

# DDC NEWSLETTER

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**Comments:** Our new 2001 DDC folding Desk Calendar is now available for mailing. Please send in your request to receive it.

The article on Mercury Lamps from the last issue is continued below. (article by Bob Eckel & Bob Donofrio).

## MERCURY CAPILLARY LAMPS

Parallel with advancements of short arc lamp photolithography for micro-electronic manufacture came the application of mercury capillary optical projection systems. Unlike the standard mercury capillary lamp developed in the 1930's, in the 1970's a new projection optical system required the development of an air cooled "bent" capillary lamp. Advanced Radiation Corporation was the first company to develop a bending technique to achieve reproducible bent arc configurations. This lamp provided intensity uniformity of 6% or better along the entire bend of the arc. The Perkin Elmer Corporation developed the optical projection system that led to the dominance of this technology for many years. This bent capillary lamp used in the Perkin Elmer equipment has remained an active player in the microelectronic manufacturing since its inception the late 1970s.

## WAFER ANNEALING

In addition to photolithography, arc lamps have found application in wafer annealing. With the advent of smaller geometry being used for patterns, closer line spacing was required. During the normal furnace annealing (with the long cycle time required) normal diffusion resulted in a spread or widening of the patterned lines. If the lines were too wide they might start to overlap and limit the packing density. To overcome the long annealing time requirements the high infra-red intensity radiation of the xenon arc was used to heat and anneal the wafers between resist

layering. The hour (s) annealing cycles could now be accomplished in only 10's of seconds and this limited diffusion on the printed pattern components.

The xenon long arc lamps developed by Advanced Radiation Corporation for wafer annealing operated at power levels between 4000 and 5000 watts per linear inch. These arc lamps annealing systems were developed and built by Peak System, Inc.

## LAMP CHARACTERISTICS

The five most important lamp characteristics are 1. Life time, 2. Lamp Stability, 3. Power output for the Actinic wavelengths needed for the Photoresist used, 4. Source Size and 5. Cost.

## LAMP LIFE

While engineers in the earlier application of mercury arc lamps for photolithography were satisfied with lifetime of 200 to 400 hours/lamp, improved component processing and other technology developments has now delivered lamps with expected and guarantees of over 2000 hours.

Lamp lifetime is determined by the fall off of intensity with operating hours. Generally, two factors will result in an intensity decrease and both are involved with the darkening of the lamp envelope.

## News

**IBM** in Dec 2000 announced it has launched production of powerful new microchips for computing products. This technology, named CMOS 9S, unites IBM innovations in copper wiring, silicon-on-insulator (SOI) transistors, and improved, "low-k dielectric" insulation to build chip "features" as small as **0.13 microns**.

**The Second International Conference on Microdisplays** This SID South West Chapter event is tentatively scheduled to be held at the Flatirons Conference Center in Interlocken, CO during the week of August 13<sup>th</sup>, 2001.

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