ABSTRACT

Air pollution is becoming a serious environmental problem, especially with increasing levels of $PM_{2.5}$ and CO_2 in the air. Measurement of the concentration of these pollutants is often hampered by meteorological factors, such as humidity and wind speed, which can affect the accuracy of microsensors. Therefore, this research aims to develop a sampling line conditioning integration system that can improve the accuracy of continuous and real-time $PM_{2.5}$ and CO_2 measurements. The methods used in this research include the application of isokinetic sampling to optimize air sampling, as well as humidity conditioning to reduce reading errors by sensors. System testing was conducted for 14 days through field collocation using SNI 9178:2023 standards to ensure precision, linearity, and error in measurement. The test results show that the average standard deviation of the unconditioned system is 3.9 µg/m3 and the conditioned system is 1.4 µg/m3. This shows that the conditioned system is able to reduce the standard deviation value of the unconditioned system. The average coefficient of variance in the unconditioned system is 8% and the conditioned system is 5%. The conditioned system has the ability to reduce the coefficient of variance to almost half the value of the coefficient of variance of the unconditioned system. The test results show that there is an improvement in measurement performance when measuring using the conditioned system.

Keyword : isocinetic, humidity, $PM_{2.5}$, CO_2, conditioning