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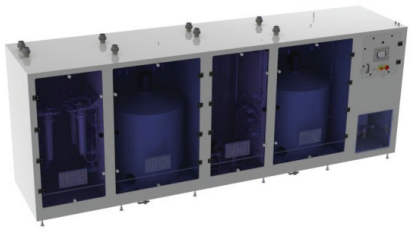
The World's Leading Provider of
Process and Mechanical Solutions



Kinetics SB 200

Slurry Blend & Dispense System

- Flexible—variety of blend ratios, constituents and slurry shelf-life requirements
- Accurate—proven blending technology to meet critical CMP process requirements
- Adaptive—supports blending of slurry with very limited shelf-life

System Overview

The Kinetics SB 200 Slurry Blend & Dispense System is designed to provide the highest levels of CMP slurry quality and availability, for advanced semiconductor processing. Kinetic's proven weight-based blending technology provides very tight blend specifications under a variety of blend ratios and chemical conditions. For slurry blends with a limited shelf life, a pair of tandem blend/dispense tanks are utilized, to ensure that fresh slurry material is always available to the CMP process tools. Within the slurry blending module, DI water, concentrated slurry and constituent chemicals (dispensed from independent dispense units) enters one of two blend tanks residing on a precision load cell. Both gross-fill and fine-fill steps are utilized to maximize the slurry blend make-up rate. Following blend batch verification with a variety of metrology packages, the blended slurry mixture is dispensed directly to the fab, using either diaphragm or magnetically levitated centrifugal pumps. The slurry dispense module delivers the blended material with a high degree of precision relative to settling, shear sensitivity, foaming and chemical stability.

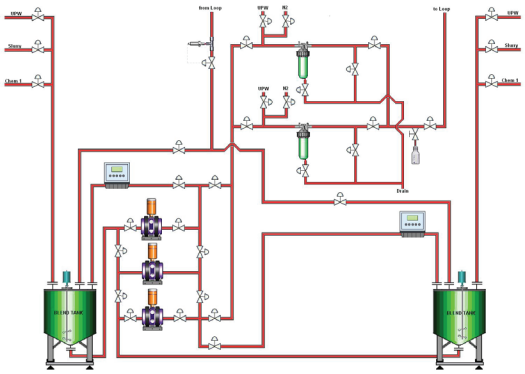
Key Features:

- Weight-based blending technology
- Two blend/dispense tanks; various sizes available
- Diaphragm blend/dispense pumps
- Chemical blend accuracy up to 0.005 weight %, absolute error
- Blending of DIW, slurry and 1 chemical
- 20 LPM nominal dispense rate
- Humidified N_2 for blanketing of source containers and day tank
- Polyethylene and polypropylene materials-of-construction
- Polypropylene cabinet
- Spray ball for DI water rinsing of blend and day tanks

Options:

- 2nd constituent blend chemical
- Redundant 3rd pump, for back-up of failed pumps
- Multiple slurry metrology packages (pH, conductivity, density, index of refraction and titration)
- Magnetically-levitated centrifugal pump for slurry dispense
- Dispense filtration
- Distribution loop back- pressure control
- Automated filter flush- purge operation
- Stirrers for blend and day tanks (electric and pneumatic)
- Sample station

Process Flow Diagram



Configuration showing two blend tanks, redundant pumps, dispense filtration, and slurry stirrer devices

Reliability

- MTBF > 4500 Hours[1]
- MTBA > 2500 Hours[1]
- MTTR < 2 Hours
- Availability > 99.9%

[1]Filter change-out not considered part of system down-time or repair time.

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Technical Data

Controls

- Allen-Bradley SLC 500 or Siemens S7 series PLC
- Allen-Bradley Panelview 550 or Siemens TP177B HMI, displaying:
  - System P&ID status
  - Alarm and warning screens
  - Distribution valve box status
  - Blend recipe and calibration screens, password-protected
  - System flush sequence screen, password-protected
  - Pump and filter runtime screens
  - Password-protected maintenance screens
- Connectivity to factory control system

Safety Features

- Segregated pumping compartments for online maintenance
- Local and remote EMO
- Cabinet leak detection and door interlocks
- Audible and visual warnings and alarms
- Options for exhaust and high-flow sensors

Specifications

Parameter	Capability
Application	Oxide, tungsten, polysilicon, STI or copper slurry applications
Chemical Blend Accuracy, weight %	Up to 0.005 weight % absolute error
Dispense Flow Rate	20 LPM optional, at 40 psi[1] (3 barg)
Flow Path Size	¾-inch
Loop Pressure Specification[2]	+ 2 psi across all process tools
Blend Tank Sizes	100, 200, 500, 1000 Liters
Optional Day Tank-Sizes	500, 1000, 2000 Liters
Cabinet Materials	Polypropylene
Dispense Filter Housings	Optional: • 2, 10" (in parallel) • 2, 20" (in parallel) • 2, dual-series trains (in parallel)
Cabinet Footprint, blend and filter modules (WxDxH)	105" x 48" x 75" (2660mm x 1200mm x 1900mm)
Footprint, blend tank cabinet, each cabinet (WxDxH)	52" x 48" x 75" (1300mm x 1200mm x 1900mm)
Component Materials—Standard	• Polyethylene or PFA valves • PE pumps and pulse dampeners (PTFE diaphragms) • PFA tubing and fittings • Polyethylene filter housings • HDPE or PE day tanks

[1]Dispense flow rate and pressure measured at outlet of slurry dispense unit.
[2]Loop pressure guarantee only available with optional magnetically levitated centrifugal pumps.

Facility Requirements

Utility	Requirement	Connection Type
Slurry and Chemical	8 GPM @ 30 psi (30 LPM @ 2barg)	¾" PFA Flare
N_2	2 SCFM @ 90 psi (3.5 Nm^3/hr @ 6 barg)	½" SS Swagelok
CDA	18 SCFM @ 90 psi (31 Nm^3/hr @ 6 barg)	3/8" SS Swagelok
Exhaust—blend and filter modules	293 SCFM @ 2" H_2O (496 Nm^3/hr @ 2" H_2O)	6" Pipe Flange
Exhaust—blend tank cabinet (each)	97 SCFM @ 2" H_2O (165 Nm^3/hr @ 2" H_2O)	6" Pipe Flange
Process Drain	7 GPM @ 70 psi (25 LPM @ 5 barg)	1" FNPT, polypropylene
Cabinet Drain	Gravity	1" FNPT or DN15 butt weld, polypropylene
Power—with centrifugal pumps	100 to 240 VAC, 50-60 Hertz, 15 amps	¾" Conduit
Power—with 2 magnetically levitated pumps	3 phase 200 or 208 V, 10 amps or 1 phase 230V, 16 amps	¾" Conduit