

Lawrence Berkeley National Laboratory

Recent Work

Title

Electron beam 3.5MV, 2kA injector diode diagnostics for the DAHRT Facility

Permalink

<https://escholarship.org/uc/item/7qf989g6>

Author

Ekdahl, C.

Publication Date

2000-04-17

Electron beam 3.5MV, 2kA injector diode diagnostics for the DARHT Facility*

S. Eylon, E Henestroza, M. Vella, S. Yu ,LBNL, C. Ekdahl. LANL.

The injector for the second axis of the dual-axis Radiographic Hydrotest Facility (DARHT) is being designed and manufactured in LBNL. The injector consists of a single gap diode extracting a 2 microseconds, 2kA (can be extended to 4kA), up to 3.5MV electrons from a dispenser cathode. The diode is powered through a high voltage insulating column by a Marx generator. We shall present an overview of the 3.5 MV diode diagnostics, including: the A-K gap voltage measurement using a capacitive voltage divider (dE/dt) probe, cathode (source) current using 12 low inductance stainless steel foil current viewing resistors (CVRs) located on the cathode base plate, anode dark current collected on the anode shroud using CVRs. A rise in the dark current, can indicate a buildup of an A-K breakdown, and can be used to trigger the injector crowbar switch thus limiting breakdown damage. Beam spillage, generating X-rays around the anode tube and shroud, is monitored using solid state PIN diodes positioned around the anode tube. Furthermore we shall present the diode diagnostic system conceptual design, development tests, system design, manufacturing and the results of some acceptance tests.

*This work was performed under the auspices of the U.S. Department of Energy under contract AC03-76SF00098.