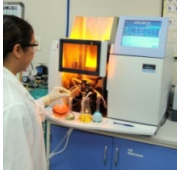


INSTRUMENTATION



11941 HERTZ STREET, MOORPARK, CA 93021
(805) 517-1222, FAX (805) 517-1224



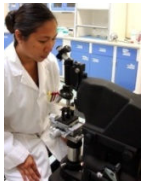
PERKIN ELMER ANALYST 200 ATOMIC ABSORPTION SPECTROMETER

Metals in plating and related solutions are determined using Atomic Absorption (AA) Spectrophotometry. In AA analysis, the flame converts the sample aerosol into atomic vapor, which absorbs radiation from a light source. The amount of light absorbed is measured by the detector to give a quantitative metal determination.



SANDA MULTI-TITRATOR F.A.C.T.S CE2010™

The Sanda Multi-Titrator is used to analyze plating and related solutions by thermometric titration. This is a titration performed in an adiabatic system, yielding a plot of temperature versus volume of titrant. Thermometric titration can be used for neutralization, precipitation, redox, organic condensation, and complex-formation reactions.



WILSON-TUKON MO MICROHARDNESS TESTER

The Knoop hardness of plated coatings can be measured using a microhardness tester. This instrument is equipped with a Knoop indenter that penetrates the testing material at a specified force. The hardness of the coating is determined by measuring the long diagonal of the diamond-shaped indentation made by the indenter.



SCHOTT TITRONIC® *universal* PISTON BURETTE

The Titronic universal dosing unit is used to analyze plating and related solutions by volumetric methods. These are titration methods that involve a titrant and an indicator to signal the endpoint. The titrations may involve oxidation-reduction, acid-base, complexation, and precipitation reactions. The sample component can be determined based on the amount of titrant required to reach the endpoint.



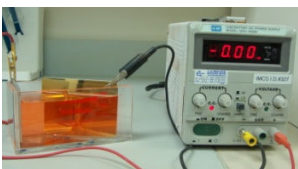
CMI 900 X-RAY FLUORESCENCE SPECTROMETER

X-ray fluorescence is the industry standard for measurement of metal film coating thickness and composition, and substrate metal composition determination. Fluorescence is a process in which an atom or a molecule absorbs a photon of certain energy and releases another photon of lower energy. In X-ray fluorescence, the X-ray tube provides bombardment of excitation photons to the sample. Thickness or composition is determined by the intensity of the fluoresced X-rays.



CMI 700 COATING THICKNESS MEASUREMENT INSTRUMENT

Non-destructive coating thickness measurements can be performed on this instrument using three methods: Beta Backscatter, Micro Resistance, and Eddy Current. Beta backscatter is a principle using beta rays and diverting them at a plated sample. The micro-resistance method uses specially designed probe tip that The Eddy current method measures the apparent change in impedance of the coil that induces the eddy current into the base metal.



HULL CELL

The Hull Cell is among the most useful tools for control of plating electrolytes. It is a miniature plating unit designed to produce a cathode deposit that records the character of electroplate at all current densities within the operating range. Hull cells allow experienced operators to determine process parameters such as approximate bright range, presence of metallic and organic impurities, covering power, and throwing power.



HANDYSURF E-35A SURFACE PROFILOMETER

A contact profilometer is used to measure a surface's profile, in order to quantify its roughness. A diamond stylus is moved vertically in contact with a sample and then moved laterally across the sample for a specified distance and specified contact force. A profilometer can measure small surface variations in vertical stylus displacement as a function of position. The height position of the diamond stylus generates an analog signal which is converted into a digital signal stored, analyzed and displayed.