Selection of Substrate Carrier Plates for Rapid Thermal Annealing Furnaces

Expensive does not equal better!

Semiconductor Rapid Thermal Processor Technical Exchange

2025.04.09

Disclaimer

This material is compiled by Allwin21 based on over 40 years of experience in the field of Rapid Thermal Annealing (RTP) furnaces and is intended solely for technical exchange and industry reference. The views and information presented are based on the company's professional judgment and fundamental understanding and are not aimed at any specific company or product. Please do not take them personally. We have made every effort to ensure the accuracy and reasonableness of the content; however, due to limitations in understanding and expression, there may still be inaccuracies or errors. Any consequences arising from the use of this material (including but not limited to business decisions, technical choices, procurement actions, etc.) are at the user's own risk and responsibility. Allwin21 assumes no direct or indirect liability.

Address: 220 Cochrane Circle, Morgan Hill,CA95037.
Website: www.allwin21.com Email: sales@allwin21.com

Allwin21 Corp.

Selection of Carrier Plates for Rapid Thermal Annealing Furnaces

Type	Material	Configuration	Sizes	RAMP SPEED	Cost	Load/Unload	Remark
Susceptor	Graphite with SiC CVD Coating	Base + Cover	2",3",4X2",4X3",5X3", 4X4"	**1–50°C/s is widely accepted in the industry.** The larger the wafer size and the thicker the total carrier plus sample stack, the **slower** the heating rate should be. As long as the **RAMP rate** meets process requirements, **slower is better**—to reduce the risk of carrier cracking. Avoid the temptation to pursue the fastest possible RAMP speed—**the risks and costs are extremely high**.	Not cheap	Manual	Mainstream applications use qualified suppliers, with strict requirements for material and coating quality. The process performance is good, with low contamination and 40 years of extensive validation. Regular replacement is required, as prolonged high-temperature use can cause warping, and the silicon carbide coating may peel off—customers need to optimize high-temperature processes.
		Base + Cover	4",5",6",8"		Not cheap	Manual / Automatic	
		Base Only	2",3",4X2",4X3",5X3", 4X4"		Not cheap	Manual	
		Base Only	4",5",6",8"		Not cheap	Manual / Automatic	
	Sintered SiC	Base + Cover	2",3",4X2",4X3",5X3", 4X4"		Not cheap	Manual	Generally not recommended. Recently developed applications use qualified suppliers, where material purity and design are crucial. The process performance is good, but contamination may be significant. Regular replacement is required, as prolonged high-temperature use can cause warping—customers need to optimize high-temperature processes.
		Base + Cover	4",5",6",8"		Not cheap	Manual / Automatic	
		Base Only	2",3",4X2",4X3",5X3", 4X4"		Not cheap	Manual	
		Base Only	4",5",6",8"		Not cheap	Manual / Automatic	
	Pure CVD SiC	Base + Cover	2",3",4X2",4X3",5X3", 4X4"		Expensive	Manual	Generally not recommended due to high cost and limited suppliers, so it is rarely used. The process performance is good, with low contamination, and regular replacement is required. Prolonged high-temperature use may cause slight warping—customers need to optimize high-temperature processes.
		Base + Cover	4",5",6",8"		Expensive	Manual / Automatic	
		Base Only	2",3",4X2",4X3",5X3", 4X4"		Expensive	Manual	
		Base Only	4",5",6",8"		Expensive	Manual / Automatic	
	Silica with SiC Sputter Coating	Base + Cover	4X2",4X3",5X3", 4X4"	30-60C/S	Not cheap	Manual	Generally not recommended, but recently developed applications. Using qualified suppliers, material purity and sputtering process are very important. The process performance is acceptable, with acceptable contamination levels. Regular replacement is required, as prolonged high-temperature use may cause warping, and the silicon carbide coating may peel off—customers need to optimize high-temperature processes.
		Base + Cover	6",8"		Not cheap	Manual / Automatic	
		Base Only	4X2",4X3",5X3", 4X4"		Not cheap	Manual	
		Base Only	6",8"		Not cheap	Manual / Automatic	
Wafer Carrier	Standard Si Wafers	One or two pieces as Base and Cover	4",5",6",8"	Similar to the heating rates for 4", 5", 6", and 8" Si wafers	The cheapest	Manual	Expensive does not equal better; suitability is the best. Process performance depends on the customer's application and is suitable for customers looking for low-cost solutions.
	Standard Si Wafer with pockets	Base + Cover if necessary	4",5",6",8", or customized	Similar to the heating rates for 4", 5", 6", and 8" Si wafers	The second cheapest.	Manual	
TC Wafer	Standard TC wafer	Single Point, Upside Down.	6", 8"	Similar to the heating rates for 6", and 8" Si wafers	The third cheapest	Manual	

Let's *All win* in the *21*st Century

Allwin 21 Corp.

Email: sales@allwin21.com