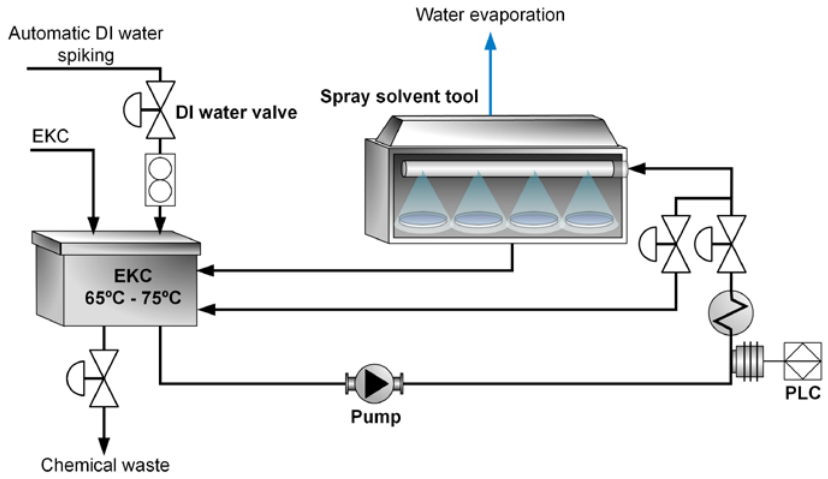
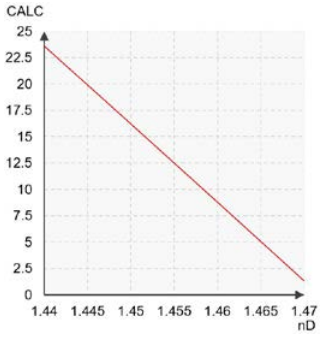


POLYMER RESIDUE REMOVER, EKC

Typical end products

Silicon wafers.

Chemical curve: Water in EKC R.I. per Conc% b.w. at Ref. Temp. of 20˚C



Introduction

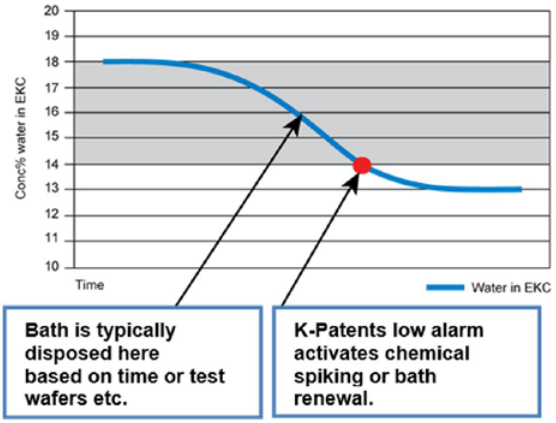
Spray solvent tools are used in the post etch residual polymer removal process to clean the surface of wafers. EKC is a commonly used chemical in the process that employs two tanks. The process operating temperature of EKC is kept between 65 °C (149 °F) and 75 °C (167 °F). The actual residue removal takes place in the spray solvent tool where EKC is fed to, according to a pre-determined cycle of chemical recirculation and wafer run.

Application

Two control strategies can be adopted with the aid of Vaisala K-PATENTS® Semicon Refractometer PR-33-S. The first one is to monitor water content in EKC, and the second is to maintain the water content at a constant level. The former allows for setting high and low alerts for the amount of water, which warrants safe wafer production. The latter has proved to provide a considerable reduction in the EKC consumption.

The recirculation starts when the wafer run in the spray solvent tool is over and the chemical is delivered to the EKC tank. The tank is partially drained of the chemical and refilled with fresh EKC and water. Water is evaporating through the exhaust system of the spray solvent tool during the spray run.

The amount of water in EKC is maintained with automated chemical spiking after each wafer run. The chemical spiking is activated using the PR-33-S output signal. This arrangement provides the exact set point for water in the EKC concentration and helps to optimize and reduce EKC replenishment.



After EKC clean, there is an IPA/Dry process where IPA may get contaminated with EKC traces. The Semicon Refractometer can monitor the concentration of the chemicals to alert of possible mixes. The refractive index values of EKC and IPA differ substantially allowing a very reliable measurement of EKC traces in IPA.

Instrumentation and installation

The Semiconductor Refractometer PR-33-S is installed in the EKC recirculation loop. The compact instrument's design suits the water level control for EKC perfectly. Data logging software allows on-line printing of concentration and temperature profiles.

Instrumentation	Description
	A small footprint, PVDF covered sensor for cleanroom environment and integrated process tools. Monitors the chemical concentrations in real-time and provides an Ethernet output signal and immediate feedback to the control system. Connected through a modified PTFE flow cell body to the process by a 1/4"-1" Nippon pillar or flare fitting.
Measurement range	Refractive Index (nD) 1.3200 – 1.5300, corresponding to 0-100 % by weight.