

FREE TECHNICAL GUIDE

Chemical odour scrubbing explained: a guide for site managers

Which odours a chemical scrubber removes, acid versus oxidising stages, when to add carbon or biological polishing, and what to record for your odour management plan.

For
Site and
operations
managers

And
Environmental
managers

Covers
Wastewater, food
and waste





Odour is a handful of compounds, not a mystery

Most odour complaints trace back to a few compounds present at tiny concentrations. Identify them, and the right scrubber removes them at source. Treat the airflow without knowing them, and the complaints carry on.

Who it is for

Site, operations and environmental managers on wastewater, food, rendering and waste sites dealing with odour complaints or permit conditions.

How to use it

Read it before you commission an odour survey or ask for scrubber quotes. The checklist on the back page lists what a supplier needs.

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FIVE THINGS TO GET RIGHT

- 1 Identify the compounds** before you size anything.
- 2 Separate nitrogen and sulphur odours:** they need different stages.
- 3 Size for the peak,** not the average.
- 4 Know what a chemical scrubber will not remove,** and plan for it.
- 5 Keep the records** your odour management plan needs.

01 Name the compound, then treat it

These compound families cause most industrial odour complaints. Each has a typical source and a scrubbing route.

COMPOUND	SMELLS LIKE	TYPICAL SOURCES	SCRUBBING ROUTE
Hydrogen sulphide (H ₂ S)	Rotten eggs	Septic sewage, sludge, anaerobic processes	Caustic with an oxidant
Mercaptans, organic sulphides	Cabbage, garlic	Sewage, rendering, food waste	Caustic with an oxidant
Ammonia	Sharp, pungent	Composting, manure, rendering	Dilute acid
Amines	Fishy	Fish and meat processing, rendering	Dilute acid
Fatty acids, aldehydes	Rancid, cooked	Cooking, frying, rendering	Partly by caustic; often needs polishing

MEASURING ODOUR

Odour concentration is measured in European odour units (ouE/m³) by dynamic olfactometry to EN 13725. Gas analysis tells you which compounds; olfactometry tells you how strong the odour is.

IN PRACTICE

Start with a survey

An odour survey or gas sampling at the main sources tells you which compounds you are dealing with before money is spent.

Note when complaints happen

Complaints that follow a process step, a delivery or the weather point to the source and the peak to size for.

QUESTIONS TO ASK A SUPPLIER

Q1 Which compounds have you designed the scrubber to remove?

Q2 What data did you use for the inlet concentrations?

Q3 How will we know it is working on site?

02

Nitrogen odours and sulphur odours need different stages

Ammonia and amines are alkaline. Sulphur compounds are acidic and need oxidising. One liquor cannot do both.

IN Odorous air From tanks, halls, lines	STAGE 1 Acid Ammonia and amines	STAGE 2 Caustic-oxidising H_2S and mercaptans	03 Mist eliminator Stops carry-over	OUT To stack Dispersed
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Acid stage

Dilute sulphuric acid absorbs ammonia and amines, forming salts that leave in a controlled bleed.

Control

pH on the acid stage, pH and ORP on the oxidising stage, dosed automatically to follow the load.

Caustic-oxidising stage

Caustic absorbs H_2S and mercaptans, and an oxidant such as hypochlorite or hydrogen peroxide converts them so they do not come back out.

Single-stage sites

Where H_2S is the only problem, as at many pumping stations, the caustic-oxidising stage alone is enough.

IN PRACTICE

Size for the peak

Sewage pumping, sludge handling and batch cooking all produce peaks. Size the stages and dosing for them, not the average.

Reagent storage

Plan where acid, caustic and oxidant will be stored and delivered, and bund them.

QUESTIONS TO ASK A SUPPLIER

Q1 Does our odour need an acid stage, an oxidising stage, or both?

Q2 Which oxidant do you propose, and why?

Q3 What reagent consumption should we budget for?

03

Choose the technology for the load

Chemical scrubbing is one of three common approaches. Many sites use two of them together.

	CHEMICAL SCRUBBER	BIOLOGICAL TREATMENT	ACTIVATED CARBON
Best at	High H ₂ S, ammonia and sharp peaks	Steady, moderate, biodegradable loads	Low concentrations and final polishing
Footprint	Compact	Larger	Compact
Response	Full performance from start-up	Needs time to establish and stable conditions	Immediate until the carbon is spent
Running costs	Reagents and power	Power, water and media	Carbon replacement
Limits	Some organic odours only partly removed	Upset by load swings and shutdowns	Loses capacity fast at high loads

COMBINING THEM

A chemical scrubber followed by a carbon polishing stage is a common answer where most of the load is H₂S or ammonia but some organic odour remains.

IN PRACTICE

Mixed answers are common

Many sites use a chemical scrubber for the bulk of the load and carbon or biological treatment to polish what is left.

Think about shutdowns

Biological systems need feeding through quiet periods. Chemical scrubbers restart at full performance.

QUESTIONS TO ASK A SUPPLIER

Q1 Why have you recommended chemical scrubbing for our site?

Q2 Which odours will remain after the scrubber, if any?

Q3 Do we need a polishing stage, and where should it go?

04 Evidence for your odour management plan

Permitted sites in England are expected to manage odour through an odour management plan, following the Environment Agency's H4 guidance.

What the scrubber should give you

- Predicted outlet concentration for each compound
- Design flow, reagent use and bleed
- Signed commissioning record
- Dosing, pH and ORP logged through your BMS
- Alarm history for every fault

What to keep in the plan

- Sources and how each is controlled
- Monitoring and inspection routine
- What happens when an alarm or fault occurs
- Complaint log and the response to each
- Maintenance and probe calibration records

COMPLAINTS

When a complaint comes in, a dosing log that shows the scrubber was running in range is the fastest way to show where the odour did not come from.

IN PRACTICE

Link alarms to actions

Each scrubber alarm should have a named response in the plan, from topping up reagent to stopping the source process.

Review after changes

New processes, extended hours or higher throughput change the odour load. Review the scrubber duty when they happen.

QUESTIONS TO ASK A SUPPLIER

Q1 What data will the control system log for us?

Q2 Which alarms will the scrubber raise, and what should we do for each?

Q3 How often should the system be serviced?

05

The checklist for a quote you can trust

Send what you have; an engineer can fill gaps on a call or a site visit. The more of this list you can answer, the tighter the sizing and the fewer surprises at commissioning.

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| ☐ Odour sources: tanks, halls, process lines | ☐ Extract flow in m ³ /h, or the room volumes |
| ☐ Any odour survey or gas analysis you hold | ☐ Complaint history and when complaints happen |
| ☐ Permit conditions or odour targets | ☐ Site space , indoor or outdoor |
| ☐ Utilities: power, water and drainage | ☐ Photos of the sources and boundary |



TALK TO AN ENGINEER

Stop the complaints at source

Tell us where the odour comes from, the airflow and what you need to achieve. A process engineer will reply within 4 working hours and tell you what it takes to remove it, before anyone talks about price.

WEB

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