

# A CUSTOMER SUCCESS STORY

The Atlas Porous Head – how an abatement system upgrade saved a leading Semiconductor Manufacturer valuable production time

Edwards  
semiconductor  
*Intelligent*  
service

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# Introduction

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Wafer throughput and maintaining production uptime is a key priority for our customers.

A chamber going offline and stockers slowing down, leads to a drop in Fab efficiency and wafer throughput.

However, the problem is not always in the cleanroom, it can be hidden away in the SubFab.



## From the Fab to the SubFab

With complex processes, the failure could be due to powder build up in the abatement system, requiring frequent servicing. This results in *production downtime*, causing *increased operational costs* and even *wafer loss*.



## The challenges our customer faced

Our customer, a prominent global semiconductor company, is the market leader in *power semiconductors* and are highly regarded as an innovator in power systems. Their products play a pivotal role in both industrial and consumer IoT applications.

During a challenging process involving four chambers on the process tool, a persistent issue arose. The burner head in the ATLAS Helios experienced powder accumulation leading to rapid blockages.

With each service interval taking **8 hours** this costs valuable production time and maintenance expense.



Find out how often the chamber cleaning was required

Chamber cleaning was required every

4

WEEKS

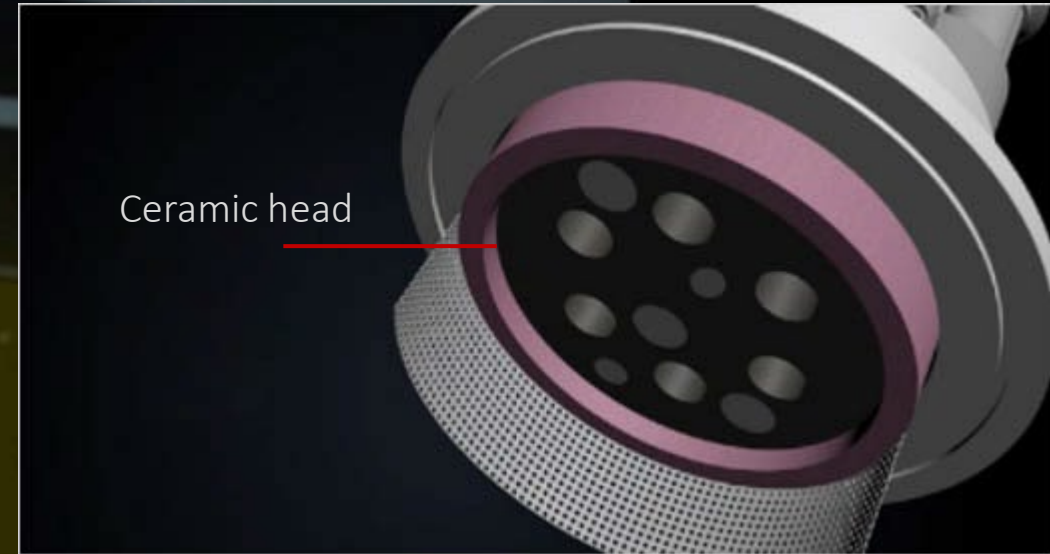
to ensure uninterrupted process performance and to avoid tool downtime.

## The key to unlocking an age-old problem

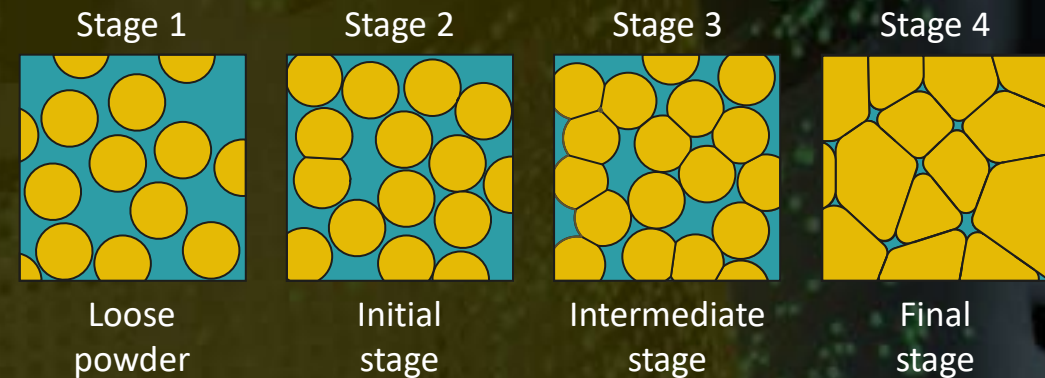
Edwards engineering team devised a solution that fixed the root problem by constantly preventing powder accumulation without mechanical moving parts.

The key was to make this using a material that could withstand the combustion chamber heat, yet allow air to be distributed as an air purge across the surface. This metal piece was manufactured by *sintering*, rather than being cast or stamped, which meant it retained porosity.

The air purge across the surface proved to significantly reduce the risk of powder accumulation.



Sintering is the process of compacting and forming a solid mass of material by pressure or heat without melting it to the point of liquefaction.





## Trialling the solution

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For trials with our customer at their semiconductor facility, Edwards invested in a porous head prototype to test.

Using EdCentra, Edwards' *advanced digital monitoring system*, to record real-time data, the initial findings were encouraging. We noticed a complete absence of blockages and the systems operated smoothly without error. Internal inspections conducted after 20 weeks found the heads and system clean and free from issues.

Inspection at 40 weeks demonstrated impressive performance with no sign of problems. We persevered in testing and after a year of rigorous assessment the Porous Head solution was concluded as a resounding success.

EdCentra 

EdCentra is Edwards  
bespoke real-time data  
collection programme



Test phase  
**40**  
WEEKS

## Results and successes

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We then extended the test to 1 year. After a year of testing the Porous Head design solution surpassed all expectations.

Initially, we anticipated an increase in service life from 4 to 20 weeks, but outcomes exceeded our projections, lasting for more than 40 weeks (~10 months).

Porous head systems yielded identical and highly positive results, reinforcing the validity of the findings.

**40**

**weeks**

# 6 month saving: Engineering Time

BEFORE

AFTER



2 Engineers

×

8 Hours

×

6 times

(4 weeks service intervals)



1 Engineer

×

4 Hours

×

1 time

(1 service check)

96 Labour Hours

4 Labour Hours

Every 6 months  
Service hours saved

92 hours

The porous head improvement carried substantial benefits, significantly reducing risk of tool downtime while enhancing the TCoO (Total Cost of Ownership).



# 6 month saving: Uptime

## BEFORE



8 Hours

downtime for service check

×

6 times

per 6 months

48 Hours

Loss of potential uptime



By how much does the result improve uptime value?

Uptime Value up to

**\$2.9M**

## AFTER



4 Hours

downtime for service check

×

1 times

per 6 months

4 Hours

Loss of uptime

The **uptime value** calculation is based on the wafer cost, the process tool utilization and the wafers processed by the tool per hour

The extended service life provided by the Porous Head solution combines increased operational efficiency, enhanced productivity, and reduced maintenance requirements, creating a valuable and cost-effective advancement.



## Customer testimonial

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The development of the Porous Head stands as a testament to Edwards' capacity for innovation in tackling intricate challenges. By adopting the Porous Head solution, we can limit maintenance and tool downtimes. This strategic move not only contributes to cost reduction but also ensures the safety and reliability of our production processes.

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- Senior Operations Manager, Semiconductor Manufacturer



## Contact

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To discuss your service options  
request a consultation with our team

[consultation@edwardsvacuum.com](mailto:consultation@edwardsvacuum.com)

Or search for “Porous head” on our website

[www.edwardsvacuum.com](http://www.edwardsvacuum.com)



The logo features a red stylized arc above the letter 'E', which contains a black arrow pointing to the right. The word 'EDWARDS' is written in a bold, red, italicized sans-serif font.

**EDWARDS**