

EAF Carbon Injection Device

Supplier: Ningbo Ville Enterprise Co.,Ltd

Carbon injection device

Ville Electric



1. Function

This device can achieve injection of carbon into the furnace, effectively solving the defects caused by oxygen enriched operation. Reducing iron oxide in slag and improving steel recovery rate; Rapid slagging to realize submerged arc heating of foam slag.

The direct benefits can be summarized as follows:

- a). Reduce power consumption, reduce electrode consumption, shorten smelting time, shield effect of foam slag on electric arc, reduce heat radiation of furnace lining and furnace cover, and improve furnace life. Ultimately, reduce smelting costs.
- b). Replacing pig iron or adding carbon to electrodes, reducing electrode consumption and cost. This device can also be used for blowing other powders.



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2. Technical parameters

Medium	Dry compressed air or Nitrogen
Source pressure	>0.5Mpa
Consumption	400Nm ³ /h
Test pressure	0.6Mpa
Work pressure	0.3—0.35Mpa
Volume of tank	1.5m ³ -6m ³ (Customized)
Injection speed	20-80kg/min (Adjustable)
Carbon particle size	≤0.5-3mm
Humidity	<0.5%
Overall dimension	Based on capacity and volume



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3. Composition

Pressure tank, weighing unit, bracket, feed control valve group, exhaust unit, conveying unit (regulating valve, control valve), fluidized gas butterfly, gas source cabinet, local operation box, hose, etc



Pneumatic cabinet
气动控制柜

Pressurize dispenser
带压分配罐

Weighing system
称重系统

Electrical box 电气控制箱

Fluidization pads
流化锥桶

Shut-off valve 截止阀

4-20mA flow control valve
比例流量控制阀

Transport gas 输送气

Ejecting device 喷吹装置



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4. Pressure tank components

- ⚡ There is a feeding butterfly valve installed at the inlet, which has good sealing performance and is matched with the outlet valve of the silo to add material to the powder spraying tank.
- ⚡ There is an exhaust ball valve on the top of the tank. When the pressure inside the tank exceeds 3 bar, the exhaust ball valve will automatically open for exhaust and pressure relief according to the situation to ensure normal working pressure inside the tank.
- ⚡ A pressure transmitter is installed above the tank body to detect the pressure inside the tank and send the signal data to the controller. At the same time, it is also equipped with a stainless steel pressure gauge, which can directly observe the pressure inside the tank.
- ⚡ A spring type safety valve is installed above the powder spraying tank, which automatically opens when the pressure inside the tank reaches 5 bar, providing safety protection.
- ⚡ The bottom of the powder spraying tank is equipped with a fluidization device to loosen the upper part of the outlet inside the tank, prevent blockage and sedimentation, and also play a role in pressurizing the tank.
- ⚡ The outlet is a distributor. Composed of manual ball valves and pneumatic ball valves, the powder spraying pneumatic valve is a wear-resistant valve with a long service cycle due to the high wear characteristics of carbon powder under a certain pressure.

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5. Main equipment

Fluidized bed: The main function is to evenly discharge carbon powder at the bottom of the powder spraying tank according to actual needs, which is conducive to the spraying of carbon powder.



Weighing display system: mainly composed of sensors, junction boxes, weight transmitters, and displays. Using a pressure sensor, the amount of carbon powder in the powder spraying tank is displayed on-site and remotely, making it easy to calculate the usage of carbon powder and providing operators with powder adding information.



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5. Main equipment

Powder adding device:

It mainly consists of two pneumatic butterfly valves, one manual butterfly valve, and a throat. The universal electronic control system controls the action sequence of the valves to achieve powder adding operation.

Air circuit control system:

Considering the harsh on-site environment, the gas pipelines will be centrally installed in a sealed control box. The carrier gas valve station mainly consists of purge gas pipelines, fluidization pipelines, and instrument gas pipelines.

The purge gas pipeline provides carrier gas for powder injection. The blowing pipeline is composed of solenoid valve, pressure regulating valve, one-way valve, and rubber hose assembly.

The instrument gas pipeline mainly consists of a pressure regulating filter valve, a pressure gauge, a gas branching device, etc. The main intake pipe is equipped with an oil-water separator, which can effectively remove dust, water, and oil mist from the air source.



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5. Main equipment

On site control box:

The control box is sealed, and the panel is equipped with weighing instruments and operation buttons. Mainly used for on-site operations.

The control box panel can be designed and manufactured according to customer requirements to meet on-site operational needs.

The local control box PLC slave station of the carbon injection tank communicates with the industrial control computer in the operating room, which can visually display parameters such as carbon powder weight and powder spraying pressure, making it convenient to cooperate with process operation control.



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6. Advantage of device

Based on customer suggestions and after multiple innovations, it has the following characteristics:

- ⚡ The distributor is encapsulated in a separate steel frame for easy operation;
- ⚡ Automatic anti blocking system;
- ⚡ Independent pneumatic cabinet, optimizing the consumption of transportation air;
- ⚡ Low operating and maintenance costs;
- ⚡ Accurate tolerance of set points, fast and stable carbon flow rate;
- ⚡ Special valve for carbon powder, with high wear resistance, ensures the durability of the product and is easy to maintain.

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❑ Ceramic powder injection hose



❑ Bag dust removal fan



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- Storage bin and hopper



- Pressure tank



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Specification

Part	Spec.	Shape (Square-circular silo)	Mat. (carbon steel - Stainless steel)	Selection
Carbon powder storage tank and frame	PF-5-160m ³	S-C	C-S	Customized
Pressure tank	1-6m ³	C	Q345R	
Dust removal of carbon powder storage tank	D	S-C	C	
Pneumatic cabinet	PF-A-1/2	1. Single output; 2. Double output.		
Ceramic injection hose	DN50	2.5+8.5m (normal)		
Valve	V-1/2		1. Imported; 2. China make	
Control	E		Slave station	

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Example of supply list

S/N	Designation	Type	Qty	Price	Remark
1	Carbon injection tank				
1.1	Pressure tank	1.5m ³	1 set		Ville Electric
1.2	Weighing unit	2KN/pc.	3 sets		SCHENCK、METTLER TOLEDO
1.3	Wear-resistant ceramic tube	DN50 8.5m+2.5m	1 set		Ville Electric
1.4	Pressure transmitter	0- 10bar	3 sets		WIKA
1.5	Distribution unit	Match PID diagram	1 set		Ville Electric
1.6	Release valve	DN50	1 set		Ville Electric
1.7	Feed valve group	DN200	1 set		Ville Electric, AIR TORQUE make actuator
1.8	Flexible joint	DN200	1 set		Ville Electric
1.9	Valve under pressure tank	DN40	1 set		Ville Electric, AIR TORQUE make actuator
1.10	Adjusting valve	DN40	1 set		AIR TORQUE make actuator, SIEMENS make positioner
2	Pneumatic cabinet		1 set		
2.1	Protective cabinet	配套 PID 图	1 set		Ville Electric
2.2	Flowmeter	DN25-40m ³ /h	1 set		E+H, YOKOGAWA (EJA), ROSEMOUNT
2.3	Adjusting valve	DN25	1 set		ARCA, GULDE, KOSO
2.4	Filter	25um	1 set		
2.5	Pipeline	DN25	1 set		Ville Electric
3	Electrical control part		1 set		SIEMENS
3.1	Carbon injection cabinet	Profibus local cabinet	2 sets		Internal wiring and cabinet cables are in the form of aviation plugs

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Project site



Thanks!