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Quality control for the first large areas of triple GEM chambers for the CMS endcaps

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The CMS GEM collaboration plans to equip the very forward muon system with triple GEM detectors that can withstand the environment of the high-luminosity LHC. This project is at the final stages of R&D and moving to production. An unprecedented large area of several 100 qm are to be instrumented with GEM detectors which will be produced in six different sites around the world. A common construction and quality control procedure is required to ensure the performance of each detector. The quality control steps will include optical inspection, cleaning and baking of all materials and parts used to build the detector, leakage current tests of the GEM foils, high voltage tests, gas leak tests of the chambers and monitoring pressure drop vs. time, gain calibration to know the optimal operation region of the detector, gain uniformity tests, and studying the efficiency, noise and tracking performance of the detectors in a cosmic stand using scintillators.

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