO NOT leave during work process
- 8. Big water tank for water pump.
- 9. After changing nozzle and electrode, put water pipe(Photo 12) lower than Nozzle
   0.5-0.7mm

11.If plasma head do not move up when working, please use control panel make touch up then power off. Press button "RUN/ PAUSE".

# Attachment

Material Name	Thickness mm	Current Am	Air Pressure Mpa	Speed (M/Min)
	0.3	20	0.6	4.5
	0.6	25	0.5	4
Steel	1.0	40	0.6	5
	1.5	50	0.6	4
	2.0	55	0.65	3.5
	3.0	70	0.65	3
Titanium	0.5	20	0.5	5
	0.8	25	0.5	5
Steel	1.0	30	0.55	4.8
	1.5	40	0.6	4.5