

Proven Air Permitting Compliance - Varimax™ V-40

E3 Solution's (e3) enhanced, high efficiency evaporation systems are capable of adjusting and controlling water flow and droplet size to maximize wastewater evaporation and are designed to be fully automated with remote sensing and control, while collecting real-time performance data.

Along with our high-performance standards, e3 understands that our clients face challenging regulations pertaining to air quality and emissions control. As part of the air permitting process, facilities are required to demonstrate that the emissions coming from their sources will not cause the violation of any applicable air pollution regulations or standards. Permit violations are often accompanied with a penalty of up to \$25,000 per day, per violation for all days of operating out of compliance.

To assist in meeting EPA and State permitting and compliance requirements, we have gone beyond just providing state-of-the-art enhanced evaporation systems, we have established that our systems can assist our clients with meeting the National Ambient Air Quality Standards (NAAQS) regarding the regulated deposition of Particulate Matter (PM). The NAAQS for PM_{2.5} and PM₁₀, on a 24-hour average, are 35 microgram per cubic meter air (µg/m³) and 150 µg/m³, respectively.

To substantiate system performance, WSP USA Inc., an air quality industry leader, recently conducted an air dispersion and modeling study for a continuously operating VARIMAX™ V-40 system. The six-month study was conducted over a broad range of operating scenarios regarding flow rate and motor speed. The field monitoring study was conducted to determine air quality impacts from the facility's source, a VARIMAX™ V-40 system, to 50 meters (m) distance, and was then modeled to a distance of greater than 1,000 m, to show the fraction of total deposition predicted by application of the US EPA preferred and recommended AERMOD air dispersion model.

The study established the following:

- Generation of PM_{2.5} or PM₁₀ NAAQS emissions are dependent on flow rate and atomizer speed therefore, the airborne concentrations and the deposition of PM, can be influenced by adjusting the speed of the atomizers and/or the water flow. [The VARIMAX™ V-40 System's remote sensing and control programming can account for variable weather conditions to ensure that computerized operational changes occur during inclement weather conditions to avoid drift and permit noncompliance.](#)
- [Deposition modeling shows that a majority of the total water deposition predicted occurs within a short radius of the source and surface depositions are expected to decrease rapidly with distance.](#) The modeling does not account for evaporation during the transport of the water droplets between the source and the receptor locations. The modeling results for deposition are, therefore, conservatively high compared to actual field conditions.
- Modeling results show a reasonable comparison between modeled and actual concentrations of Total Dissolved Solids (TDS) measured, with the modeled concentrations expectantly being 2-3 times higher than monitored concentrations; [providing reasonable assurance to regulators that the operation of e3's evaporation systems can assist in the management of PM emission deposition to meet permit conditions.](#)
- Ambient air quality monitoring was performed for a continuously operating VARIMAX™ V-40 system over a broad range of operating scenarios and [the maximum 24-hour average PM_{2.5} and PM₁₀ concentrations contributed by the system were measured to be 1.6 to 5.4 µg/m³ and 1.9 to 7.9 µg/m³, respectively, at a distance of 50 m from the system; well under EPA's NAAQS. These values can be linearly scaled up depending on the number of operating evaporation systems deployed and their relative location if clustered.](#)