

CMP Processing Slurry Pump

an alternative for slurry pumping using the damascene process!

Effective recirculation of abrasive particles to promote mixing

Chemical Mechanical Polishing

CMP is a process that uses a chemically-reactive abrasive slurry to polish the surface of a semiconductor wafer as a step in the fabrication process. The polishing process uses both mechanical abrasion and chemical reaction to remove material from the surface.

Because the particles are much denser than the liquid, the abrasive will be a much smaller percentage by volume. The liquid can include potassium hydroxide, nitric acid, ferric nitrate, or any other fluid required for the chemical reaction in the CMP process.



NDT300.23AA 2-head design

The CMP process is used in the "damascene process" for the fabrication of semiconductors using copper, instead of aluminum in the internal microchip circuits. This use of copper or materials other than aluminum is becoming very popular in the newer semiconductor fabrication facilities using high-density circuits as well as in nanoscale fabrication processes.

Recirculation of Fluids for Mixing

The CMP fluid is a suspension of abrasive particles in an acid/oxidizer liquid. The particles have a tendency to separate and settle out of suspension. This settling will result in an unpredictable composition of the fluid required for polishing. The slurries are distributed to a holding tank at each CMP station. At the holding tank, settling of the fluid is avoided by constant mixing using a number of different methods including recirculation pumping.

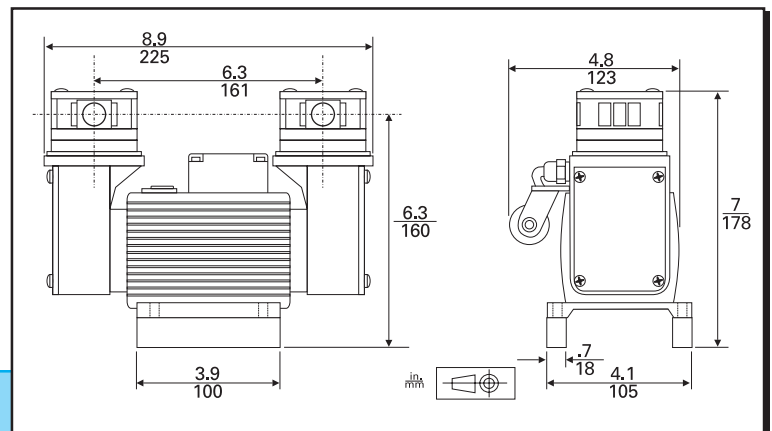
The NDT300 recirculates 4 liters/minute of the fluid to produce the desired mixing. The pump is typically mounted above the tank and produces a suction lift of 1 to 2 meters. The discharge is returned to the same tank with a maximum pressure of 7 meters/10 psig.

NDT300 Corrosion-Resistant Materials

Testing has shown that PVDF, PTFE, PEEK, VITON FPM are acceptable materials for pump parts in contact with the chemicals in the polishing slurry. The NDT300 CMP slurry pumps have all head parts in PVDF with absolutely no glass filler or colorings. The valves are made from Viton® FPM with internal reinforcement fabric Viton®. FPM o-rings are used for internal sealing.

Lower Cost, Longer Service Life

The NDT300 outlasts the expensive, high-purity, all-Teflon® diaphragm pumps, widely used for other purposes in the semiconductor industry that have a service life of 3-4 months. The NDT300 has a much lower initial purchase cost, features significantly improved uptime of 6 to 9 months or more before diaphragm and valve parts replacement, reducing process disruptions. Maintenance is easily performed on-site using readily-available tools.



NDT300.23AA CMP Slurry Pump Specifications:

Free Flow per Head:	2.0 liters/minute/head
Discharge Pressure:	7 meters H ₂ O
Number of Heads:	Two or four heads
Pump Mounting:	Foam rubber shock mounts
Power Requirements:	115 VAC 60 Hz (other voltages available)

Pump Head Materials:	PVDF
Valve Materials:	Viton® FPM
Valve Support:	PEEK
Diaphragm:	Viton® FPM
O-rings:	PTFE

Contact KNF Applications Engineers for further details

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NEUBERGER, INC.

KNF Neuberger, Inc. · Two Black Forest Road · Trenton, NJ 08691-1810
609/890-8600 · Fax: 609/890-8323 · Web: www.knf.com/usa.htm