



High Speed Vacuum Brazing Machine

PP-S

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Vacuum brazing machine is excellent for brazing between super-hard materials, tungsten carbide, ceramics and all kinds of diamonds. Also, it is very easy to braze at rapid speed.

* Materials: natural diamond, artificial diamonds such as PCD, PCBN, CVD, monocrystalline diamond etc.
* Substrate materials: tungsten carbide, steel, steel alloy, cermet, ceramic, etc.

The machine is **fully automatic** and once loaded, the brazing cycle time is approximately 30 minutes.

Benefits

Vacuum brazing method realizes a shorter construction period, work environment improvement, enhancement of strength due to degassing and reduction of distortion due to wholly heating. All levels of engineers can braze complex tools by using high speed vacuum brazing machine **with one simple touch**.



Advantages

- » No oxidation
- » Enhancement of strength
- » Reduction of distortion
- » Easy temperature control
- » Work environment improvement
- » Total cost efficiency

Technical Data

CPE	Power	380V 3P 5 wires or 220V 3P 4 wires
	CDA	Ø8 mm, 5 ~ 7 kg/cm ²
	Cooling Water	50 L/min, 19200 BTU/hr
Control System		
	PLC	One touch control integrated 10 programming recipes
	HMI	9"
Vacuum Chamber		
	Quartz Chamber	Quartz inner Ø 150 mm Quartz plate 285 x 140 mm H75 mm Max
Heating System		
	Heating Lamp	2 kw x 12 = 24 kw
	Heating Rate	800 °C /min
	Accuracy	±3 °C
	Maximum Operating Temperature	950 °C
Vacuum System		
	High Vacuum Pump	1100 L/sec, cold trap, ultra-high vacuum valve
	Rotary Pump	670 L/min
	Ultimate Vacuum Pressure	20 min < 9 x 10 ⁻⁶ torr
	Pumping Speed	5 min < 5 x 10 ⁻⁵ torr
Dimension		
	Main Frame	1400L x 880W x 1670H mm

Options:

- HMI multilanguage support
- Datalog collection
- Remote control and remote access
- Product traceability

Besides standard machines, we offer tailor-made solutions for vacuum brazing application.

Brazing Procedure of High Speed Vacuum Brazing Machine

- STEP 1**


After ultrasonic cleaning, apply the paste
- STEP 2**


Set diamond tip on the shank
- STEP 3**


Dry the workpiece in the drying oven
Temperature : 100 °C ~ 120 °C
Time: 10~20 min approximately
Atmosphere : Air
- STEP 4**


Shave extended paste off while necessary
- STEP 5**


Put into the high speed vacuum brazing machine
- STEP 6**


Complete brazing

What is vacuum brazing?

Vacuum brazing is a material joining technique that offers significant advantages: extremely clean, flux-free joints of high integrity and strength. The process can be expensive because it must be performed inside a vacuum chamber. Temperature uniformity is maintained on the workpiece when heating in a vacuum, greatly reducing residual stresses due to controlled heating and cooling cycles. This, in turn, can significantly improve the thermal and mechanical properties of the material.

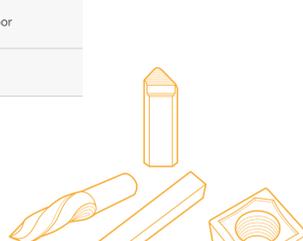
Vacuum brazing is often conducted in a vacuum chamber; this means that several joints can be made at once because the whole workpiece reaches the brazing temperature. The heat is transferred using radiation, as many other methods cannot be used in a vacuum.

Comparison

High Speed Vacuum Brazing V.S. Conventional Brazing

	High Speed Vacuum Brazing	Conventional Brazing
Usage	Brazing Natural diamond , CVD, PCD, PCBN and related materials onto tool body	Some limitations on substrate materials due to thermal coefficient
Brazing Temperature	Available up to 900 °C	Limit up to 750 °C
Applicable Material	PCD, PCBN, tungsten carbide: low temperature brazing PCBN, CVD, CBN, monocrystalline diamond, natural diamond: high temperature brazing	Only PCD and PCBN: low temperature
Capacity	Around 80pcs per hour, depending on the tool size	Max. 20pcs per hour
Brazing Quality	Automatic process, consistent quality and complete repeatability	Manual process, quality depending on worker's skill level
Additional Benefit	No flux and no extra cleaning needed No need for experienced labor. Operator can perform other jobs while machine is running Lower production cost No dangerous fume inhalation	Need flux and extra cleaning Need experienced labor Dangerous fumes

- No more variables of manual brazing, be free from labors' skill
- Guaranteed consistent brazing quality and tip retention
- Protects PCD/ PCBN/ CVD/ diamonds from oxidation and reduces graphitization
- 1 Machine = for all types of superabrasive cutting tool products
- Improves your brazing capacity and quality



1/ Comparison with Induction or Torch Brazing for ISO Inserts

	High Speed Vacuum Brazing	Induction or Torch Brazing
Brazing Temperature	Available up to 900 °C	Below 750 °C
Diamond Type	PCD, PCBN CVD, CBN, monocrystalline diamond, natural diamond	Only PCD and PCBN
Brazing Alloy	Liquid metal (paste): higher melting point (stable at high temperature machining)	Silver alloy : melting point between 600~700 °C
Capacity 1 (ISO inserts)	40~150pcs per hour depending on the insert size. The smaller the tool the more you can braze	Brazing one by one Manual process 15~20pcs per hour
Capacity 2 (reamers, PCD tipped drills)	10~30pcs per hour depending on size of drill and PCD tip	5pcs max (longer time due to cleaning, sanding, etc) Graphitizes PCD
Flux Cleaning	No flux, no need cleaning before and after brazing	Cleaning before and after brazing Sanding after brazing
Fixing	No need fixing. One time braze due to capillary action	Fixing is necessary. Operator must maintain pressure. Possible re-heating necessary

2/ Comparison with Vacuum Furnace Brazing for ISO Inserts

	High Speed Vacuum Brazing	Vacuum Furnace Brazing
Cycle time	1.5 hours	8~10 hours
Precision	No movement of tips because of rapid heating and cooling	Tips are moving in some cases due to long process time

3/ Comparison with Induction Brazing for Reamers (4 edges and above)

	High Speed Vacuum Brazing	Induction Brazing
Brazing Speed	No difference for more edges	Longer time for more edges
Staff	1 entry-level worker can perform other jobs while machine is running	At least 1 dedicated experienced worker
Brazing Quality and Yield Rate	Automatic process with one simple touch, consistent good quality and yield rate, even for more edges	Manual process, quality's yield rate depending on worker's skill level and will become worse if more edges