



KUSTERS WATER

a division of ZIMA corporation

Terminodour™

Odour control for
the 21st Century



CSO  **Group**
AD & Pollution Solutions

www.csogroup.co.uk



▲ Terminodour™ at Tenbury Wells for Severn Trent Water Services



Terminodour™ and the Environment

Traditional odour control systems consume a significant amount of energy and, in many cases, utilise large quantities of chemical, water and media requiring regular and expensive disposal.

Terminodour™ offers a low carbon footprint solution for odour abatement as power consumption is a fraction of traditional systems and Terminodour™ does not require any chemicals, water or media. Terminodour™ provides cost effective proven odour control in an environmentally beneficial manner.

Terminodour™ Background

The first Terminodour™ system was installed in the UK in 1996 since then the process, through a programme of research and development, has become one of the most exciting developments in the field of odour abatement.

Extensive process development has now resulted in a tried, tested and proven system that is providing our clients with cost effective odour control and improved air quality. Our references speak for themselves but we will happily provide you with contact details so you can check our credentials.

The Terminodour™ Process

The Terminodour™ process combines ventilation and ionisation technology to provide efficient air distribution with maximum oxidation capacity to deliver highly effective odour control within a building or any enclosed space. The Terminodour™ process encompasses a holistic approach to effective odour abatement and, where people are present, ensures good internal air quality.

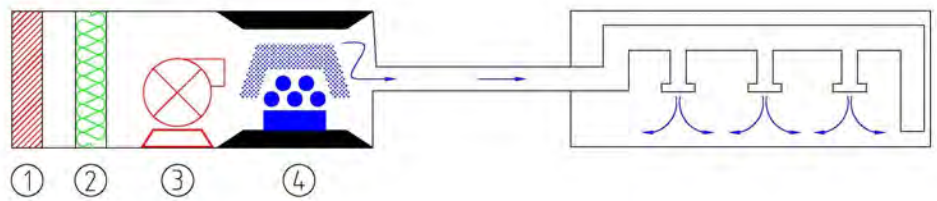
Operation

Most odour control systems extract odour from the point of source and feed via ductwork to an abatement system where the odours are either oxidised or absorbed before the treated air is emitted to the atmosphere. The Terminodour™

tank cover as the reaction vessel.

Fresh air is drawn by a fan (3) into the Terminodour™ system via an external louvre (1) and is then filtered (2) to remove particles. The filtered air is then passed into the plasma reaction chamber (4) where the hydrogen and oxygen molecules are electrically charged in a 5:4 ratio (negative/positive). The resulting ions are then distributed around the building according to the location and severity of odour emission points within the building or chamber.

The ductwork system design is an extremely important part of the process and is a critical element of the design to ensure that ions are distributed at the right quantity and rate to meet the level of odour generation at specific points.



system does not extract the odour but actually oxidises the odour at the point of source using either the building superstructure or space beneath the

The heart of the Terminodour™ process is the Terminodour™ air handling unit (AHU) that contains the principal system components; these include the inlet filtration section, fan(s), plasma reaction chamber, ionising modules etc.

Terminodour™ Reaction

Terminodour™ has the capacity to oxidise all organic doours, efficiency is a function of contact time and the length of the molecular structure of the molecule to be oxidised. Hydrogen sulphide is the trace indicator gas found in wastewater and given sufficient contact time with the ions produced by the Terminodour™ unit will be oxidised to a benign, non-toxic sulphate ion.

Terminodour™ Performance

CSO Group can provide performance guarantees for odour abatement efficiency on both new build and retrofit applications. Performance



efficiency varies according to a number of parameters however we typically offer odour reductions of 80-95% within a building and up to 99% for storage tank or wet well applications.

Terminodour™ Applications

Terminodour™ has been proven to be efficient in numerous applications including:

- Municipal wastewater
- Industrial wastewater
- GRP or FRP manufacture
- Food processing

Terminodour™ Benefits at a Glance

- Cost effective odour abatement
- Combines odour abatement and ventilation in on package
- Low carbon footprint
- No chemicals, water or media disposal costs
- Instantly effective - no start up delay
- Can handle variable loadings
- Simple non specialist maintenance
- Reduces sulphide inspired corrosion
- Improves internal air quality
- ATEX rated

Terminodour™ Heath and Safety

CSO Group have designed the Terminodour™ system specifically for treating odours in areas that may potentially have explosive gasses present such as wastewater treatment plants. The system has full ATEX certification.

Although it is perfectly possible for ionisation equipment to produce ozone the Terminodour™ design ensures that any ozone produced is minimal and far below the occupational exposure level of 0.1ppm.

Scope of Supply

CSO Group offer a complete turn-key service including: odour surveys, design, manufacture, supply, installation, commisioning, testing and after sales service. In addition to Terminodour™ we are able to offer a wide range of alternative odour control systems and ancillary products such as GRP covers.



▲ Terminodour™ system providing odour abatement for a pumping station at Vaguarda, Spain adjacent to local amenity area

Reference Applications -



Project Name: Swansea WWTW, UK
Client: Dwr Cymru
Completed: 2007
Application: Installation of Terminodour™ system to the lamella areas, inlet works and fats, oil and grease (FOG) areas
Building volume: 16,155m³
Odour Load: Hydrogen Sulphide (H₂S)
Objective: 80% H₂S reduction within 1.5m of odour source
Achieved: >92% H₂S reduction within 1.5m of odour source



Project Name: Widnes
Client: ReFood
Completed: Operational since Autumn 2014
Application: Food waste reception building
Building volume: 12,500m³
Odour Load: Hydrogen Sulphide, Ammonia, VOC's, Mercaptans and Terpenes
Objective: Abate odour in the municipal food waste reception building
Achieved: Project due for completion spring 2014



Project Name: Edar Lolin Anchovy Processing Plant, Spain
Client: Edar Lolin
Completed: 2008
Application: Food processing wastewater treatment plant
Building volume: 275m³
Odour Load: Hydrogen Sulphide (<50ppm)
Mercaptans (<10ppm)
Objective: No odour nuisance at boundary
Achieved: No further complaints since installation completed



Project Name: Davyhulme WwTW
Client: United Utilities
Completed: 2012
Application: Sludge thickening building
Building volume: 5,038m³
Odour Load: Hydrogen Sulphide (20ppm average)
Objective: Odour abatement
Achieved: >80% reduction of H₂S internally, 99% externally

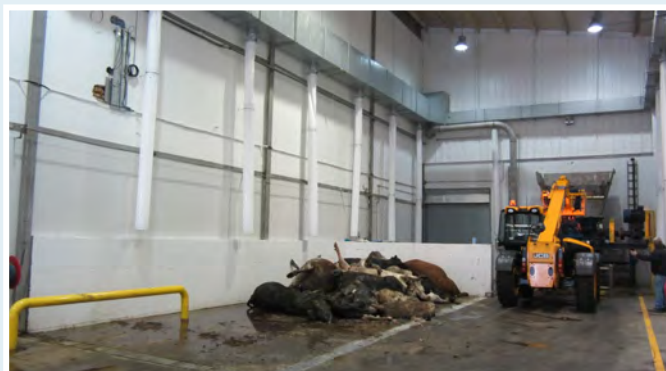
Municipal Wastewater and General Industrial



Project Name: Roundhill Sludge Incineration Building, UK
Client: Severn Trent Water
Completed: 2005
Application: Sludge cake storage and treatment facility
Building Volume: 3,700m³
Odour Load: Average 1971 OUE/m³
Peak 25429 OUE/m³
Objective: Reduce average Ammonia levels to <5ppm internally
Achieved: 3.78ppm Ammonia (average)
185 OU/m³ (GeoMean)



Project Name: Pumping Station D2, ISA Town, Kingdom of Bahrain
Client: Ministry of Works, Bahrain
Completed: 2006
Application: Inlet works, pumping station and wet wells
Treatment Volume: 868m³
Odour Load: Hydrogen Sulphide (500ppm)
Objective: No odours at the boundary and a good working environment in the dry areas
Achieved: Objectives met - system outperforming carbon filters on similar sites



Project Name: Londonderry
Client: Foyle Food Group
Completed: 2014 – Phase I
Application: Meat Rendering plant
Building Volume: 7,260m³
Odour Load: Hydrogen Sulphide, Ammonia, Mercaptans, VOC's
Objective: Improve working environment and abate odours
Achieved: Improved working environment and 99% odour abatement

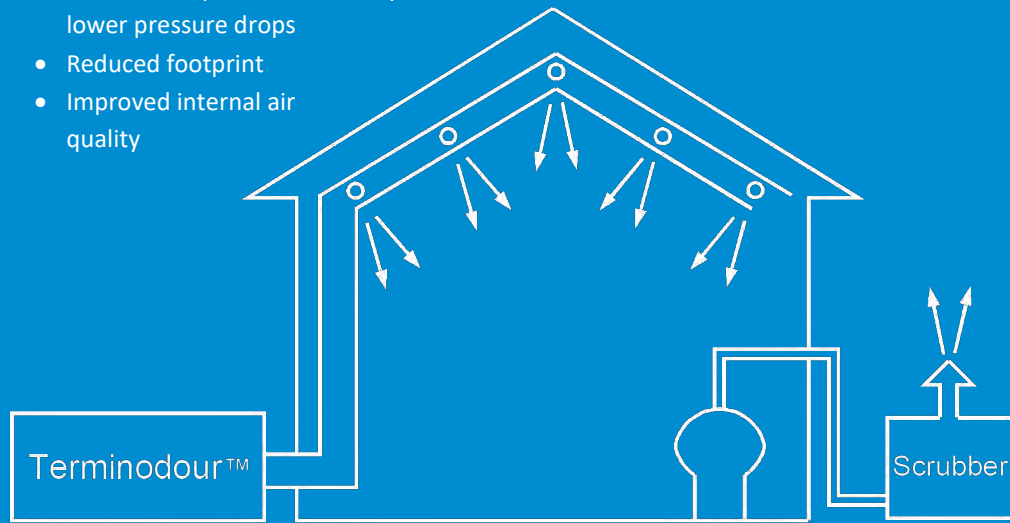


Project Name: Swansea Styrene Plant
Client: Envico Ltd
Completed: 2008
Application: Internal and external abatement of styrene within a GRP/FRP kiosk manufacturing plant
Building Volume: 7,000m³
Odour Load: 150ppm (average) Styrene
309mg/m³ TVOC (average)
Objective: Eliminate odour complaints and improve internal air quality
Achieved: Objectives met

Terminodour™ Combination Systems

In certain applications, specifically where odour levels are very high, Terminodour™ may not be a stand alone solution however in combination with various scrubbing systems it can provide a lower cost solution by treating the high volume/low load odours with Terminodour™ but extracting the low volume/high load odours to a separate odour abatement scrubbing system. A typical application would be a sludge centrifuge building. This provides the following benefits:

- Smaller scrubbing system - lower capital and running costs
- Much lower power demand due to lower pressure drops
- Reduced footprint
- Improved internal air quality



Odour Abatement - Solutions



▲ Bio-trickling filter with polishing carbon filter for Dwr Cymru



▲ 2 No. carbon filter and emission stack for a styrene abatement plant

CSO Group believe that no single odour control system is suitable for every odour problem, consequently CSO Group provides a full range of odour abatement solutions including the following:

- Biofilters
- Bioscrubbers
- Dry Chemical Scrubbers
- Wet Chemical Scrubbers
- Catalytic Iron Filters

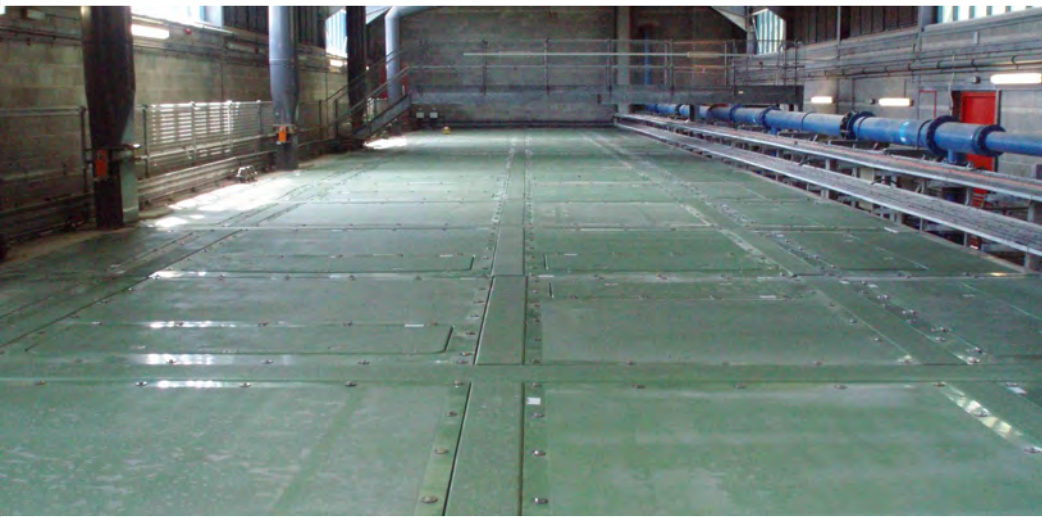
CSO Group provide a complete turn key project service including supply and installation of ancillary equipment such as control panels, kiosks, ductwork, covers etc.

Specialist Ventilation Systems

CSO Group provide specialist ventilation systems for the water, pharmaceutical and general industry, our expertise covers:

- Safe man entry systems
- Boiler make up air
- Dust extraction
- Staircase pressurization systems
- Investigation, testing and reporting on existing ventilation systems

Odour Abatement - Covers



▲ High security flat covers with non trip fixtures, double seals and bolted fixings with embedded nuts into GRP

▼ Double seal arrangements and bolts fixed into embedded nuts within the GRP

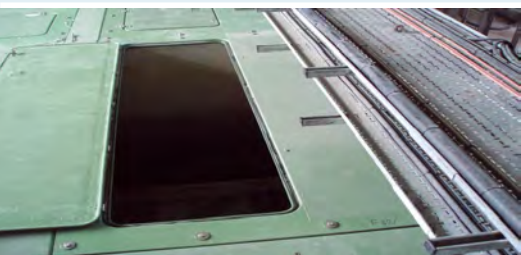
▲ 2 No. 38m diameter covers for Thames Water at Crossness
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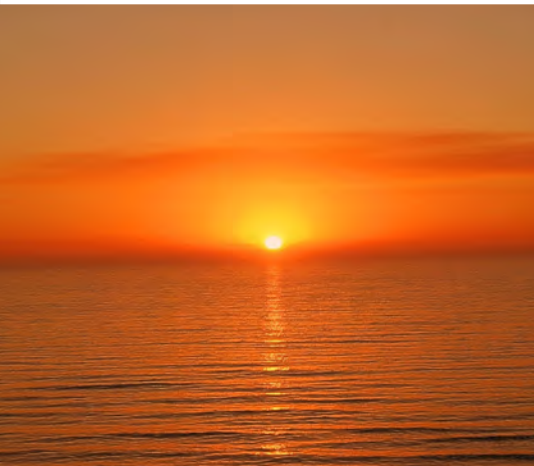
CSO Group provide a wide range of GRP covers to suit most applications including rectangular tanks, circular tanks, channels, screw pump covers etc.

Covers can be manufactured to suit a wide range of loadings according to need.

Our high security range of covers have double seals and are guaranteed not to lift or separate from the structure. The covers are fixed using bolts and embedded nuts to ensure a high quality seal and that covers can be removed and replaced easily. The high security range is specifically for highly sensitive sites or where microbiological hazards are a concern.

We can also offer a budget range of covers with a single seal arrangement where the benefits of the high security range are not a high priority and price is of paramount importance.





Also from CSO Group

CSO screens

Inlet screens and screenings handling equipment

Drum screens

Flow regulators

Tank flushing systems

Heat exchangers (sludge/sludge - sludge/water)

Biogas desulphurisation

Aeration systems

Specialist ventilation systems

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