

Regenerative thermal VOC oxidation

MEGTEC™ have been responsible for most of the major advances in heatset drying and oxidation technologies during the last 30 years, and the only company that can offer a complete choice of all available technologies. In addition, MEGTEC has unrivaled experience from over 2 500 oxidiser and 7 000 dryer installations.

Regenerative systems

Regenerative thermal oxidisers with internal heat exchangers offer unparalleled efficiency and simplicity. Once the system achieves operating temperature, the thermal energy released by oxidising solvents is often all that's needed to self sustain operation on auto therm. And because they operate at higher temperatures, they are effective for a wide range of solvents including heavy VOCs.

VOCSIDIZER™

This innovative, patented design meets most environmental regulations with remarkable energy efficiency and design simplicity. The oxidation reactions which purify the process exhaust occur entirely within the heat exchange media. There is no open flame and therefore none of the unwanted by-products of flame combustion. The VOCSIDIZER offers effective VOC control with exceptional energy efficiency. Little, if any, supplementary fuel is required to sustain oxidation once initial



thermal operating conditions are achieved. The VOCSIDIZER easily achieves thermal efficiencies as high as 98%. Even at very low VOC concentrations the latent energy in the solvent is enough to sustain thorough oxidation. A natural gas injection system provides supplementary fuel if needed. The absence of a burner and a classical combustion chamber along with its modular design reduce capital and installation costs. The low maintenance design provides years of trouble free operation. The system normally uses a forced draft fan and fast acting pneumatically operated poppet valves to ensure uninterrupted, smooth

operation of the process source. The advanced PLC system automatically controls temperature and flow in the reaction bed. The VOCSIDIZER is an

innovative, simple and cost-effective solution to air emission control needs which has been proven in several hundred installations.

VOCSIDIZER performance benefits

- Complies with strictest European legislation
- Negligible NO_x production
- 95–98% nominal heat exchange efficiencies ensure almost no energy consumption
- Very low operating costs
- Simplicity provides operation reliability
- Rugged construction and simplicity ensure long life and minimum service costs
- MEGTEC provides complete solutions for drying and pollution control

VOCSIDIZER™

Simple, innovative design

The VOCSIDIZER uses a unique, patented in-bed regenerative heat exchange principle. Compared with conventional systems there is no burner or combustion chamber, and only a single reactor instead of three. The thermal profile of the media is self-regulating and the media bed has a high heat absorption capacity to level out variations in solvent concentration.

Operating principle

The unit consists of a single heat transfer bed filled with ceramic media. Plenums (located above and below the bed) can serve either as the inlet or outlet route for process or cleaned air. The direction of air flow from the forced draft fan is controlled by pneumatically operated valves. The dampers will periodically switch position to reverse air flow and allow thermal regeneration of the bed.

The bed is initially heated to 1000°C by a grid of electrical heating coils (only during first start-up).

The VOC-laden process air is then directed through the porous ceramic heat exchange media. As the solvents move through the inlet side of the bed, they get hot enough to undergo thorough oxidation to water vapour and carbon dioxide. The energy in the cleaned process air stream, which includes the thermal energy released during solvent oxidation, is recovered by the ceramic media on the outlet side of the bed. The purified air is then released to the atmosphere.

The exhaust temperature will rise due to the shifting of the temperature profile towards the outlet side of the bed.

Reversed bed direction

Air flow direction through the bed is periodically reversed (typically 90-120 seconds) to maintain the high heat exchanger efficiency of >95%.

The energy recovered and stored in one side of the bed heats the incoming process air to oxidation temperature. The system is so effective that it recovers almost all the heat required to sustain the temperature of the bed. The exhaust temperature is typically only 20-50°C higher than the incoming process air.

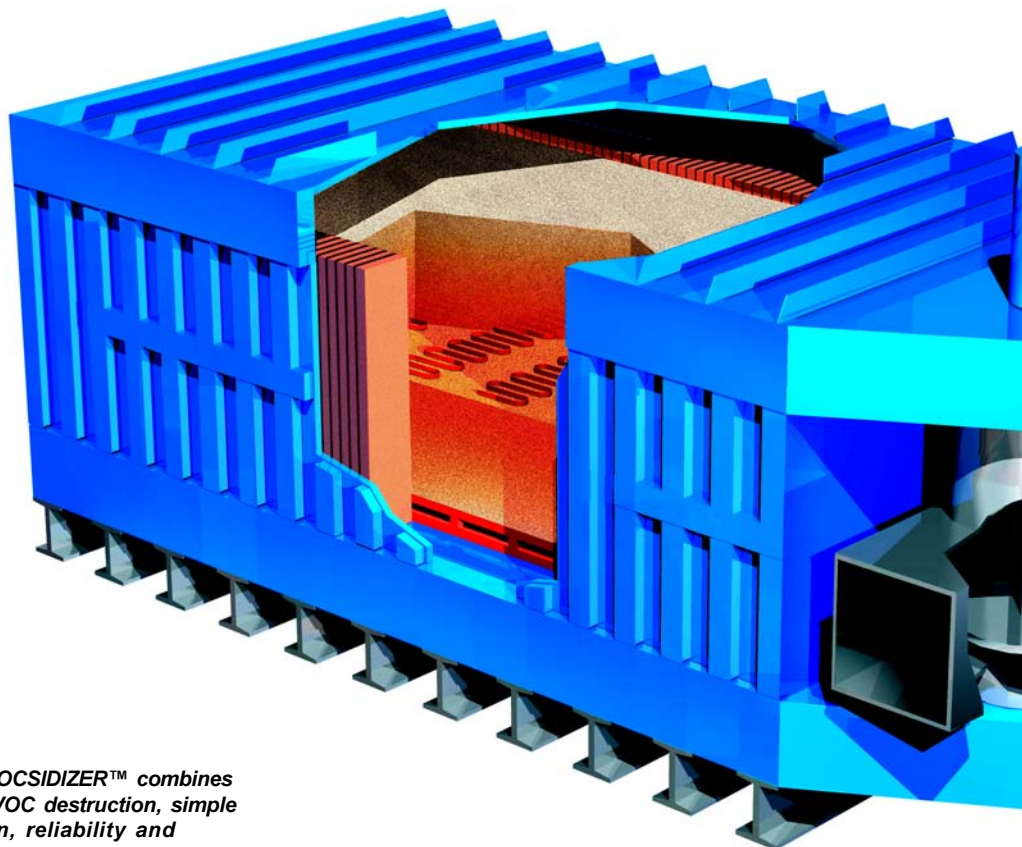
Destruction efficiency can be increased with an optional Residual Air Cleaner (RAC) which treats the brief emission peaks during valve movement (when the outlet direction is reversed).

PLC control system monitors the temperature profile of the bed to ensure that the set point temperature is properly maintained; if needed, supplementary fuel may be added by natural gas injection.

The PLC also optimises the frequency of valve switching to maximise energy efficiency.

Low operating costs

The VOCSIDIZER offers remarkable energy efficiency. After initial operating conditions are achieved, the system requires almost no additional fuel to maintain oxidation temperatures. The VOCSIDIZER achieves nominal thermal efficiencies of 95-98%. The latent energy of the solvents sustain operation in most of the typical applications like package printing, coating and odour destruction. At lower solvent levels, a natural gas injection system provides any added energy needed. Heat recovery is a further possibility to reduce total plant energy costs.



The VOCSIDIZER™ combines high VOC destruction, simple design, reliability and superior energy efficiency.

- *Simple and innovative design*
- *Low operating costs*
- *High thermal efficiency*
- *Trouble free operation*

High VOC destruction

The system achieves high VOC destruction rates with none of the by-products commonly associated with flame oxidation. The non-degrading ceramic heat exchange media ensures dependable, trouble-free operation.

Control & reliability

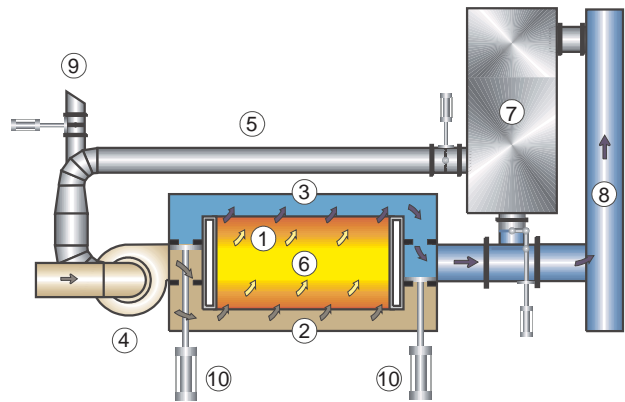
A PLC control system regulates operation for dependable performance and easy operation. The forced draft fan ensures smooth upstream process flow. To control fluctuating exhaust flow from multi source operation, the exhaust duct is controlled to a constant negative pressure. A sensor in the main duct adjusts the process fan in a closed loop control. The variable speed drive ensures minimum electrical energy consumption. Remote modem service surveillance and self-diagnostic systems are available.

Low maintenance & Long life

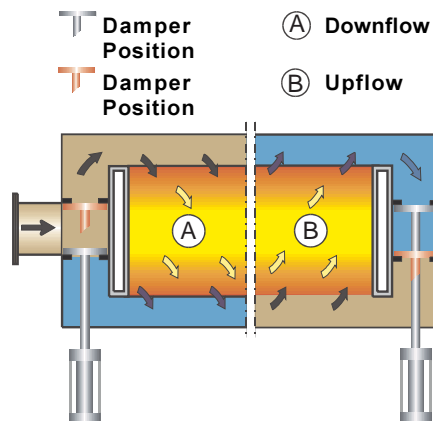
The VOCSIDIZER requires little maintenance because it has few moving parts and is made with very durable materials. Only the thermocouples and dampers normally require maintenance. There is no burner to maintain. The metal-to-metal sealing poppet valves for the inlet and outlet to the combustion bed offer carefree operation by eliminating the use of conventional sealing materials. The simple design, rugged construction and advanced control deliver many years of reliable performance and emission control compliance.

Low installation costs

The compact modular design and high degree of pre-assembly minimise installation time. Even high flow units can be delivered completely filled with bed material and ready to connect to power supplies.



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|------------------------|--------------------------|
| [1] Heat exchanger bed | [6] Start-up heater |
| [2] Solvent laden air | [7] Residual Air Cleaner |
| [3] Clean air | [8] Clean air stack |
| [4] Process fan | [9] Fresh air intake |
| [5] Recirculation duct | [10] Change over damper |



Exhaust air enters the VOCSIDIZER via the inlet valve system; is led to the up side plenum for distribution; passes through the bed for pre heating, solvent burn-up and cooling; leaves the bed via the down side plenum and leaves the VOCSIDIZER via the outlet valve system. After a pre-determined period, the flow is reversed by operating the two valves simultaneously.



MEGTEC provides a complete choice of all available VOC technologies to ensure the selection of the optimum system for each individual application.

Applications

The VOCSIDIZER is ideal for multiple source installations with low to mid solvent concentration such as package printing, coating and odour destruction.

Systems

MEGTEC's systems approach to design and engineering ensures process compatibility whilst providing effective regulatory compliance. This approach facilitates planning, simplifies maintenance, reduces service and lowers overall cost.

Version at additional cost

- Optimised bed media depending on operation conditions
- Residual Air Cleaner
- Secondary heat exchanger
- Ductwork and chimney dampers
- Instrumentation to monitor air emissions

Performance

Exhaust volume	1000-110 000 Nm ³ /h (single unit)
Heat exchanger efficiency	95-98%
Volume turn down range	1:7
Self-sustaining operation	0,7-2 g/Nm ³
Typical cleaning efficiency 98-99,7%	Depending on model
Ctot	<20 mg/Nm ³
CO	<50 mg/Nm ³
NOx	<5 mg/Nm ³

Standard features of VOCSIDIZER

Housing type	Compact weather proof box construction
Primary heat exchanger	Ceramic bed media
Motor	Direct variable-speed drive
Fresh & shut off dampers	Standard
Gas train	Natural gas or propane
Control	PLC with diagnostics and remote modem surveillance system
Norms and safety	Conforms to CE standards

Europe

France
MEGTEC Systems SAS
Telephone: +33-1-69-89-4793
Fax: +33-1-64-97-7414

United Kingdom
MEGTEC Systems, Ltd.
Telephone: +44-1628-77-6244
Fax: +44-1628-77-6263

Germany
Sequa GmbH & Co. MEGTEC Systems
Telephone: +49-6181-94040
Fax: +49-6181-46646

Sweden
MEGTEC Systems AB
Telephone: +46-31-65-7800
Fax: +46-31-22-8319

MEGTEC Systems Amal AB
Telephone: +46-532-62900
Fax: +46-532-62999

Americas

United States
MEGTEC Systems, Inc.
Telephone: +1-920-337-1479
Toll-free: +1-800-558-2884
Fax: +1-920-339-2784

Brazil
MEGTEC Systems, Inc.
Telephone: +55-19-3885-6116
Fax: +55-19-3834-7788

Asia-Pacific

China
MEGTEC Systems (Shanghai) Ltd.
Telephone: +86-21-5479-4320
Fax: +86-21-5479-4322

Singapore
Singapore Sales Branch - MEGTEC Systems
Telephone: +65-6298-4666
Fax: +65-6294-6222

Australia
MEGTEC Systems Australia, Inc.
Telephone: +61-3-9574-7450
Fax: +61-3-9574-7460

Hong Kong
MEGTEC Systems, Inc.
Telephone: +852-9731-1040
Fax: +852-2836-8388