



Unique selling points

Low power consumption: lab estimates of 1/10th power consumption of conventional plasma reactors

High dispersal rates due to application of the Microbubble Technology to create sustainable operation with energy efficiency

In situ dosing permits integration of UV production and oxidation power with dispersal to minimize unspent ozone production. The dosing lance is portable and scales up by replication.

Ozone plasma microreactor dosing lance for water and wastewater treatment

Water purification economics overview

The technology is expected to provide a 80 to 90% saving in electricity costs compared with traditional ozone generation in addition to negating the need for oxygen deliveries to water treatment works.

It is calculated that for one existing site of 90MLD an annual operational saving of £115k could be achieved. The total annual saving for the current installed UK ozone capacity is £4.6M. (Note this does not include cost of carbon credits from 1 April 2010 for the water industry.)



Submerged dosing lance

In addition to operational cost saving the technology could provide a saving of up to 80% of the capital costs associated with ozone installation equivalent to £780k. Based on a UK retrofit market of all WTW priced equivalent to a payback period of 5 years of operational cost savings the market size is estimated to be £23M. For new build assuming 50% take up of sites suitable based on 50% of capital saving and 5 years operational costs the new build market is estimated to be £15.4M.

The use of ozone due to its high conventional cost and power consumption is rare currently. With applications to breaking down complex organic molecules such as pesticides and endocrine disruptors and to disinfection, the market potential is much greater than the current installed base.

Plasma Microreactor Technology

Our new reactor design and associated electronics produce ozone from air with key features:

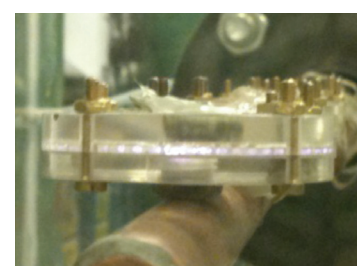
- Low power. Our estimates are a ten-fold reduction over conventional ozone generators.
- High conversion. The selectivity is double that of conventional reactors (30% > 15% single pass).
- Dual UV-ozone dosing: Recently discovered strong irradiation in UV "killing zone" of ~300 nm.
- Operation at atmospheric pressure, at room temperature, and at low voltage (170V, can be mains powered). No need for expensive safety measures to destroy the unspent ozone.

J. H. Lozano-Parada and W. B. Zimmerman, "The role of kinetics in the design of plasma microreactors." *Chemical Engineering Science* doi:10.1016/j.ces.2010.03.056, 2010.

Zimmerman and Lozano-Parada, "Plasma microreactor apparatus, sterilisation unit and analyser," patent pending, 2009.



Axial view of dosing lance



Axial view of dosing lance



Inserts with ball cock into water mains

