

Statiflo International Ltd

**A Story of Continuous
Development**

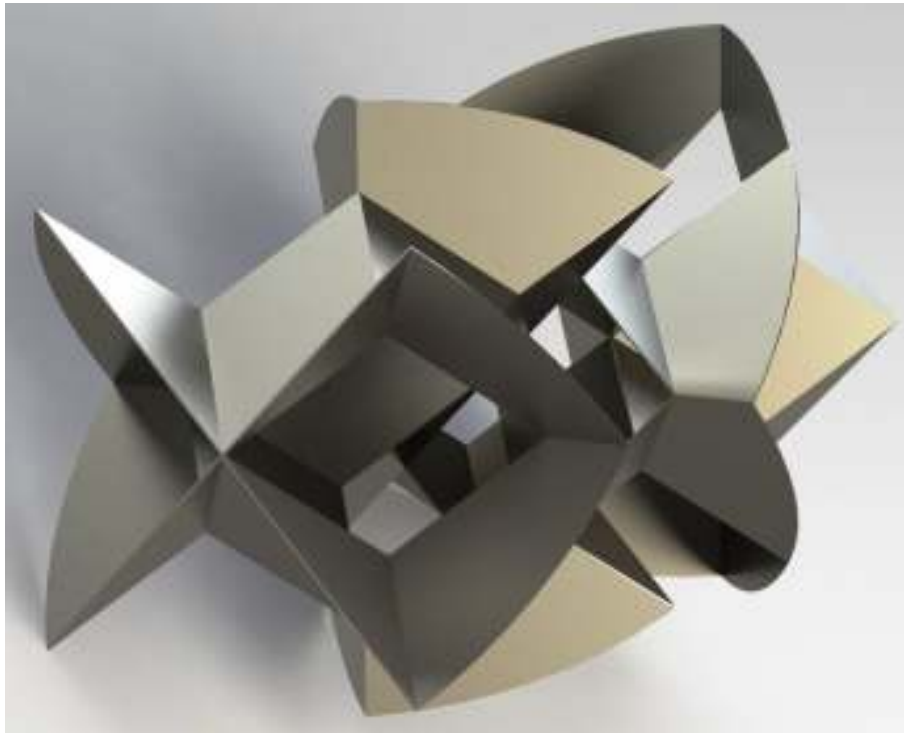
by

Philip Page

philippage@statiflo.co.uk

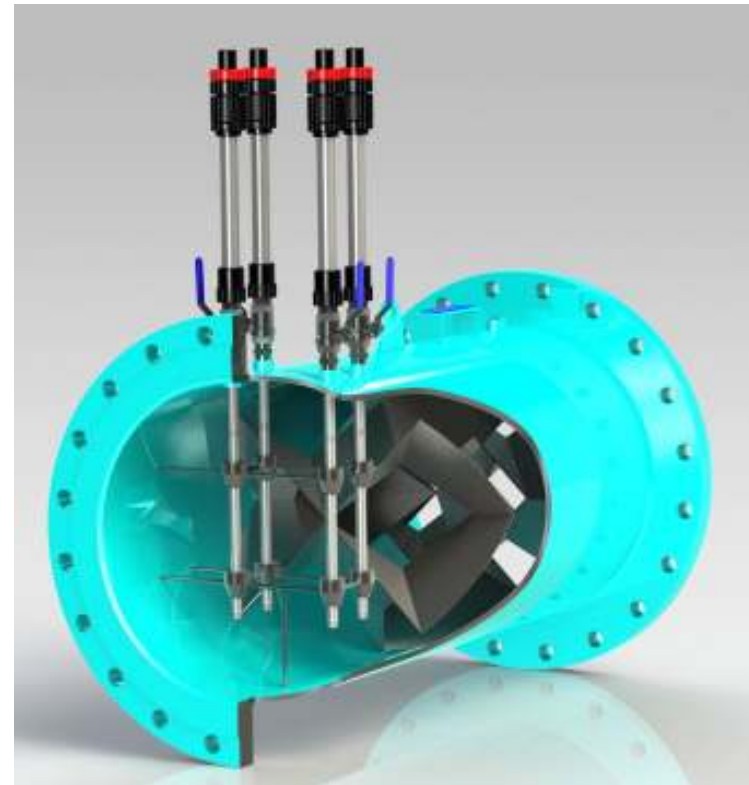
Background

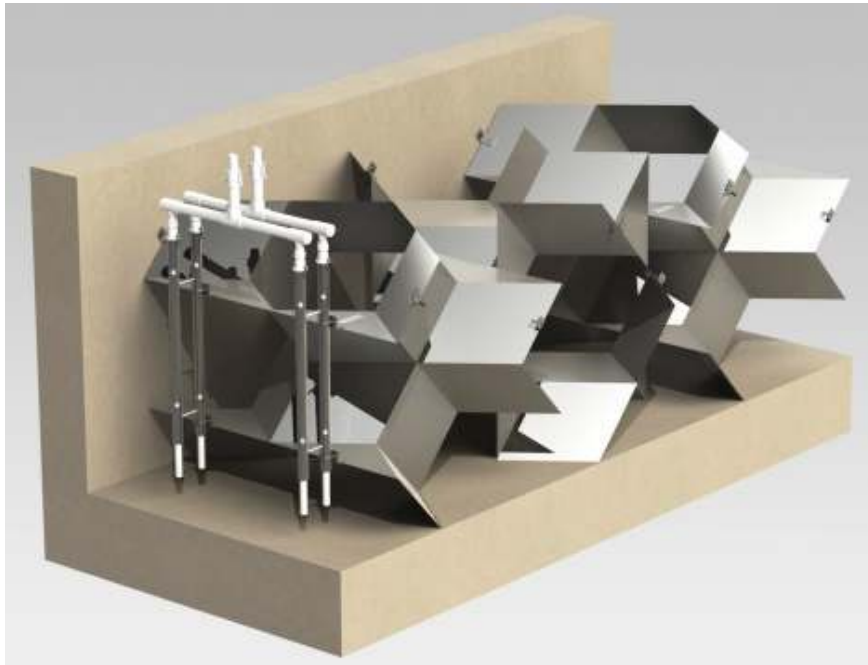
- Statiflo – Manufacturer of static mixers
- Statiflo joined WWM 2 in 1999
- From Pipes to Channels during this time
- Non Ragging pipe and channel mixer for wastewater treatment applications (WWM5)
- DesalMixer
- New approach to a UV reactor.



Statiflo STM pipe elements

Complete STM mixer with injection lances





Layout of a Statiflo STMC Channel Mixer

This unit is 3.2 metres wide by 2.7 metres high and is awaiting completion in the workshop.

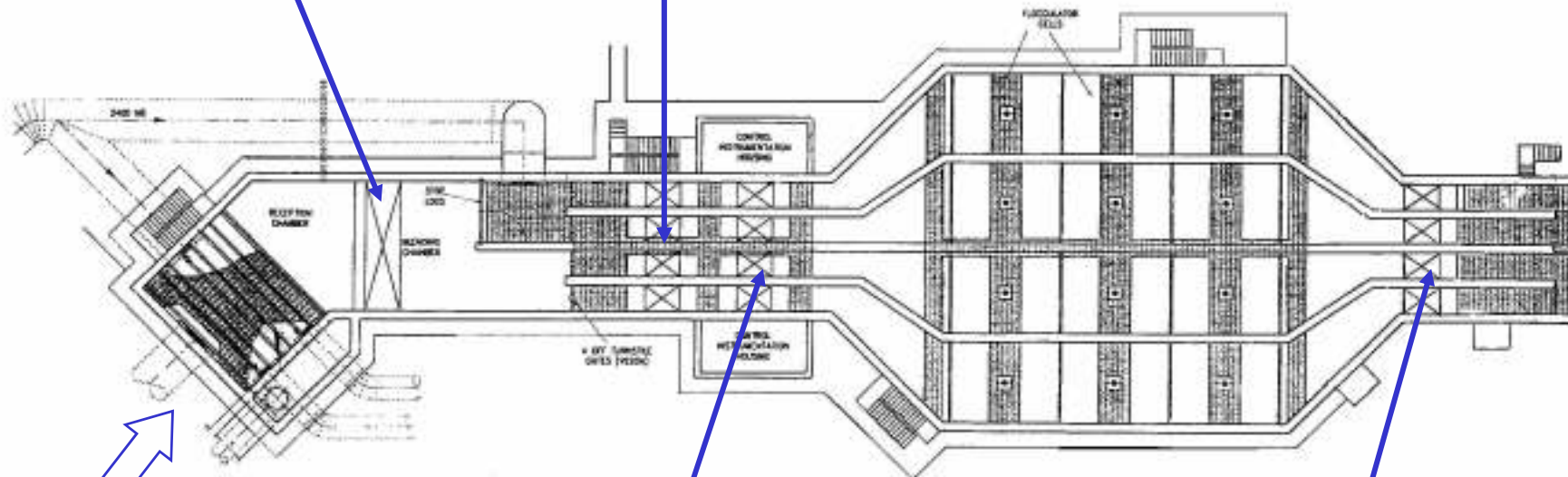


Inlet blend mixer

7 m wide X 5 m deep

4 off lime mixers

Each 1.5 m wide X 5 m deep



Total plant flow
621 Mld

4 off Alum mixers

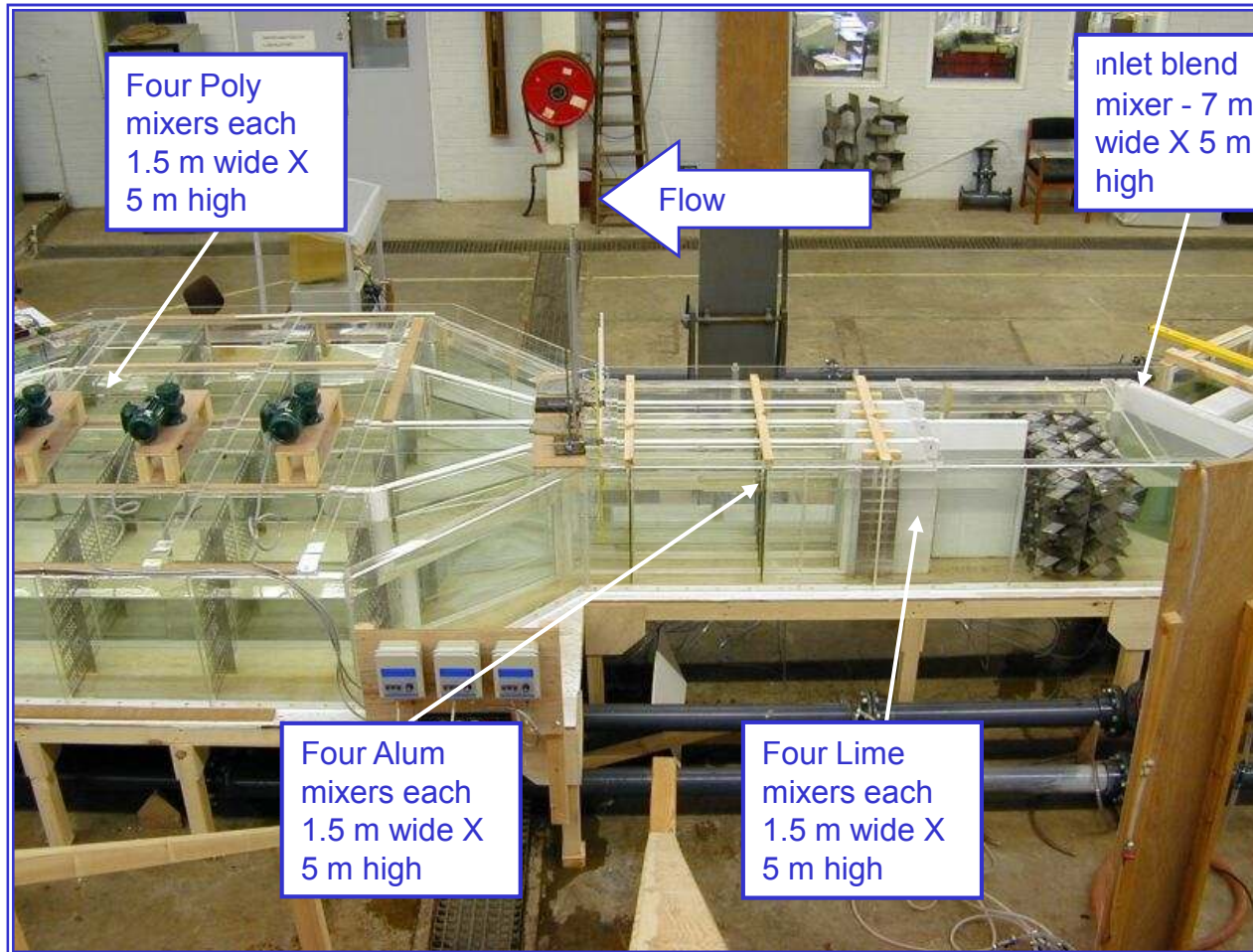
Each 1.5 m wide X
5 m deep

4 off Poly mixers

Each 1.5 m wide X
5 m deep

Total plant headloss from inlet to outlet 270 mm WG at 621 Mld

Static/In-line Mixers : Gas Dispersers : Laminar Flow Heat Exchangers : In-line Scrubbers



1/20 th scale model of the complete inlet works.

Static/In-line Mixers : Gas Dispersers : Laminar Flow Heat Exchangers : In-line Scrubbers



Flow through this is 621 mld

Or 26,000 m³/hr

Or 7.07 tons per second



APPLICATIONS IN WASTE WATER TREATMENT



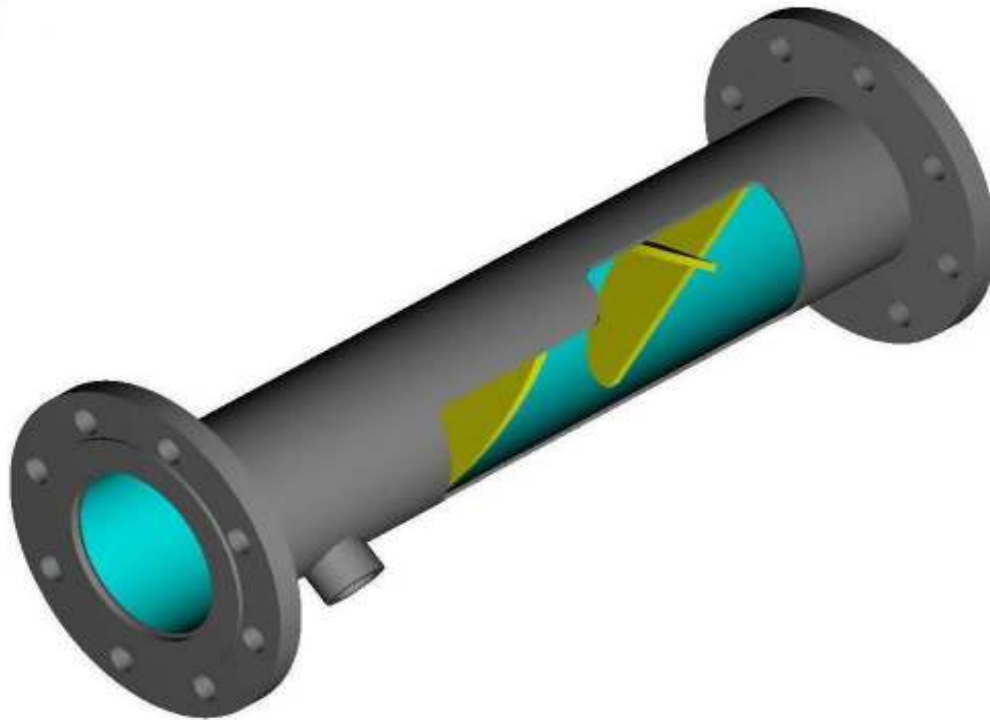
Static/In-line Mixers : Gas Dispersion Systems : Laminar Flow Heat Exchangers : In-line Scrubbers

Statiflo decided to develop a non clogging mixer suitable for fibrous materials like sludge

This proved to be quite a challenge

SLUDGE BLENDER

This was developed under
WWM5



A static mixer specifically designed for sludge and other fibrous materials

Full scale testing / comparison at a Thames Water site





Statiflo Sludge Blender



Competitors Design

Inlet Comparison



Outlet Comparison



The next natural progression was to develop a channel version of the Sludge Blender.

The goal was Phosphorous removal at WWT plants

This has proved to be one of the most exacting task undertaken at Statiflo



Good Reasons to Develop a non ragging channel mixer

Normal Dosing System

No mixing

No control

Excessive chemicals



Burnley STW

Statiflo's first NRC pilot installation.

Dosing Ferric for P removal



Burnley STW

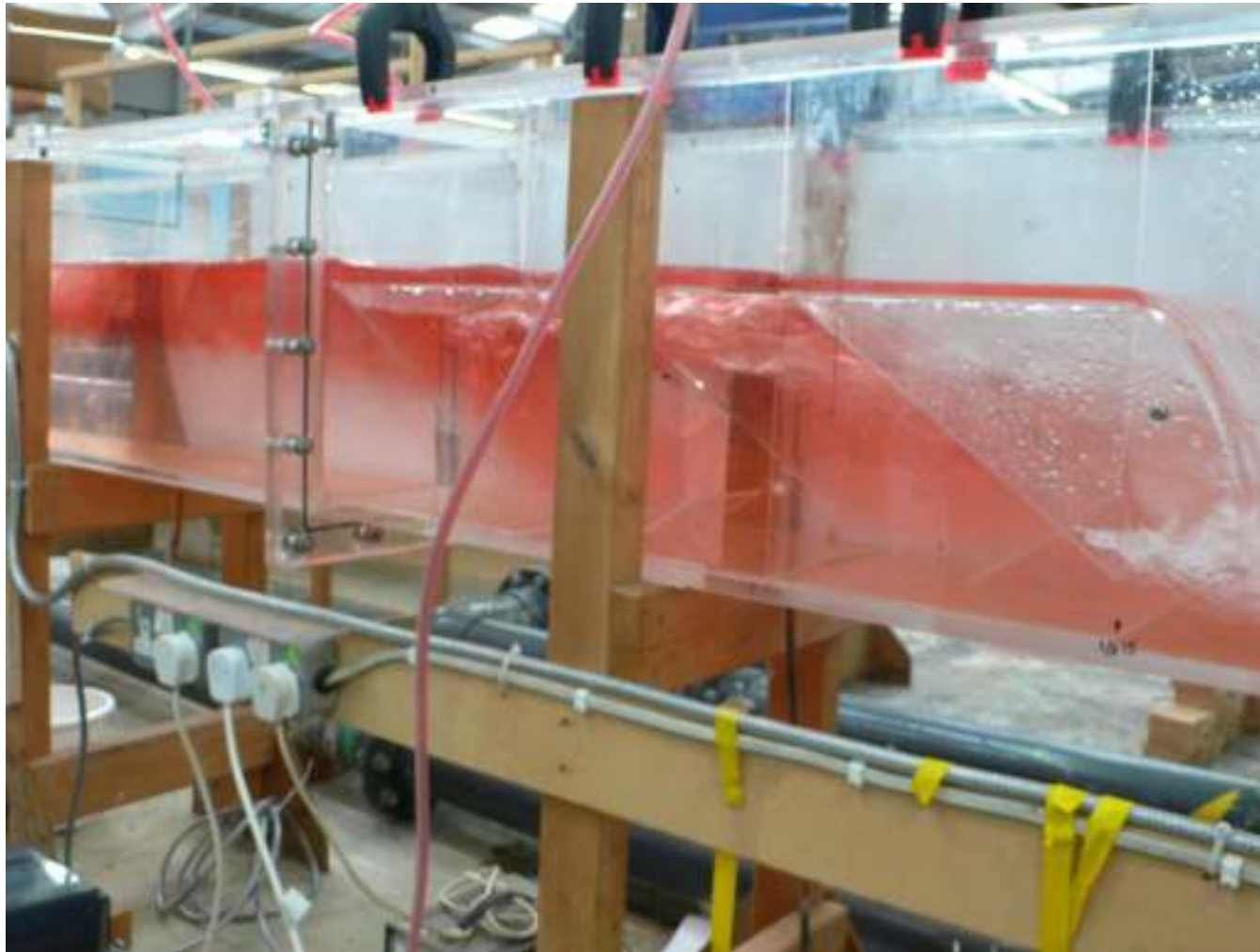
There were a lot more considerations to be taken into account than typical Water Treatment Works;

Pumped flows

Large flow variation in 24hr

Relatively high velocities

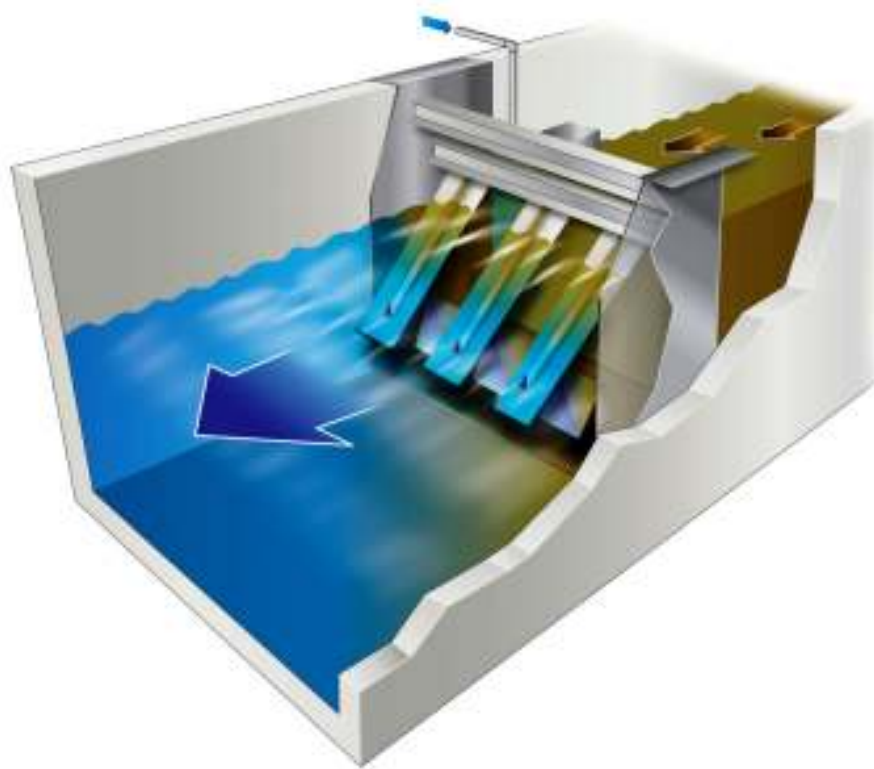
After Burnley



Static/In-line Mixers : Gas Dispersion Systems : Laminar Flow Heat Exchangers : In-line Scrubbers



A complete redesign was necessary after the initial trials at BHR

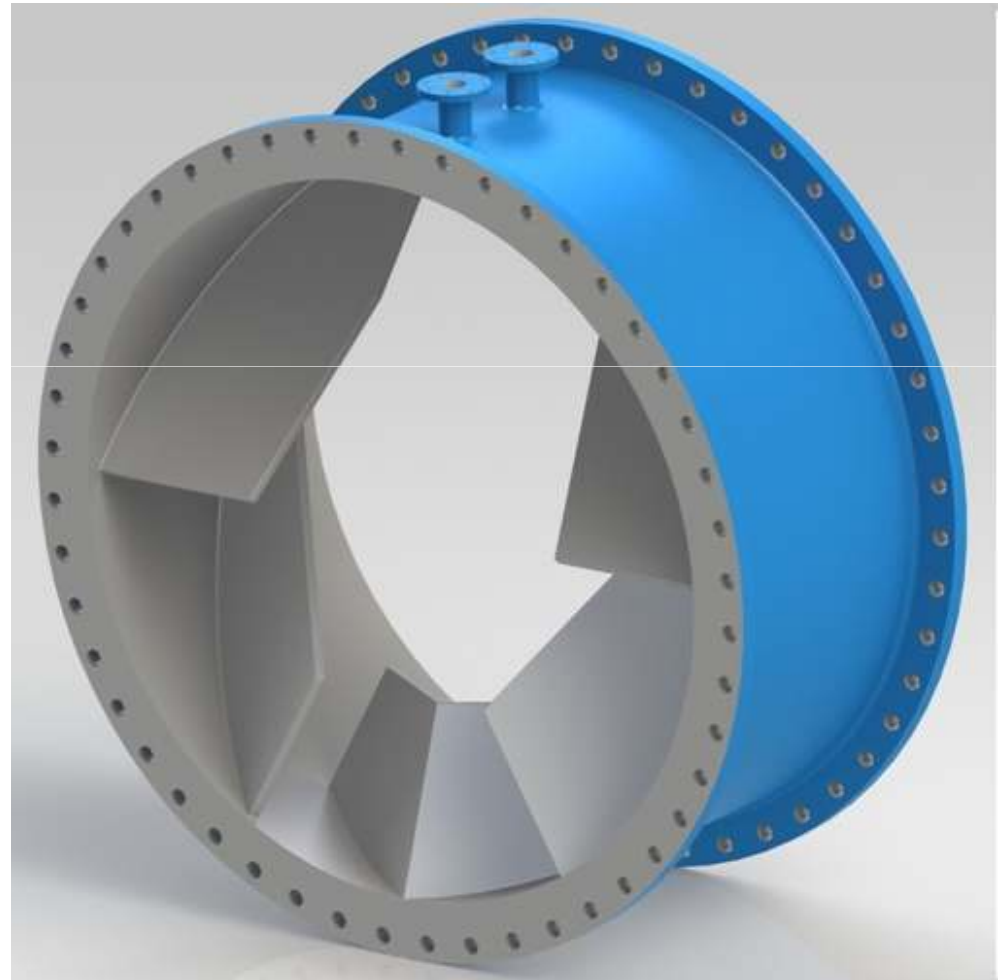


NRC – Final design

2m x 1.6 m deep
NRC at a large STW



Statiflo DesalMixer

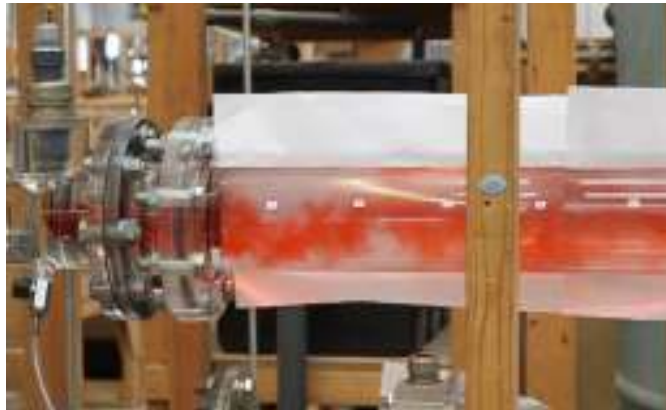


Static/In-line Mixers : Gas Dispersion Systems : Laminar Flow Heat Exchangers : In-line Scrubbers

Statiflo DesalMixer

- Special requirements
- Flexible design to meet all process and hydraulic conditions
- Good mixture quality / Low pressure drop
- Easy to install
- Simple dosing arrangement

- We used Rapid Prototyping and BHR to develop the mixer



Empty pipe

Pilot testing at BHR



Desal mixer

Pilot testing performed on realistic high mainstream to low dosed additive ratios.

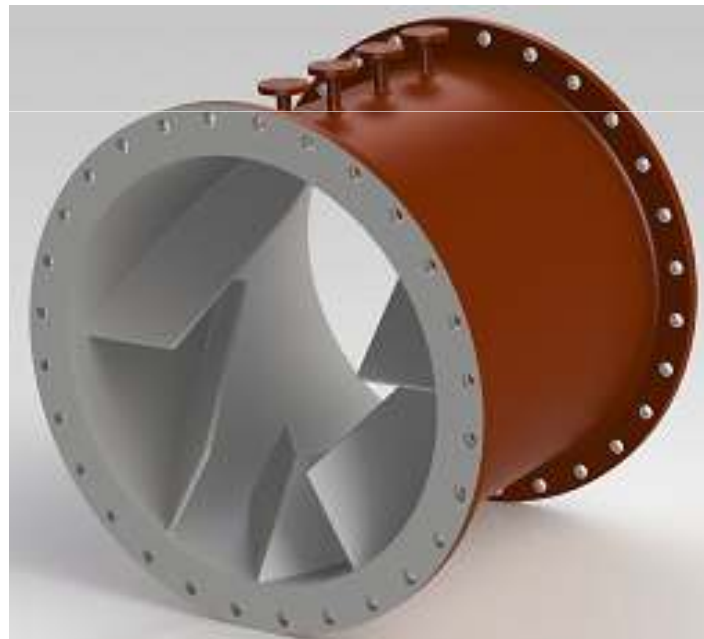
Low pressure drops – up to 70% less than other ‘short’ mixer designs

Achieves a high mixture quality – Typical CoV of 0.05 at 3 diameters downstream.

Static Mixers : Channel Mixers : Ozone GDS : Aeration GDS : Laminar Flow Heat Exchangers : In line Scrubbers



Short Mixer PR 0.25



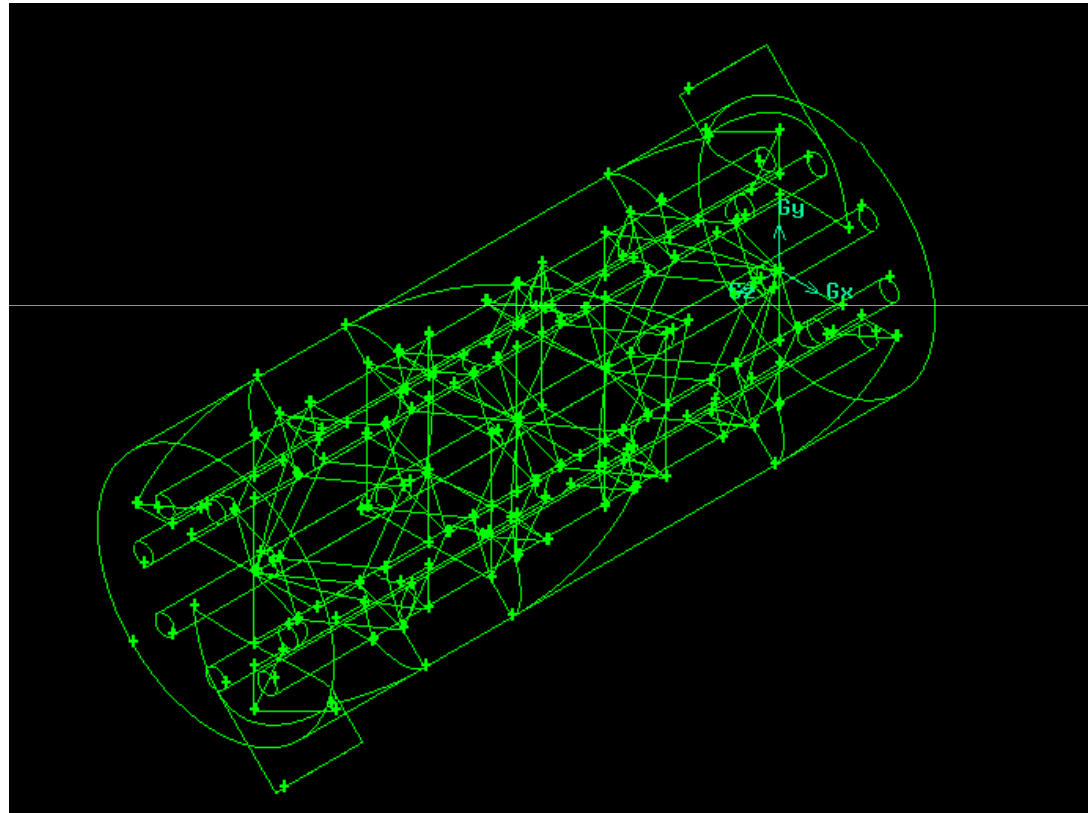
Long Mixer
PR 1.0

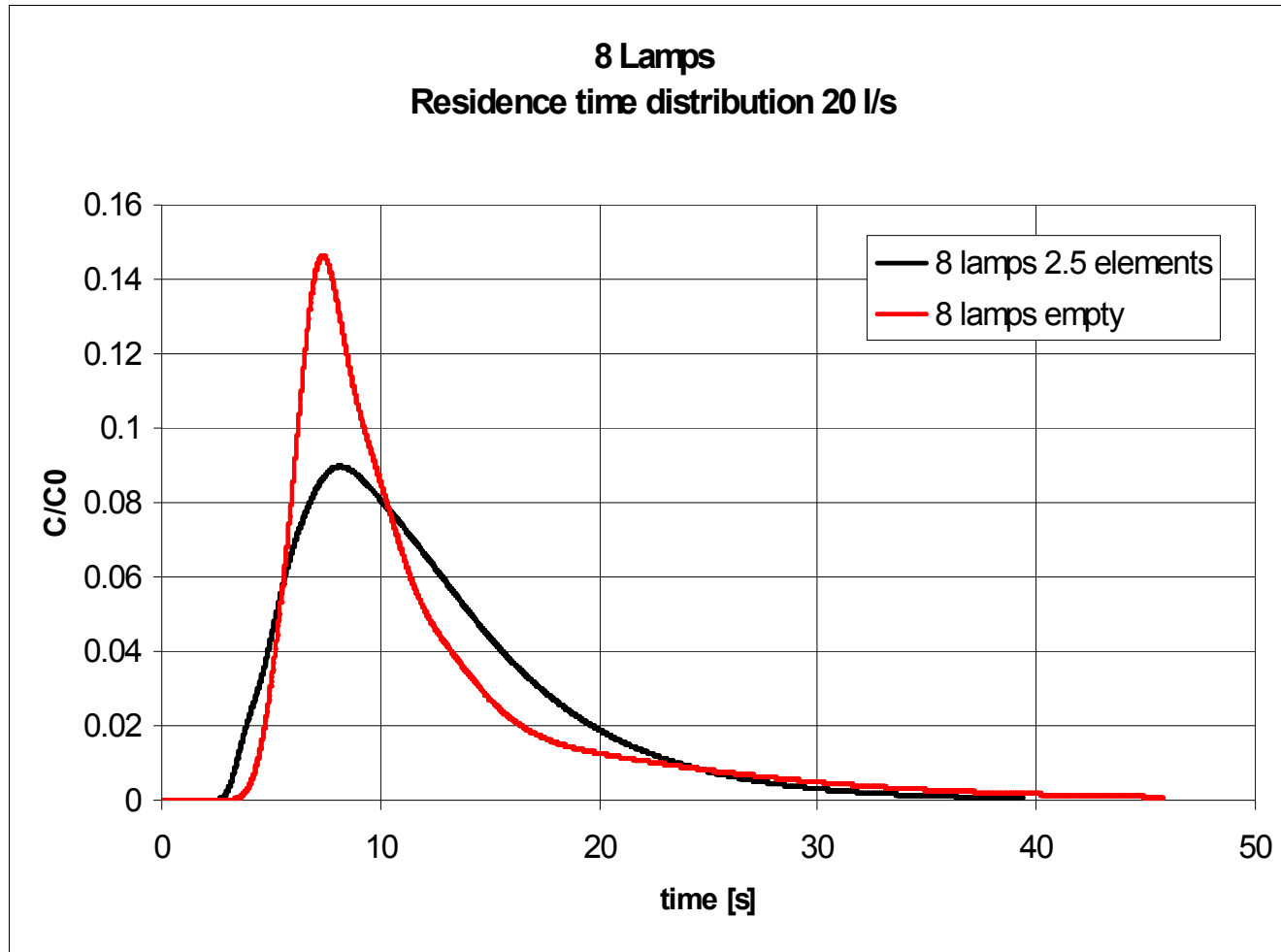
Statiflo UltraMix UV Reactor

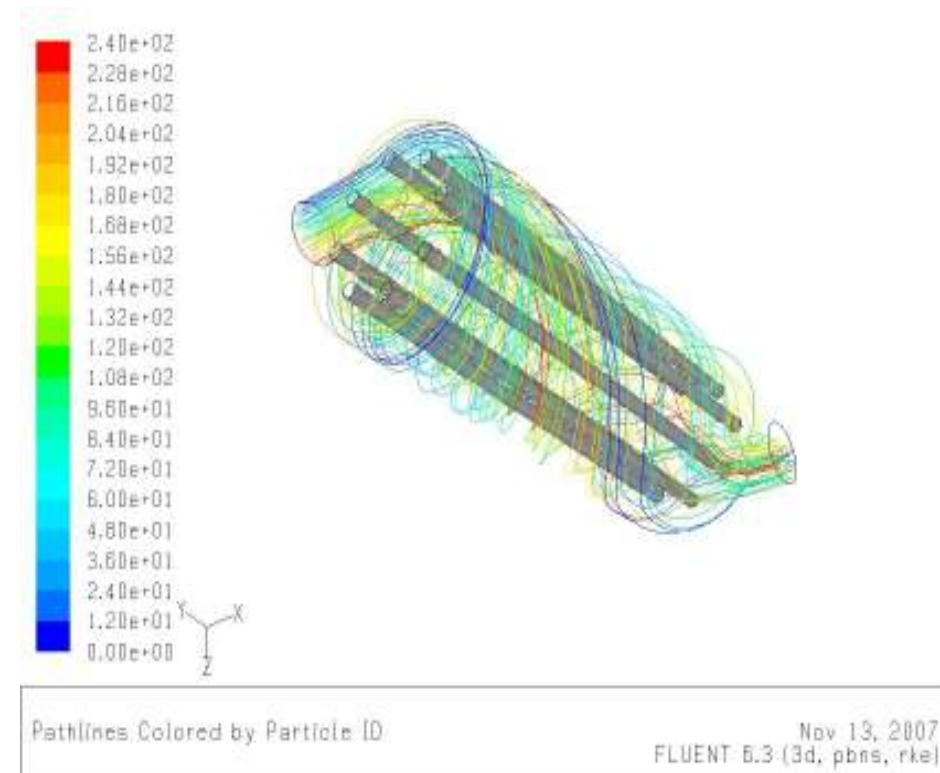
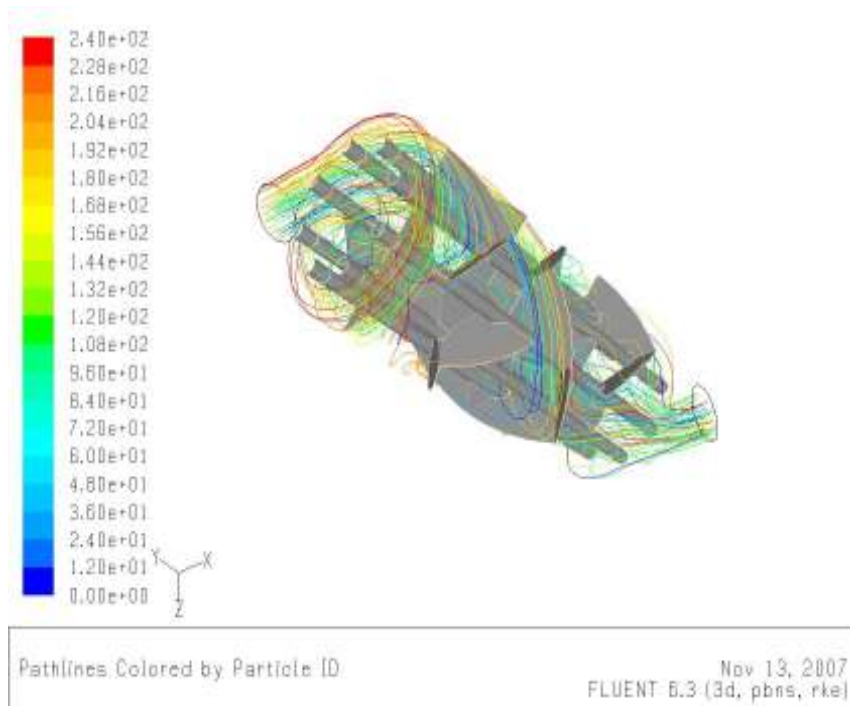
- The concept was to combine static mixing and UV technology
- Statiflo was awarded a substantial grant from the DTi
- Statiflo appointed BHR to CFD model the hydraulic and effectiveness of the UV system

Statiflo UltraMix UV Reactor

The project started by placing mixing elements into a standard UV reactor

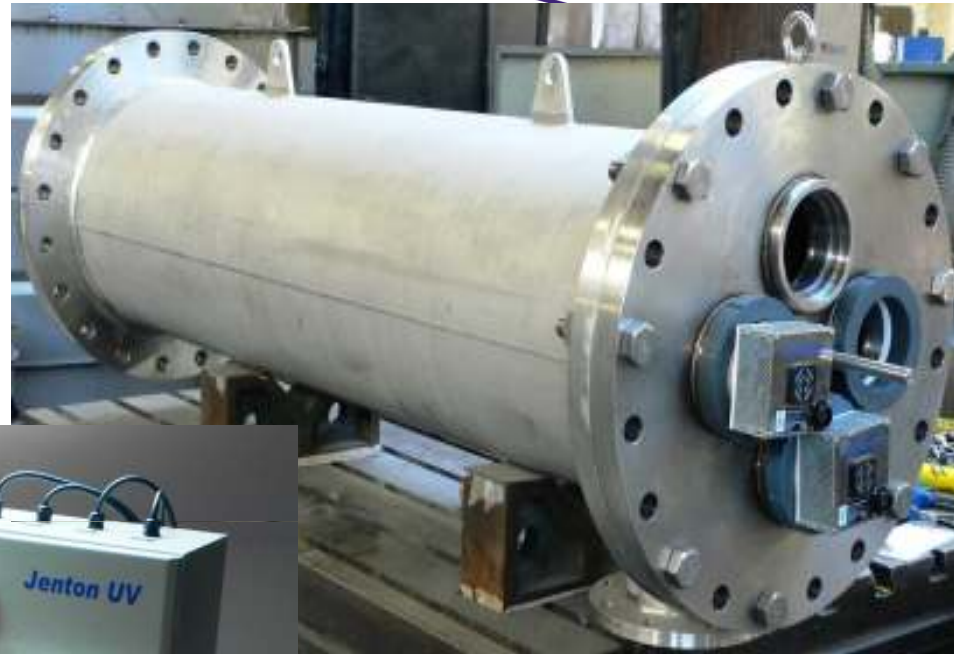






Static/In-line Mixers : Gas Dispersers : Laminar Flow Heat Exchangers : In-line Scrubbers

UV Reactor for fluids with low transmissivity

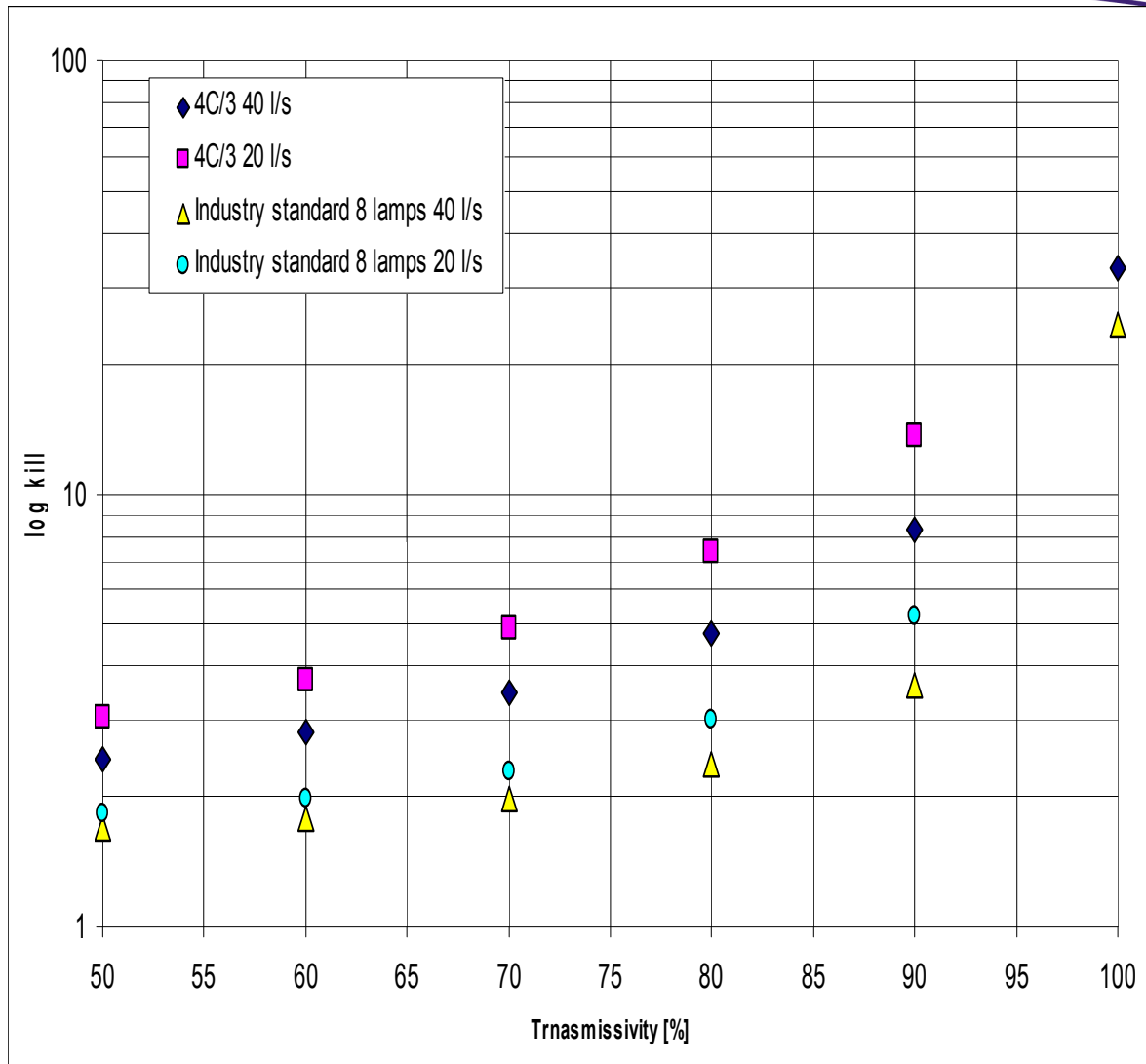


500 NB 16 Lamp 3 element unit

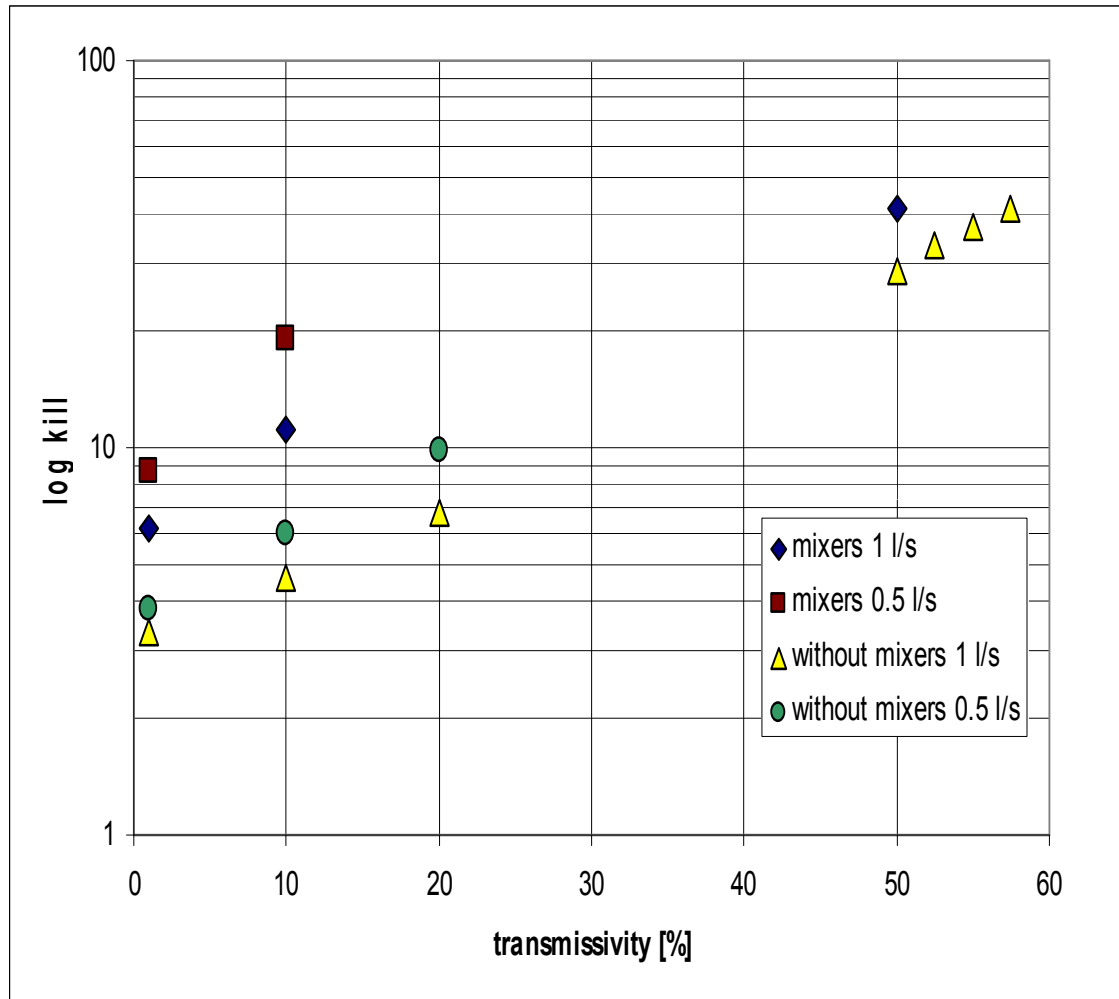


125 NB 4 Lamp 12 element unit

Static/In-line Mixers : Gas Dispersers : Laminar Flow Heat Exchangers : In-line Scrubbers



Comparison Statiflo UltraMix UV Reactor with Industry Standard UV designs for Cryptosporidium



Effect of mixing elements on performance for Sarcina Lutea

Thank You

Questions

philippage@statiflo.co.uk