Pilot plant apparatus for the treatment of VOCs or ammonia from waste air stream

Description/Parameters:

The apparatus consists of two steps, where the first step is a dry photolytic reactor utilizing intense UVC radiation (185+254 nm) to generate hydroxyl radicals and ozone. The second stage is a wet photochemical scrubber employing UVC radiation (254 nm) along with a hydrogen peroxide solution, again to generate hydroxyl radicals. This technology is suitable for measuring the removal of various organic pollutants at different concentrations and flow rates of the waste air stream. The purified air and hydrogen peroxide solution undergo thorough analysis, both at the inlet and the outlet of the technology. Gas chromatography with a flame ionization detector or mass spectrometer (8890 GC System, Agilent Technologies Inc., or GC 7890 + MSD 5975, Agilent Technologies Inc.), infrared spectrometer with Fourier transformation with a 20m gas cell (Nicolet Antaris IGS, Nicolet CZ ltd.), pH meter (Multi 3420, WTW with SenTix 940–3 probe, Xylem Inc.), and a carbon analyzer for water samples (Formacs^{TM} HT-I, Skalar) are used for the analyses. The equipment can also be modified for measuring the adsorption capacity of various materials.

Usage/Services:

Measurement of the removal of volatile organic compounds and odorous substances, such as ammonia, from an air stream within the range of 150 – 1,500 m^3/h and pollutant concentrations ranging from 0-200 ppm.

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