

KNOCK OUT HYDROGEN SULFIDE WITH
MINI-CAT™



COMPLETE PACKAGED SYSTEMS
FOR COST-EFFECTIVE HYDROGEN
SULFIDE REMOVAL



Gas Technology Products

Merichem Chemicals &
Refinery Services LLC

MINI-CAT™

SYSTEMS PROVIDE COST-EFFECTIVE H₂S REMOVAL IN LANDFILL GAS APPLICATIONS

MINI-CAT™ was born out of the LO-CAT® H₂S removal technology which treats sulfur loads between 1,000 kg/day and 25+ tons per day. With MINI-CAT™, Gas Technology Products is building on this tradition of simplicity and success by pre-engineering virtually the entire plant for sulfur loads between 200 – 1,000 kg/day.

With this simple change to a commercially successful technology in operations for 27 years, the result is nothing short of revolutionary. Capital cost may be reduced significantly compared to a similar custom designed unit. And delivery and installation time may be reduced by as much as 50%.

MINI-CAT™ is cost-effective in removing H₂S in numerous applications including landfills, municipal waste, and biogas treatment.

In comparison to old fashioned “scavenger” H₂S removal systems MINI-CAT™ will reduce chemical costs up to 80% (more if you use a liquid scavenger), continuously remove H₂S without unexpected sulfur breakthrough, eliminate the need for reactor change-outs, and cut waste products in half.

REMOVING H₂S FROM LANDFILL GAS (LFG)

Gas Technology Products offers a line-up of cost-effective, environmentally-friendly, and powerful H₂S removal systems that are adaptable to landfill gas treatment applications.

The MINI-CAT™ process, based on proven LO-CAT technology, treats smaller H₂S loads using the same chemistry as LO-CAT. However, MINI-CAT™ is especially attractive and cost-effective for many landfill gas applications as a modular option with lower capital cost than LO-CAT. MINI-CAT™ units are pre-fabricated, skid-mounted, have a small footprint, and offer expanded flexibility for variable landfill gas flows and H₂S concentrations.

MINI-CAT™ is a water-based H₂S removal process for landfill gas applications with higher H₂S concentrations. Typically, LO-CAT is used for removing 1,000 – 10,000 kg of sulfur per day as H₂S; MINI-CAT™ for removing 200 – 1,000 kg (440 – 2,200 lb) sulfur per day as H₂S.

The patented LO-CAT® (liquid oxidation catalyst) process uses an iron chelate solution to oxidize the H₂S to elemental sulfur and water. The iron chelate solution is then continuously regenerated using air, resulting in much lower operating costs than non-regenerable scavengers. The elemental sulfur product can be used

for agricultural applications—so it is not a waste product requiring disposal.

Different configurations are employed to yield better than 99.9% H₂S removal. In the mobile bed absorber configuration, moderately low pressure gas streams are contacted counter-currently with LO-CAT solution using spherical balls to aid in mixing. Venturi contactors are used for low pressure, high volume gas streams where the required sulfur removal efficiency is lower. In all configurations, the elemental sulfur is separated, the LO-CAT solution is regenerated with air in a separate Oxidizer vessel, and the solution is circulated back to the absorber.

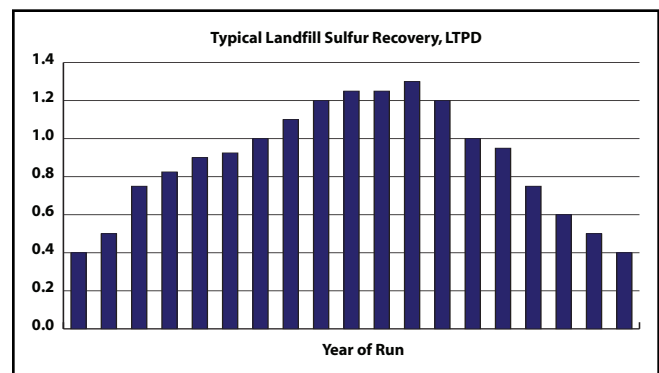
To help determine the right process for your needs, use the following formulas:

$$((\text{SCFM gas flow}) \times (\text{ppmv H}_2\text{S}))/8225 = \text{lb/day sulfur}$$

$$((\text{Nm}^3/\text{hour gas flow}) \times (\text{ppmv H}_2\text{S}))/29671 = \text{kg/day sulfur}$$

REDUCED OPERATING COSTS

To illustrate typical savings in operating costs, consider the typical landfill sulfur generation profile below.



Cost savings, based on a twenty year operating cycle, are shown in the table below.

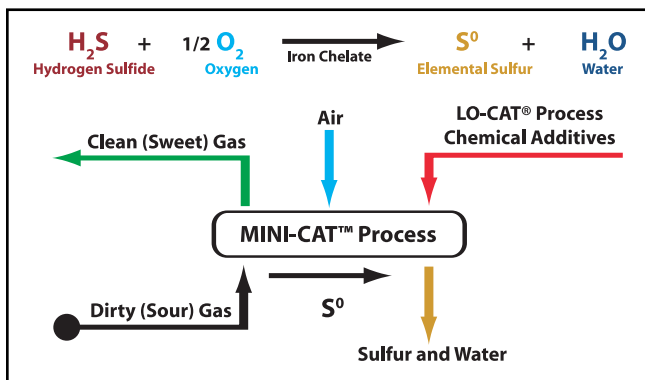
Technology Type	Capital Cost USD	Treatment Cost USD	Total Costs USD
Aerobic Iron Sponge	\$200,000	\$13,025,000	\$13,225,000
MINI-CAT	\$1,500,000*	\$1,450,000	\$2,950,000
Savings:			\$10,275,000

* = installed cost

As the table indicates, the landfill operation would realize a savings of more than \$10,000,000 using MINI-CAT™ technology.

HOW MINI-CAT™ WORKS

The MINI-CAT™ process uses the same special form of chelated iron catalyst field-proven in the LO-CAT process. This liquid, aqueous solution sweetens sour gas, produced elemental sulfur. The overall reaction, using oxygen in the regeneration step, is shown below:



EASY OPERATION

Your operating time is greatly reduced with the MINI-CAT™ process. Typically, operators spend only thirty minutes each day taking chemical inventories and running basic field tests to determine the pH and Redox potential of the MINI-CAT™ solution. Gas Technology Products laboratory personnel will test the solution samples for iron concentration and chelate concentration to help you maintain proper solution chemistry.

THE MINI-CAT™ PROCESS

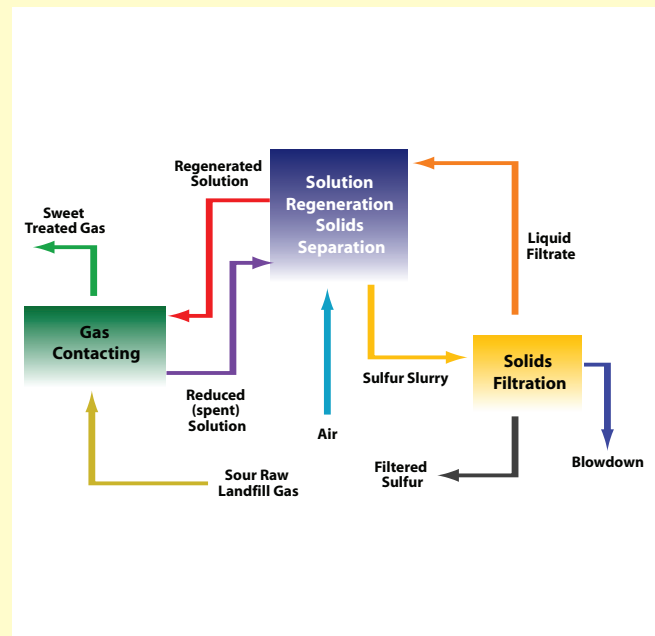
In the **gas contacting area**, gas is sweetened when it contacts the ferric iron chelate solution, creating a spent solution.

The **spent solution** is mixed with air, converting ferric iron chelate to a ferrous iron chelate solution, resulting in a **regenerated solution**.

The **regenerated solution** is clarified by decanting, cleaning the solution and thickening the solid sulfur particles.

In a final **solids filtration** step, the sulfur is filtered from the thickened sulfur particles.

Water and solid elemental sulfur are produced by the MINI-CAT™ process. Water is removed to preclude diluting the process solution, and sulfur is removed by filtering, so that this by-product can be sold as an agricultural feedstock—to be used as a fungicide, in direct soil applications.





MERICHEM

**Merichem Chemicals & Refinery Services LLC
Gas Technology Products Division**

846 East Algonquin Road, Suite A100

Schaumburg, IL 60173

Phone: (847) 285-3850

Fax: (847) 285-3888/3889

www.gtp-merichem.com

Japan Office:

Phone: (81) 3-5289-4530

Fax: (81) 33-255-5181

