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Importance of components cleaning to the ultrahigh vacuum performance of beamline front ends

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The Advanced Photon Source (APS) has 40 beamline front ends in the first phase of operations. Eventually, there will be a total of 69 beamline front ends connected to the storage ring. The ultrahigh vacuum performance of these front ends will have a significant impact on the storage ring vacuum and on the lifetime of the positron beam. In this paper, we emphasize the importance of proper component cleaning procedures to the ultrahigh vacuum performance of beamline front ends. Critical issues in the cleaning process include using environmentally friendly cleaning agents and applications of ultrasonic agitation thorough deionized water rinsing and vacuum furnace baking. A simple and cost-effective cleaning facility consisting of ultrasonic cleaning tanks, a drying tank, and a vacuum furnace has been set up. The effectiveness of component cleaning is evaluated by the base pressure achievable compared to what is expected according to vacuum calculations using available outgassing rates for the components. Each major component is vacuum tested beforefinal assembly. Vacuum comparisons in some vendor-provided components before and after additional cleaning will be discussed.

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