

## ABSTRACT

### QUALITY ASSURANCE OF LARGE AREA RPC DETECTOR, TECHNIQUES FOR MEASUREMENT OF GAS LEAK RATE

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Gas leaks from operational RPCs are quite undesirable due to pollution caused , increase in operational cost and degrading of detector performance. RPC detectors are influenced by the quality and quantity of gas mixture. Close Loop Recirculation method is commonly used to conserve gas mixture with efficiency of 90%+. However , working of close loop system itself is severely affected by gas leakages – mainly through RPC detector body . Many factors such as gas flow rate , differential pressure , drift and diffusion of gas mixture components within RPC gap are related to gas leaks. Ingress of contamination into gas mixture is also possible due to strong concentration gradient present across a leak .The problems are further compounded with formation of radicals in the process of measurement and poses a threat to integrity of the Glass RPC detectors in particular.

Various leak detection techniques such as Pressure decay , Tracer techniques , and mass spectroscopy are studied for quantitative estimate of leak rate. Design and Construction of equipment required to conduct leak tests is detailed . Acceptable range of Leak rate is estimated . Implementation of Leak test procedures into a Quality Assurance Plan for RPC Fabrication Process is discussed .