Spray Solvent Tool Semitool System
Levitronix Pumps Upgrade

Speaker  Casimiro Russo
Levitronix Upgrade on Spray Solvent Tools

Levitronix Pump
Process Chamber
Filter
Flowmeter
Heater
Levitronix Controller
Feed Back Signal

Levitronix
Pump
Process 
Chamber
Filter
Flowmeter
Heater
Levitronix
Controller

Filter

Process Chamber
THREE MAIN REASONS FOR THE UPGRADE

• SAFETY

• COST REDUCTION

• PROCESS IMPROVEMENT AND PROCESS CONTROL
Safety

- DIAPHRAGM OR BELLOWS PUMPS FAIL BECAUSE OF VARIOUS REASONS. MAINLY BECAUSE OF MECHANICAL STRESS ON PUMP COMPONENTS

- PUMP REPLACEMENT IMPLIES SAFETY OPERATIONS BECAUSE OF EKC LEAKAGES

- DUE TO MECHANICAL STROKES STANDARD PUMPS STRESS TUBINGS, FILTERS AND FITTINGS. OVER TIME EKC 265 LEAKAGES ARE VERY COMMON (BROWN COLOR ON THE BACK OF SYSTEM SHOWS EKC OXIDATION IN CONTACT WITH AIR)

- WITH LEVITRONIX PUMP THE SAFETY ISSUE IS SUCCESSFULLY SOLVED
Cost Reduction

• MTBF is more than 30 years for Levitronix BPS600 VS existing pump replacement every 8-12 months

• Levitronix Upgrade Cost is about 3 times more then a bellows pump, but this cost will be amortized by the benefits of the new upgrade

• Filter Lifetime is longer (normally double), studies and reports are available

• Maintenance is very simple. It takes just a few minutes typically. Levitronix is recommending to change the impeller every 1-2 years (historical data shows higher lifetime). The maintenance costs are very low.

• Energy Costs are dramatically low for Levitronix Pumps (a dedicated slide is included in this presentation)
Comparison Magnum 620 and BPS-600

Cost of Energy

Annual Energy Cost

Cost per year in Euro [€]

--- Levitronix
--- Bellows

10l/min

0 200 400 600 800 1000 1200 1400 1600 1800 2000

Cost of Energy
Process Improvement and Process Control

• LOWER PARTICLE GENERATION DUE TO NON CONTACT LEVITATION TECHNOLOGY (see next slide)

• PROCESS STABILITY DUE TO SMOOTH FLOW

• PROCESS CONTROL DUE TO THE LEVIFLOW NON CONTACT ULTRASONIC FLOWMETER
Process Improvement and Process Control

• NON CONTACT LEVITATION TECHNOLOGY
Particle comparison on SST

Chamber A VS chamber B

Particle test on SST

<table>
<thead>
<tr>
<th>Days</th>
<th>Number of particles @0.18u</th>
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<tbody>
<tr>
<td>23/07/2010</td>
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<tr>
<td>28/07/2010</td>
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<td>05/08/2010</td>
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<td>13/09/2010</td>
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- **Levitronix pump**
- **Bellows pump**
OUR EXPERIENCE WITH LEVITRONIX PUMPS

- Tool A (Scepter): Levitronix pump installed 3 years ago (2010)
  only one Tool DOWN due to a broken power supply fuse
- Tool B (SST): Levitronix pump installed 2 years ago (2011)
  No issues with the pump. Only one issue with flowmeter due to air bubbles. Firmware update solved issue.

In the last three years we changed more than 10 bellows pumps/year
Yearly maintenance work and qualification procedure requires a lot of time
OUR EXPERIENCE WITH LEVITRONIX PUMPS

Reduced Maintenance Hours by > 70%

2011

2012
OUR EXPERIENCE WITH LEVITRONIX PUMPS

WFY improvement by > xx%
(Less scrap -> Higher Yield)
OUR EXPERIENCE WITH LEVITRONIX PUMPS

Decreased Pressure Fluctuation by > 50%

-> higher flow uniformity
**NOISE REDUCTION**

- D.Lgs 81/08

<table>
<thead>
<tr>
<th>REFER VALUE</th>
<th>LEX, 8h (dBA)</th>
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<tbody>
<tr>
<td>Threshold value EX</td>
<td>87</td>
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<tr>
<td>Critical Value</td>
<td>85</td>
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</table>

- Acoustic measurement done in Clean Room
- Record value is below level recommended by law
M1 TOOL PRESSURE STABILIZATION

Temporal

OLD TREND

NEW TREND

Temporal

OLD TREND

NEW TREND

Std Dev trend improvement
Results

✔️ Further projects for process improvements
✔️ Less Maintenance and unscheduled tool down
✔️ Higher process stability
✔️ Less scraped wafers