



**S-300  
Automation**

**Bruce Technologies Inc.**

18 Esquire Road, North Billerica, MA 01862



# **S-300 SYSTEM HORIZONTAL FURNACE AUTOMATION**

p (978) 670-5501

f (978) 262-2149

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## JUSTIFICATION FOR INVESTMENT

### ELIMINATE MISPROCESSING

- Eliminate Operator Error
- Integrate Furnace Automation to Factory Host Computer
- Track Lots
- Verify That Lots Match in the Load
- Load Lots to Correct Tube
- Download Correct Process Recipe to Furnace

### REDUCE DEFECTS/IMPROVE PROCESS

- Greatly Reduces Particles
- Minimize Operator Interface with Load Station
- Eliminate Operator Rubbing and Scratching of Boats while Loading
- Integrate with Mass Transfer Tool, SMIF or FOUF
- Eliminate Manual Handling of Wafer Boats
- Repeatable Positioning of Boats on Paddle without Marking Loader

### SAFETY

- Eliminate the Need for Operators to Climb Ladders
- Eliminate Repetitive Motion Injuries
- No Manual Handling of Hot Boats

### COST BENEFIT

- Creates a More Productive Working Environment
- Reduce Wafer Boat Consumption
- Reduce Wafer Lot Scrap
- Reduce Workers Compensation and Legal Liability





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## S-300 ADVANTAGES

- Improper processing and particles added by operators are problems that adversely affect wafer yield. Placing the wrong lot of wafers in horizontal diffusion furnace tubes or running the wrong process can cause significant monetary losses.
- There are available building automation systems with the ability to communicate with furnaces, but until recently there was no automation for horizontal diffusion furnaces that could work with these systems.
- Another problem is that manual handling of wafer boats increases particles on the boat and in the clean laminar flow area of the load station which can reduce wafer yield, lowers process boat lifetime through chipping and cracking and increases the risk of operator injury thus, creating potential employer liability.
- Amtech Systems S-300 horizontal diffusion furnace automation addresses these problems. The S-300 is a single automation system, which services all tubes on a furnace stack. It can be configured two ways. All have the capability to interface with building automation.

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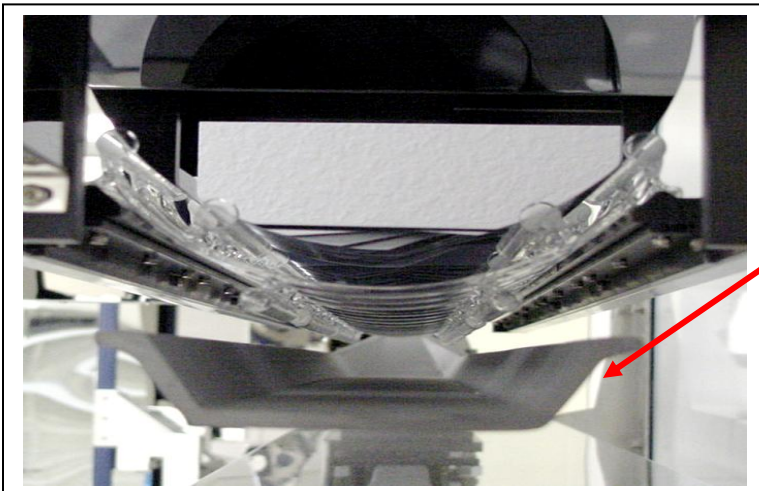
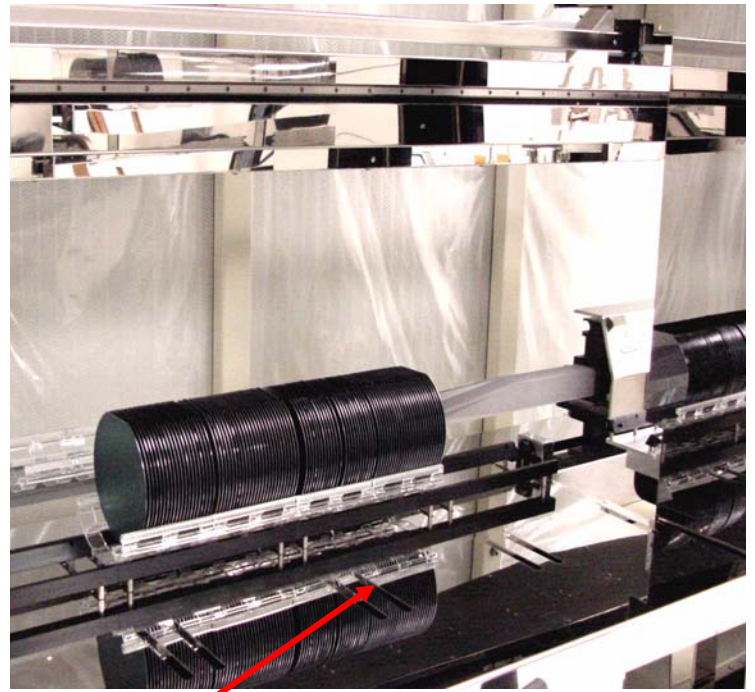


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## S-300 STAND ALONE OPERATION



- In stand alone mode boats are manually placed and retrieved from the S-300 load platform
- The entire load of **standard** or **long wafer** boats is loaded or unloaded at the same time.

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## S-300 CASSETTE TO CASSETTE

### S-300 System

- Loads/Unloads boats from Cantilever Paddles
- Empty Boats are stored on the paddle

### S-300 Transfer Shuttle

- Transports boats between the Wafer Transfer Machine and S-300



### Wafer Transfer Machine

- Mass Transfer Tool, SMIF or FOUP standard or long boats can be used.
- Installation as shown or at end of the load station

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## S-300 CASSETTE TO CASSTTE OPERATION

- This configuration contains the most automation. Operators never touch process boats, they only place and retrieve plastic cassettes from the transfer tool (pods if using SMIF or FOUP). When loading, the S-300 will place the wafer boat (quartz or carbide), which was stored on the paddle, onto the transfer tool nest to receive wafers.
- Process boats are managed entirely by the S-300 increasing their life, reducing cost of replacing broken or damaged boats and reducing the introduction of particles. An OCR camera mounted on the transfer tool will perform the lot verification step by scanning one or more wafers then the transfer shuttle will place the loaded boats onto the S-300 load platform. If the lots are OK, the S-300 will load the tube level designated by the building automation.
- As with any form of the S-300, the load is placed onto and removed from the paddle without scraping. Even if the paddles are not centered the S-300 can adjust the load to match the paddle angle. Loads are also placed in the same location on the paddle every load for more repeatable process results. Unloaded wafers are placed back in the plastic cassette box, the empty boat is placed back on the S-300 load platform to be either reloaded or stored on the paddle

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## SUMMARY

### Reduces Defects/Improves Process

- The S-300 adjusts the load to match varying paddle angles. Operators no longer have to intrude into the clean laminar flow area of the load station, eliminating 2 major sources of particles. Process boats can be managed by the S-300 dramatically reducing boat chipping and cracking, increasing their lifetime lowering cost and reducing particles. The wafer load is placed in the same position on the paddle, thus, every load yielding a more repeatable process.

### Safety

- Operators never have to climb ladders to service the top tubes or stoop to service the bottom tube.
- S-300 allows the removal of all ladders for loading of the paddle. The S-300 built in cool down cycle eliminates the chance of handling hot boats.

### Cost Benefit

- Using automation for the tedious task of loading and unloading horizontal furnaces improves the working environment for the operator resulting in increased operator efficiency.
- Automatic handling of wafer boats increases their useful life and reduces the costs associated with replacing boats. Eliminating the physical strain of manually servicing furnaces lessen the likelihood of employees filing workers compensation claims, which reduces the chance of legal action.

