PTM-1 : THE SOLUTION FOR CRITICAL SLURRY HANDLING

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Summary

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Introduction

- As nodes are becoming more tightened, CMP process is becoming more and more critical and a particular attention is needed on the slurry distribution and storage to maintain slurry health to its highest level.

- The PTM-1 has the advantage to take care of both. The conception of the tank induce to the slurry a recirculation that keeps it always in motion and avoids sedimentation, meanwhile the Levitronix pump avoids shear forces on the slurry and allows a smooth slurry handling.

- More and more slurries contains surfactants that foams as soon as they pass through a pump, even at 4000rpm, the Levitronix pumps do not induce any foam to the slurry.

- The PTM-1 tank is the alternative solution for the new generation of slurries.
The Need

- Have a slurry distribution cabinet to allow qualification and pre-production of new slurries and chemistries.
  - The Cabinet must respond to the needed volume for pre-production
  - The Cabinet must be transportable from one area to another and have a small footprint
- Have a tool that can run all kind of chemistries:
  - Capability to recircle (keep the slurries in motion)
  - Capability to stir without any external stirrer
- Several projects were identified
  - With displacement pumps, no stirring, directly with pails
  - One of them was able to do « all in one » and able to be customized
- The specificity of the use needed a custom project based on the budget and the slurry use.
  - A smooth handling
  - The possibility to mix and stir without any additional components
  - All this fitted inside a Cabinet that must contain not more than 100 liters
  - No particles generation
The Projects

3 types of projects were studied but only Levitronix was retained because the solution of the tank is more flexible.

Note:
Pictures are only for indications and do not belong to the real projects. These are used to illustrate what can be done.
The Capabilities

- **The Levitronix PTM – 1 Tank**
  - A smooth handling thanks to the BPS – 1 pump
  - The slurry is permanently mixed in the tank by two holes. The gentle motion is given by the pump

- **The Chemical Cabinet**
  - The whole cabinet must be managed by an automaton
  - Able to do H2O2 titration
  - The transfer from the pails to the tank need to be done by a displacement pump (No choice)
    - Risk of foam
  - Three possibilities of work
    - Connected to a MIPS with concentrated slurry (Mix In Place System)
    - Connected to 1 or 2 Tools with Ready to Use slurry
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The Capabilities

Eberlé made the Cabinet, in order to…

… fit the PTM – 1 Tank
Advantages

Most of the new generation slurries has surfactants and generates foam during the handling. It is important to take this in account. The PTM system has a smooth handling that, even at 4000rpm there is no foaming.

- The PTM Tank offers flexibility in all kind of projects
- There is no shearing forces, no stress on the motion of the slurry.
- The holes that allows the recirculation works well, the slurry is always in motion.
- Defectivity has given very good results (No charts available)
  - The Large Particle Count normal @ 0.56µm
Drawbacks

- The capabilities of the cabinet are rapidly reach as the allocated budget has limited its performances, but this can be override with an upgrade on the automaton.
- The holes on the bottom of the PTM – 1 tank are not inclined in order to give a whirl motion.

- The PTM – 1 has crests where slurry can fix. The Tank needs to be more curved to receive high % solids ceria slurries.
- Need a displacement pump to intake the slurry and fill the PTM-1 tank.
Conclusion

- The PTM system takes care of slurry health and allows handling on the last generation of slurries.
- The flexibility of the system offers to the customer several solutions depending on the liquid and the volume to be considered.
- The PTM system is an alternative for slurry handling and for the new generation slurries.

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