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Measurements of resonance broadening constants of mercury lines in ceramic high intensity discharge lamps ALEXANDER DUNAEVSKY, Philips Lighting — Resonance broadening of provides a convenient way to measure mercury density in the arc core of high intensity discharge (HID) lamps. 491.6nm, 577nm, and 1014nm resonance Hg lines are optically thin in the majority of conventional HID discharges. Temperature-dependent broadening of these lines due to Stark, van der Waals, and Doppler effects is weaker than resonance broadening. Several studies showed that temporal and radial averaging have only limited effect on the line profiles. Therefore, resonance broadening of Hg lines may be used for core density measurements in HID discharges with non-transparent ceramic envelopes. Preliminary experiments showed, however, that broadening constants should be validated. Side-on measurements of the broadening constants for the 577nm and 1014nm Hg lines were performed for ceramic HID discharges in the power range from 140 to 600W. The obtained constants show certain deviation from the calculated values. Possible reasons of deviation are discussed. For diagnostic purposes, 1014nm line was found more convenient due to higher sensitivity to pressure variations and less overlapping with emission lines of other elements in the discharge.

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