

Vacuum Performance of PLS Electron Storage Ring^{*}, C.D. PARK, C.K. KIM, PAL - The vacuum system for PLS storage ring at PAL is designed to maintain a beam on pressure in the nanoTorr range. The vacuum chambers were made using either machined A5083 or extruded A6063 aluminium alloy. The vacuum system is pumped by combination pumps which consist of lumped non-evaporable getter (NEG) and ion pumps (IPs). At the early stage of commissioning, the system was pumped by IPs only without in-situ bakeout. The base pressure was $8\text{E-}9$ Torr and the specific pressure rise was $2\text{E-}7$ Torr/mA at the very first of operation. After 8 AH of running, the system was vacuum-baked followed by NEG activation, resulting in the total pumping speed increment from ~ 5300 to ~ 30000 l/s and a dynamic vacuum of $3\text{E-}9$ Torr achieved at 100 mA. After chamber bakeout and NEG activation, the beam lifetime has increased from several minutes to about 10 hours at 100 mA. The pressure rise due to photons varied from $6\text{E-}9$ Torr/mA at 1 AH to $1\text{E-}9$ Torr/mA at 7 AH with IPs only, and to $3\text{E-}11$ Torr/mA at 100 AH with NEG activated. The reduction of pressure rise with the accumulated beam dose has followed closely to the expected value, $(\text{AH})^{-0.7}$.

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