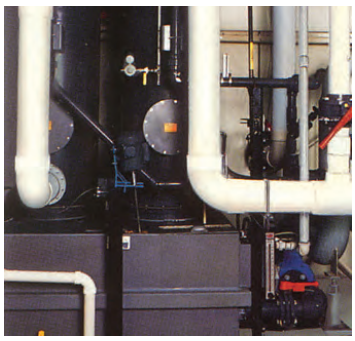
Tri-Mer® CORPORATION

Technology Leader
air pollution control

Tri-Mer Odor Control Scrubbers –for Zero Odor at the Stack

Industrial and municipal odors are often detectable below 1 ppm, so Tri-Mer odor control scrubbers are engineered to function at 98-99% efficiencies and higher for true, “zero odor” performance.

Tri-Mer scrubbers are ideal for continuous, automatic odor control. Gas volume is not limited, but generally ranges from 35 cfm to 150,000 cfm. Where the gas stream contains corrosives, Tri-Mer provides a single scrubber for scrubbingcorrosives and odors. This multi-stage technology neutralizes corrosive fumes while using minimal water and energy and yielding a clean stack. Tri-Mer odor control systems operate in the 99%+ efficiency range and are effective for a broad range of contaminants.



Multi-stage H_2S scrubber

Scrubber Design

Depending on odor composition (see end of this PDF), Tri-Mer scrubbers have 2-3 independent stages. Mercaptins and amines are best handled with wet scrubber sections. Sulphur and other compositions may require consecutive treatment stages, including acid, caustic and oxidation stages.

Wastewater treatment is a key application for Tri-Mer odor control technology

Multi-Stage Odor Control, Dual Chemical Inlet

STAGE 1 The gas is contacted with an acetic scrubber liquid to neutralize the ammonia emission. H_2SO_4 , in a 10% concentration, is used down to a pH of 2. Tri-Packs, Tri-Mer’s high-efficiency packing media, is integral to the system; load inlet ppm determines packing depth. Scrubbing efficiency in all cases is below detectable limits.

STAGE 2 Air is contacted with an alkali scrubbing liquid such as sodium hydroxide (NaOH, with a maximum pH of 13.5). Sodium hypochlorite and similar oxidizers are oftenadded to complete the scrubbing action.

Most Tri-Mer scrubbers have a dual tower design, with packing depth determined by odor composition and efficiency required. This concept is the most effective due to counterflow operation. The scrubber system allows optimum control of recirculation solution chemical concentrations.

Ammonia odor scrubber

Vertical and Horizontal Designs

Vertical orientation is recommended where practical. Horizontal scrubber configurations, which provide equal performance, are used where space is limited. Mass transfer calculations make either design effective, and guarantee efficient performance under all operating conditions.

Modular Design for Optimum Flexibility

Tri-Mer odor scrubbers feature an advanced, modular design that readily accommodates expansion. If a process change creates higher load conditions, it's often possible to add packing depth using Tri-Packs packing media. This preserves the scrubber's odor control efficiency. Often, these modifications can be made by joining a new packed section to the existing tower, minimizing labor costs and allowing operation to continue uninterrupted.

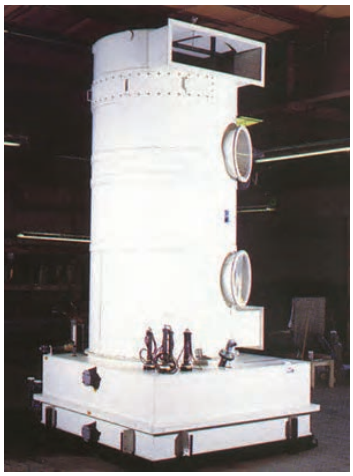
Tri-Mer odor control systems also provide interchangeability: if a process changes, a change in feed chemical is generally all that's needed.

The ease with which Tri-Mer scrubbers can be modified to accommodate new conditions is a key reason why Tri-Mer scrubbers are widely-specified for the control of industrial and municipal odors.

Horizontal multi-stage wet chemical odor control with carbon bed

Multiple Load Capability

Tri-Mer odor control scrubbers can simultaneously handle contaminants in addition to the specific odor for which they're engineered. Contaminants include particulate, other inorganic compounds, and reactive materials including acids and other gases.



Light load processes may only require a single stage scrubber.

Carbon Beds

Some applications require an activated carbon bed in addition to the wet scrubber section to properly control odors. Carbon beds are provided by Tri-Mer in vertical or horizontal formats.

Particulate and Dust Control

Where applications generate both odors and particulate, Tri-Mer's Whirl/Wet dust collector, high-energy venturi, or baghouse can be incorporated into the system design. Applications that generate submicron particulate can be designed using Tri-Mer Cloud Chamber technology. The "CCS" Cloud Chamber scrubber eliminates particulate down to 0.1 microns at high efficiencies, with very low energy consumption. CCS is an excellent, lower cost alternative to electrostatic precipitators when particulate is suspended in hightemperature gas streams.

Single-stage scrubber for iodine fumes features all-polypropylene constructiuon

Controls

Tri-Mer odor control scrubbers are typically supplied with control panels, sensors, chemical feed systems, motor controls, recirculation tank monitoring and other equipment. Scrubber control packages often include a PC or PLC, and stack monitoring. Systems integrate with facility-wide control configurations.

Scrubber Specifications

Gas velocity though the column is maintained below 300 ft./minute. Liquid recirculation flow rates are maintained above 15 gpm per sq. ft. of packing. Standard construction materials are polypropylene, PVC, 304 and 316L stainless steel. The packing depth and number of scrubber stages required are critical to system design. Tri-Mer odor control scrubbers are typically one to three stages; efficiency requirements usually necessitate at least two stages for optimum performance.

Tri-Mer specializes in the design and manufacture of odor control scrubbers for the most challenging applications, including wastewater treatment, fish and meat processing, and chemical plants. With each installation, the outcome is the same: an odor-free stack.

Typical Applications for Tri-Mer Odor Control Scrubbers

Acetaldehyde	CH_3CHO	Pungent
Acrolein	CH_2CHCHO	Burning Fat
Allyl Disulfide	$(CH_2CHCH_2S)_2$	Garlic
Allyl Mercaptan	CH_2CHCH_2SH	Garlic
Ammonia	NH_3	Pungent
Benzyl Chloride	$C_6H_5CH_2Cl$	Aromatic
Benzyl Mercaptan	$C_6H_5CH_2SH$	Unpleasant
Butyric Acid	$CH_3CH_2CH_2COOH$	Rancid
Camphor	$C_{10}H_{16}O$	Aromatic
Carbon Disulfide	CS_2	Rotten
Chlorine	Cl_2	Pungent
Diethylsulfide	$C_2H_5C_2H_5S$	Garlic
Dimethylamine	CH_3CH_3NH	Fishy
Dimethylsulfide	CH_3CH_3S	Decayed Cabbage
Ethyl Mercaptan	C_2H_5SH	Decayed Cabbage
Ethylseleno Mercaptan	C_2H_5SeH	Foul
Formaldehyde	$HCHO$	Pungent
Hydrogen Sulfide	H_2S	Rotten Eggs
Methyl Mercaptan	CH_3SH	Decayed Cabbage
Phenol	C_6H_5OH	Emphyreumatic
Propyl Mercaptan	C_3H_7SH	Unpleasant
Pyridine	$N(CH)_4CH$	Emphyreumatic
Sulfur Dioxide	SO_2	Pungent
Trichloroethylene	$CH_3CH_3CH_3N$	Fishy
Trimethylamine	$CHClCCl_2$	Aromatic
Valeric Acid	$CH_3CH_2CH_2CH_2COOH$	Body Odor