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RESEARCH AND APPLICATION OF LOW PARTICULATE MATTER CONCENTRATION TESTING TECHNOLOGY IN HIGH HUMIDITY AND LOW TEMPERATURE ENVIRONMENT

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Abstract

The accuracy of the particulate matter (PM) emission measurement in coal-fired power plants has been enhanced to meet stricter environmental standards. The self-made " test and calibration device of low PM concentration" was used to simulate the complex field conditions of flue gas with high humidity, high acid and low temperature (about 50 °C). The detection limits and PM trapping performances of six filtration membranes were tested. The filtration membrane with the best trapping performance was studied under different filtration wind velocities and low flow velocity condition. And the simulation test was verified by practical application. The results showed the feeding frequencies had a good linear relationship to the PM concentrations, which can be used as a standard curve to calibrate the PM concentration. The borosilicate membrane had the lowest detection limit and the best PM trapping performance in high humidity and low temperature environment. The large diameter sampling nozzle should be selected for the measurement of low PM concentration. Predicting constant current isokinetic sampling method was recommended for the measurement of low velocity PM concentration. Practical application had proved that our test method is feasible, and the borosilicate membrane is more suitable than the commonly used Swedish quartz membrane for the measurement of low PM concentration in saturated wet flue gas.

Keywords: coal-fired power plant, high humidity, low temperature, low PM concentration, testing technology

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