

GIGA 690

Multipurpose Plasma Batch System



Trusted Plasma Processing Expertise for Over 30 Years

Cleaning and activating semiconductor components during the manufacturing process is essential to ensure the performance and longevity of modern electronic products.

The GIGA 690 plasma system is a low pressure microwave plasma system specifically designed for chip packaging applications— particularly before die attach, wire bonding, flip-chip underfill, and encapsulation. Microwaves at 2.45 GHz are introduced into the vacuum chamber through a window, generating a mostly chemically reactive plasma. This process allows for **very fast and damage-free plasma treatment.**

PVA Metrology & Plasma Solutions, a subsidiary of PVA TePla AG, specializes in plasma processes and laser-based measurement techniques for the analysis of semiconductor, micromechanical and optoelectronic components. In combination with other areas of expertise at PVA TePla AG, we offer high-tech systems and comprehensive solutions for the production, optimization and analysis of various materials.



Over 500 tools in operation

Full flexible machine automation

The system can handle magazines of any size and type. The plasma cleaning effect is driven by chemical reactions of reactive plasma particles (radicals) that are directed through the substrate or wafer carriers. The system is easy to operate in both manual and automatic modes, and its highly user-friendly software complies with SEMI standards.

Batch versus Single Strip



Plasma processing distinguishes between batch and single treatment. Treating products in a batch (magazine) allows the use of simpler tooling. Single product treatment provides a more uniform process result.

Applications

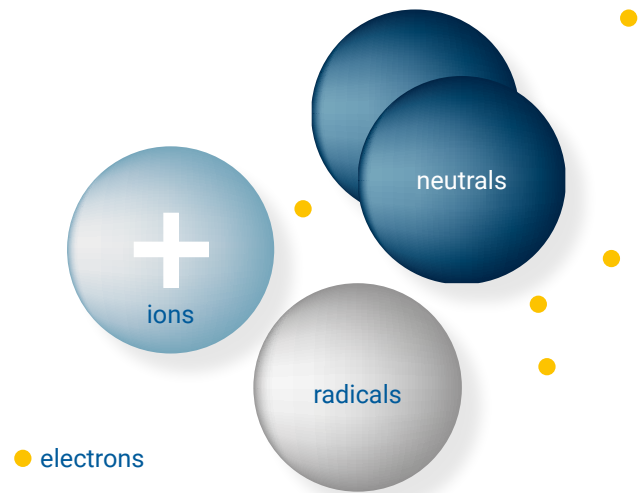
- Activation before molding
- Activation before underfill
- Cleaning before wire bond
- Surface activation before painting and coating



The plasma process

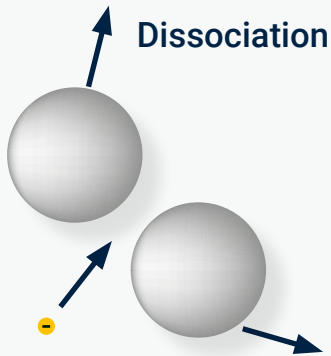
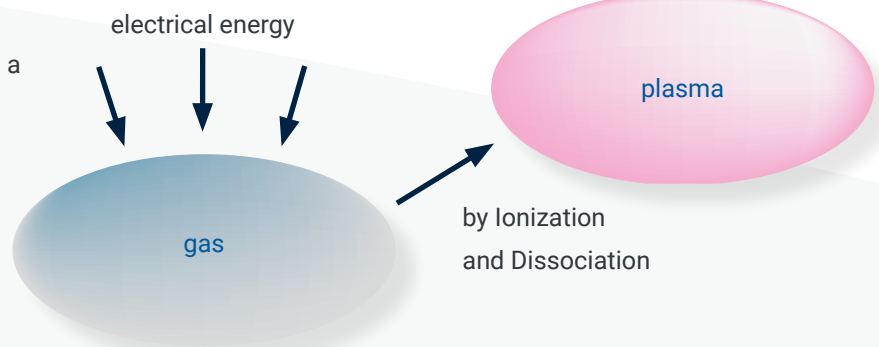
Components of the plasma

Plasma is a balanced system of neutrals, electrons, radicals, and ions. Free electrons maintain the plasma by colliding with neutral gas particles, transferring energy through dissociation and ionization.

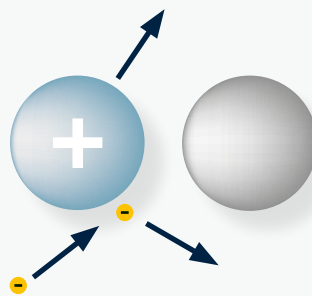


Plasma Generation

Transfer of a neutral gas into a plasma as a basis.



Dissociation



Ionization

Plasma Processes

In plasma, free radicals from dissociation and ions from ionization act as active agents. Accelerated by electric fields, ions clean and activate surfaces by physical impact, while radicals enable chemical treatment by oxidation, removal of organic contaminants, and attachment of molecular groups for surface activation.

Microwave Plasma

Microwave excited plasma is not quasi-static, but is based on wave propagation. As a result, there is no electric field bias and charged particles are not accelerated, making microwave plasma treatment diffuse rather than directional. This key advantage allows it to effectively penetrate even the smallest crevices.

Applications

The GIGA 690 plasma system is a versatile, high-performance treatment tool that is used in a wide range of industries. In semiconductor manufacturing, it enables essential back-end processes such as surface activation prior to molding and bond pad cleaning. Beyond semiconductors, plasma surface treatment is an integral part of industries such as fine mechanics, jewelry, watchmaking, coating and painting.

Equipped with a sophisticated plasma chamber and advanced features, the GIGA 690 ensures **efficient and adaptable processing** for a wide range of products.

Available in GHz and RF variants

Door Types



Manual hinge type



Manual drawer type

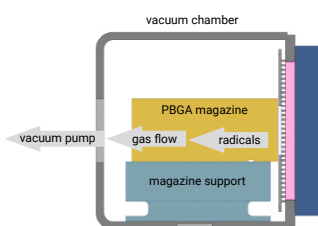


Motorized slide type



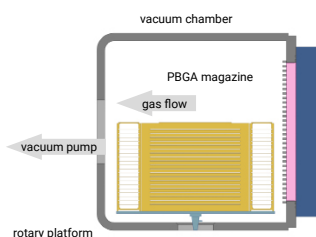
Motorized drawer type

Downstream mode



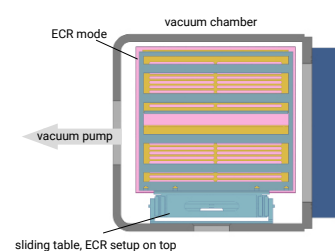
- For closed magazines
- Remote plasma generation
- Magazines drive pressure difference
- Top to down penetration of radicals

Rotary table mode



- For slotted magazines
- Remote plasma generation
- Magazine rotation improves uniformity

ECR mode



- For slotted magazines
- Direct plasma generation
- Plasma generation directly in the magazines
- Better uniformity through direct plasma

Fully flexible machine automation

Specifications



Process chamber	Material:	aluminum
	Volume:	64 liter (optional 91 liter)
	Inner Dimension (H x W x D):	400 x 400 x 400 mm (optional 450 x 450 x 450 mm)
	Chamber door:	in front (different versions available)
Plasma generation and gas flow	Choice of GHz or RF plasma generation	
	No electrodes inside chamber for GHz / Electrodes inside chamber for RF	
	Gas flow variable, depending on application	
	Plasma generation on top of chamber. Exhaust on bottom of chamber.	
Vacuum system	Vacuum connection:	DN 63 ISO K
	Ultimate pressure:	< 0,01 mbar
	Process pressure:	approx. 0,1 - 1,5 mbar
	Vacuum gauge:	range 0,01 to 10 mbar
	Venting:	solenoid vent valve
Gas channels	2 separate mass flow controllers, calibrated according to process requirements.	
	All solenoid valves in stainless steel, max. 4 gas channels (optional)	
Microwave plasma generator	Continuously adjustable magnetron, air cooled	
	Frequency:	2.45 GHz
	Output power:	0- 1000 Watts – pulse free operation
Control Hardware	PC based system controller:	10.4" touch-screen
		Graphical user interface
		Ethernet, USB, RS232 interface
		Light tower system status r/y/g

<p>Process chamber</p>	<p>Real-time operating system Windows 10 IoT</p> <p>Manual and automatic system control via user interface</p> <p>User password protection configurable</p> <p>Multiple recipe storage</p> <p>Process recipe with 1-10 steps each</p> <p>System with self test routine</p> <p>Warnings error message dialog</p> <p>Software and hardware safety interlocks</p> <p>Optical plasma intensity monitoring</p> <p>Real-time monitoring of process data</p> <p>Export of process data</p>
<p>Safety</p>	<p>2 Emergency off push buttons</p> <p>Vacuum interlock interrupts microwave</p> <p>Inductive sensor in the door</p> <p>EMC-safe and microwave-safe viewing window</p> <p>User password protection</p>
<p>Supplies (System)</p>	<p>Power: different voltages and frequencies available</p> <p>Process gas: ¼" Swagelok-connector, input pressure 1 - 2 bar</p> <p>Compressed air: connector 6 mm Festo, input pressure 4 - 6 bar, oil free</p>
<p>Dimensions</p>	<p>Width: 1050 mm</p> <p>Height: 1720 mm (1950 mm incl. light tower)</p> <p>Depth: 815 mm</p> <p>Weight: 195 kg (445 kg incl. vacuum pump)</p>

Optional Features - Hardware finetuning for specific process requirements

- A comprehensive selection of vacuum pumps, from oil-sealed to dry models, with varying pumping capacities.
- SECS-GEM host communication for seamless integration into production environments.
- Hydrogen process gas option, featuring a safety-certified gas box and an integrated hydrogen generator.
- Customizable product carriers, including multiple magazine sizes, wafer treatment configurations, and specialized part carriers.
- Chemraz sealing for fluorine processes, enhancing organic removal efficiency.

Our promise

We combine deep consulting expertise in plasma, solution-oriented thinking, and the highest quality standards across all technology fields. This results in future-proof high-tech systems with industry-leading process technology and top-tier quality – Made in Germany.

We support our customers throughout the entire project with expert, personalized service – from the initial consultation to reliable after-sales support. Our customers value our flexibility, backed by the financial strength of the publicly listed PVA TePla AG.

This is how we consistently fulfill our promise: the best system technology for even better materials.



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