

# Plasma Powder Overlay Welding Device

Overlay welding of various high-hardness metals is possible

## Feature

- Overlay welding of **hard materials that are difficult to form** into ordinary welding wires or **special metals** is possible
- By individually controlling the heat source and filler material (powder), it is **easy to control the amount of dilution and extra overlay**
- Supports a **wide range** of small to large **wall thicknesses**

The plasma powder overlay welding method uses plasma arc as the heat source and powder as the filler metal.

### Main features

#### The cladding is powdered.

Overlay welding of **hard materials** that are difficult to form into welding wires or **special metals** is possible.

#### Independently control heat source and filler metal

By individually controlling the heat source and welding condition of filler metal (powder), the following advantages can be obtained.

##### •Controllable penetration

Dilution: **1/3** to **1/10** of the extra overlay

##### •Wide bead shape area

Thickness: **0.5–6 mm**

Bead width: **5–50 mm**

##### •Easy to control the amount of welding

Maximum overlay: **4.5 kg/h**

#### Overlaying in inert gas

By welding in inert gas, there is no generation of slag or pore defects, and **high-quality overlay welding** is possible.

In addition, since **the overlaid surface is finished smoothly**, the amount of excess overlaying can be reduced, **saving materials** and reducing **post-processing costs**.

#### Long-term stable welding

The extremely high heat concentration arc of plasma welding enables stable welding for long periods of time.

Consumption of electrodes is relatively low, making it ideal for automatic welding in combination with robots and jig devices.

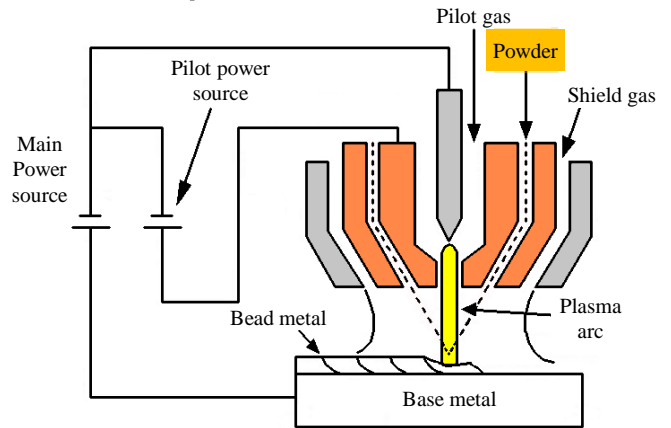
#### Metallurgical fusion different from thermal spraying

The overlaid metal is fused with the base metal and is more **resistant to peeling** than thermal spraying.

#### Equipment is 100% domestic

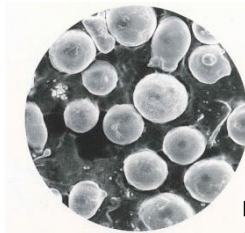
Powder equipment is manufactured overseas in many cases, but our equipment made in Japan is easier to maintain than overseas products, and quick service and response are possible.

### Principal



As shown in the figure above, powder is directly fed into the plasma arc, and the powder is melted and transferred to the pool to form overlaid metal.

### Applicable powder



Particle size 100–250  $\mu\text{m}$   
•(150–60 mesh)  
Gas atomized, spherical powder  
Specific gravity equivalent to Co-Cr alloy

Example of powder

If you use powder other than that in the above conditions, please consult us before purchasing.

### Example of comparison with various overlay methods

	Filler metal	Deposition efficiency (kg/hr)	Dilution ratio (%)	Minimum overlay thickness (mm)
PTA	Powder	4.5	3~10	0.5
TIG	Wire/Rod	1	10~25	2.4
MIG	Wire	3.6	15~30	3.2
MMAW	Covered electrode	2	15~25	2.5
SAW	Wire (Band wire)	4 (2.8)	15~30	3.2
Oxy-fuel gas welding	Rod	1	1~3	0.8
Thermal spraying	Powder	2.5	0.1 or less	0.1

Peripheral equipment's

Welding machine / Chiller



Type	NW-150AH-V	NW-350AH-V
Current	5~150A	10~350A
Duty cycle	70%	
Chiller	NC-3500V	NC-5500V

- A highly stable plasma welding machine with a proven track record in mass production welding
- Welding conditions can be set digitally
- Communication with external computers, sequencers, etc. equipped as standard
- Features required for automatic welding
- Allows selection of models that match the intended use

Torch



Type	351PPH ※1		200PPH	106WH-P
Used current	Low	~100A	~200A	~110A
	Middle	~200A		
	High	~350A		

- Other torches are available for various purposes. (Please contact us.)

※1 351PPH is switched by replacing 3 types of insert tips (by replacing the chip base)

Powder feeder



Type	PH-3B	PH-3C
Capacity ℓ ※1	1.6~	0.45/1.2
Supply amount g/min ※2	5~80	5~40

- Stable supply of powder for a long time
- Structure for easy powder exchange (PH-3C)

※1 The capacity of the B type can be expanded. For C type, please choose the capacity.

※2 The indicated supply amount does not mean that it is controllable over the entire range

Example of welding for hard facing



Engine valve



Inner face of pipe  
(Use 200PPH)



Hard facing of clad steel



■ Examples of application

**Steel manufacturing**

Reduction roll, Guide roller, Table roller,  
Mill guide

**Automobile, Ship building**

Engine valve, Valve sheet, Turbine,  
Crane wheel

**Paper manufacturing**

Cutter, Screw, Printing roller

**Chemical industry**

Gate valve, Valve sheet,  
Injection machine cylinder, Screw

**Construction machinery, Oil refining**

Roller, Link, Bucket, Cutter tip,  
Drill collar

**Other**

Plunger, Mixer parts,  
Wire winding machine, Bit

■ Example of devices



**Dedicated machine**  
(valve powder overlaying device)

Specialized automatic welding equipment can be designed and manufactured to suit your workpiece shape. We can also prepare samples, so please contact us when you are considering powder overlay.




**Robot type**



**Manipulator type**

Please visit our company website from the QR code on the left about device configuration.



 <b>Safety precautions</b>	<ul style="list-style-type: none"><li>●Set this machine at places indoor where ventilation is possible and there are no combustibles.</li><li>●Before operating this machine, read the instruction manual carefully to ensure proper use.</li></ul>	
<div>Our company website    <a href="https://www.weld.nipponsteel.com/">https://www.weld.nipponsteel.com/</a></div> <div>Website of Plasma welding machinery unit    <a href="https://www.weld.nipponsteel.com/products/plasma/">https://www.weld.nipponsteel.com/products/plasma/</a></div>		Plasma welding machinery unit

Plasma welding machinery unit

6-1,Higashinarashino 7-chome,  
Narashino City, Chiba Pref.

275-0001 JAPAN    TEL: +81-47-479-4138

FAX: +81-47-479-2968