

Heated insert cell for Ga & In - ABI

- Large loading capacity from 85cc to 3000cc
- Higher stability than any other effusion cell
- Lowest growth defect density compared to any other effusion cell
- Wafer growth uniformities improved by factor of up to 3
- Reduced flux transient
- Reusable insert



Product introduction

The Riber ABI effusion cell is designed to produce stable purity molecular beams.

The ABI cell relies on the concept of a cylindrical crucible with a self-heated beam-shaper insert on top. This unique design enables extended campaign durations - 4 times higher loading capacity than conventional conical crucibles and large ingot loading (reduced source material oxidation and increased material quality).

It is specifically adapted for the growth of epitaxial layers of medium vapor pressure materials.

ABI cells perform with a very high reproducibility, with excellent run-to-run stability and long-term flux

stability - less than 1% variation over 40 h

ABI give improved epilayer quality compared to standard conical cell, with best in class uniformity - better than 1.5% - and low defects density. The flux transient is also reduced to less than 2%.

The insert has been carefully engineered to improve the flux stability over the load consumption, while maintaining excellent uniformities of thickness and composition. The design also enables to get the same evaporation surface over time. The insert is reusable.

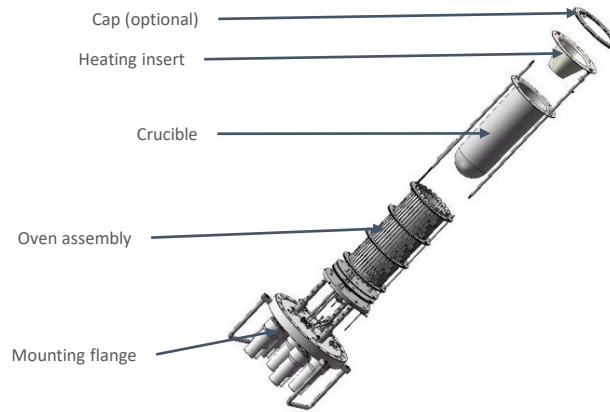
It is heated on the conical section and on the lip in order to prevent condensation and droplet formation or cross contamination, thus reducing

“oval defects” observed in GaAs growth with other technology.

Flexible operating conditions are obtained with independent temperature control of the insert filament.



Layout

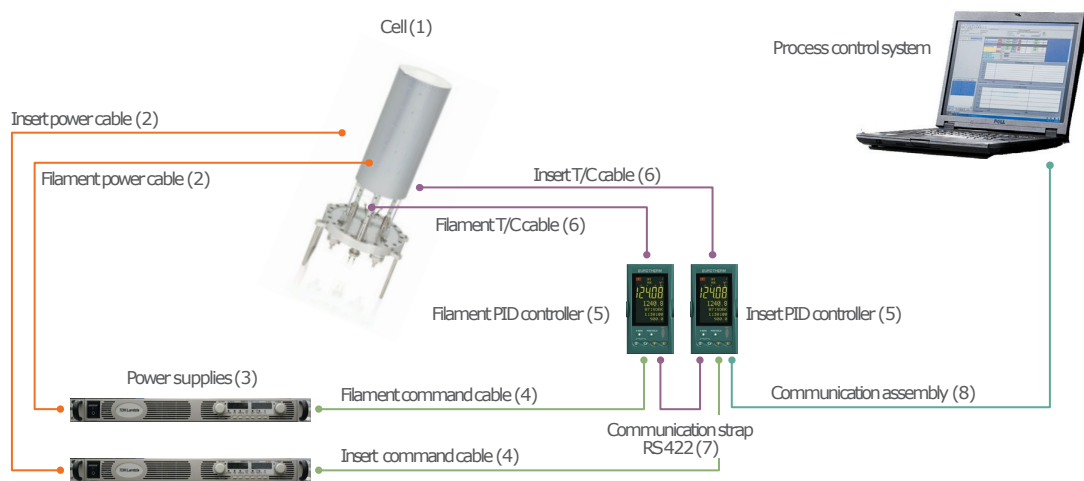


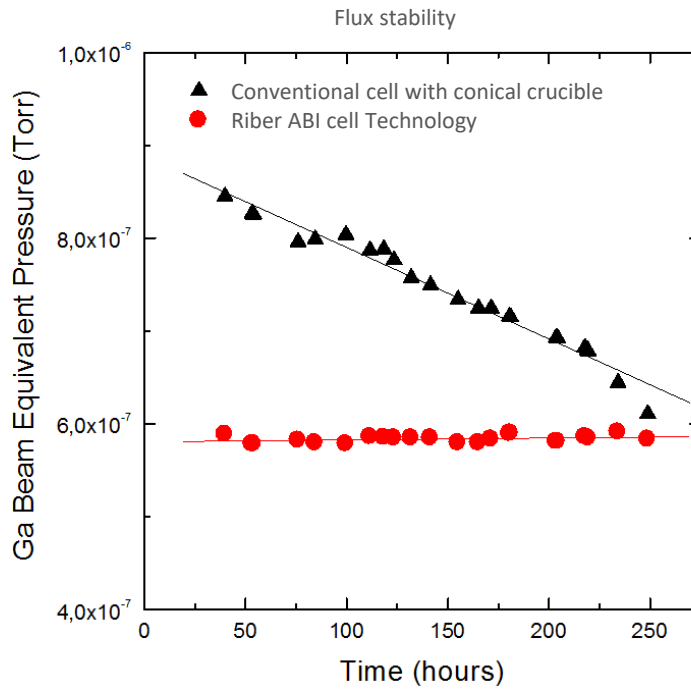
Specifications

Cell characteristics	ABI 85	ABI 500	ABI 1000
Source capacity	85 cc	500 cc	1000 cc
Mounting flange	CF63	CF100	CF150
Temperature stability	± 0,5°C		
Crucible shape	Cylindrical		
Crucible material	PBN		
Filament type	Ta wire	Ta flat filament	
Heated insert	PG resistive track encapsulated in PBN		
Thermocouple type	2x C-type		
Typical operating temperature	300 – 1250°C		
Maximum outgassing temperature	1350°C		
Power required for maximum temperature – filament*	500 W	1000 W	1600 W
Power required for maximum temperature – insert	300 W	300 W	1200 W
Power supply	Two power supplies / Two temperature controllers		

**For some versions and systems adaptations, water cooling may be necessary*

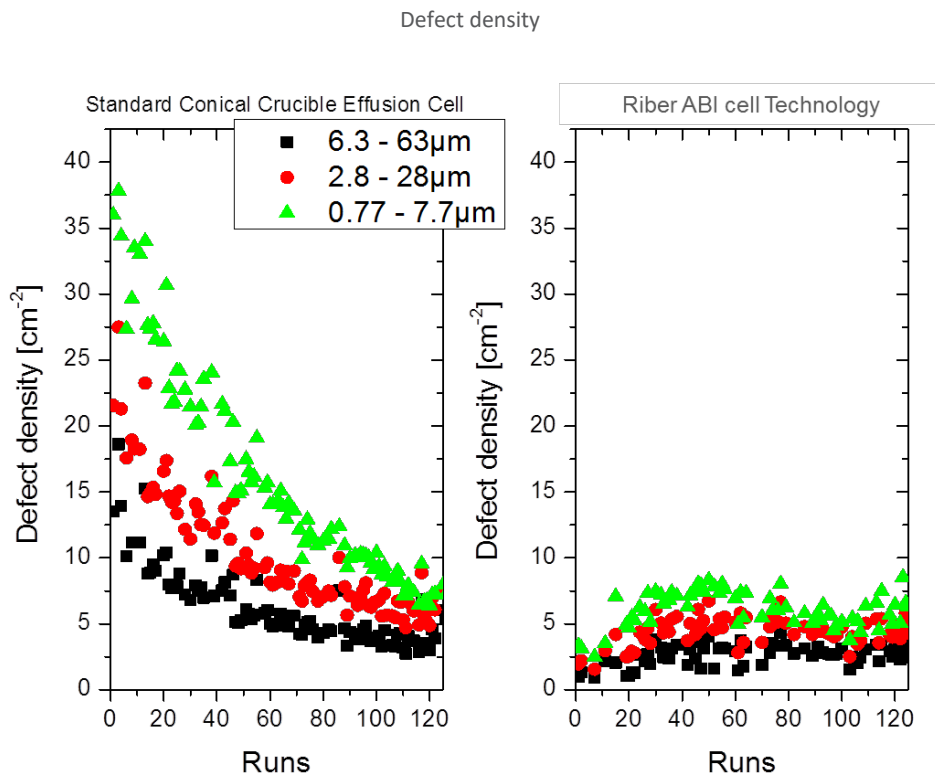
Component interfacing





The ABI technology demonstrates unprecedented flux stability over time, eliminating calibration routines, as materials depletes as in conventional conical cells.

Growth rate variation as low as +/- 0.3% has been observed over 200 runs with ABI1000. Measurements were performed by X-Ray on an AlGaAs/GaAs superlattice structure.

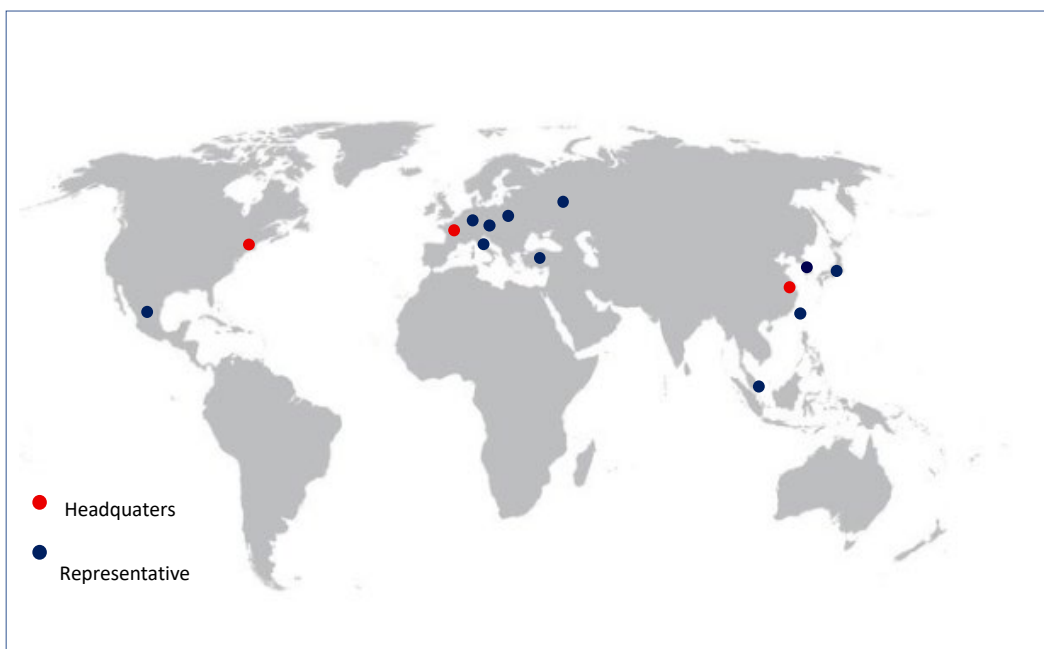


The ABI reduces significantly the density defects on multi wafer production system. The defect density reaches the lowest level at the beginning of growth campaign.

The ABI offers a solution to improve the production throughout the machine, reducing calibration wafers, decreasing the rejection of wafer due to out of specs defect density, increasing campaign duration by its loading capacity.

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