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# PERSNICKETY® BRAND ODOR COUNTERVAILANT® 312
## Wet Scrubber Formula

### GENERAL DISCUSSION
PERSNICKETY® Brand Odor Countervailant®

312 Wet Scrubber Formula is compounded to replace or augment chemical oxidants such as chlorine, sodium hypochlorite and chlorine dioxide in wet scrubbers. The two most commonly used wet scrubber designs are recirculating packed bed and mist (see page 3). While considerably different in design and operation, their shared historical purpose is to collect and absorb air-borne nuisance malodors into a liquid solution containing water and an oxidant chemical so that treatment can occur in the liquid phase. Inorganic malodors such as hydrogen sulfide and ammonia are highly soluble in water, but many organic malodors are not. Any malodor escaping absorption obviously cannot be treated by oxidants. 312 Wet Scrubber Formula provides the following very important advantages when used as the sole odor control agent or in conjunction with chemical oxidants:

### Superior Malodor Control

- Able to react in both liquid and gaseous phases.
- Used successfully on even the most complex and intensive combinations of inorganic and organic malodors, such as those in the rendering industry.
- Functions effectively in all operating ranges of temperature and pH.
- Is not affected by the presence of extraneous, non-malodorous organics.

### Improved Safety for Operators and the Environment

- Contains no toxic materials and forms no toxic by-products when used alone or with oxidants.
- Is non-explosive, non-flammable and non-corrosive.
- Biodegrades fully and forms no damaging decomposition by-products.
- Meets national and international health and safety standards.

### More Economic

- Often reduces chemical operating costs.
- Reduces or eliminates costs associated with removal of scaling caused by acid/base processes.
- Cleans and controls accumulations of fats, oils and greases on packing media.
- When used alone, eliminates corrosive destruction of equipment caused by corrosive oxidants.
- Potentially allows capital expansion avoidance via improved operating efficiency.

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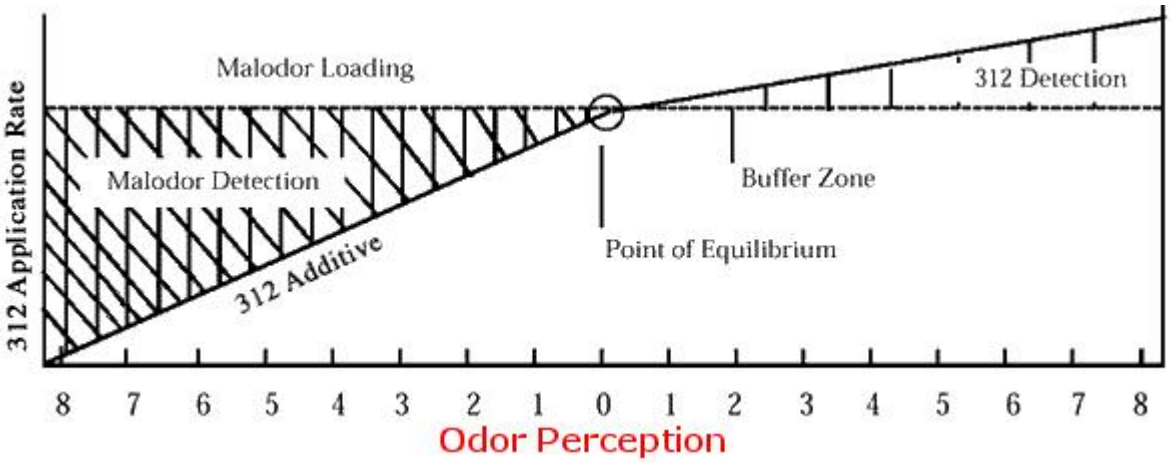
**APPLICATION INFORMATION**

Application rates for 312 Wet Scrubber Formula are largely dictated by the intensity of malodor. The proper rate establishes an equilibrium between malodor and 312 Formula. This equilibrium is illustrated below.




In practice, a steady-state malodor loading is not always present. Therefore, many customers choose to operate with a faint odor of 312 Formula present to act as an olfactory guide in order to provide a buffer zone. For recirculating packed bed scrubbers, 312 Wet Scrubber Formula can be fed directly into the reservoir or into the line feeding the spraying system above the packing. Most mist scrubbers do not recycle scrubbing liquids, consequently choice is limited to the line feeding the nozzle. On-hand dosing pumps will normally work well. 312 Formula can be fed in its concentrated form, but most users dilute with water to make up a 1-2% solution in a day tank or empty 55 gallon drum and feed the diluted solution. This approach is preferred for several reasons. An improper pump setting or a malfunctioning pump could become very costly by delivering far too much concentrated 312. For mist scrubbers it is desirable to have a rapid pump stroke to avoid a gap effect (water, 312, water, 312) in the scrubbing liquid line. The precise feed rate must be determined on site. In addition to malodor intensity, feed rate will be influenced by odor composition, bleed and make-up rates, recirculation rates, CFM and contact time provided and the general maintenance of the system. Good starting guidelines can be provided. For packed bed scrubbers the Loading Standard is rendering cooking malodors (blood, offal, feathers, bone meal). For mist scrubbers the Loading Standard is malodorous domestic wastewater, headworks locations. Weigh the intensity of the malodors under consideration against these Standards, and increase or decrease the recommended starting application rate accordingly.

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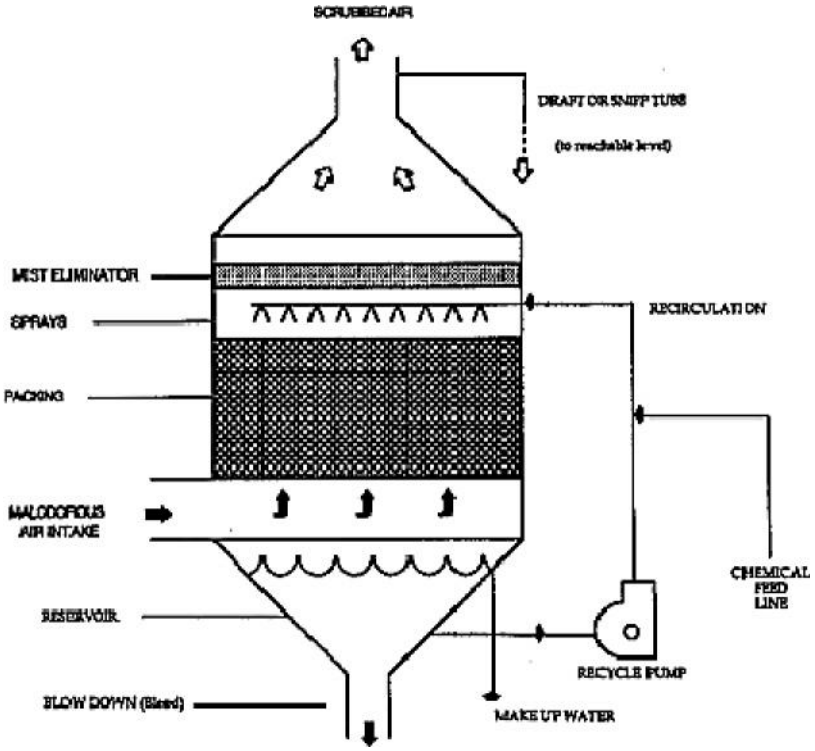
| STARTING RECOMMENDATIONS(concentrated 312 Formula) | | |
|---|---|---|
| SCRUBBER TYPE | PER 10,000 CFM FLOW | PER 100M$^3$/MINUTE FLOW |
| Packed Bed | .67 fl. oz./hour | 7 cm $^3$/hour |
| (rendering Standard) | 19.8 cm $^3$/hour | |
| Mist | 1.0 fl. oz./hour | 10.5 cm $^3$/hour |
| (domestic Standard) | 29.57 cm $^3$/hour | |
| (conversions) | 1 fl. oz. = 29.57 cm $^3$ | 1 m $^3$ = 35.31 ft $^3$ |
| Example | - packed bed scrubber – rendering, 60,000 CFM (1700m3), 24 hour day | |
| | - .67 fl. oz. x 6 (60,000 ÷ 10,000 = 6) = 4.02 fl. oz./hour x 24 hours = 96.48 fl. oz./day | |
| | - 7 cm3 x 17 (1700 m3 ÷ 100 = 17) = 119 cm3/hour x 24 hours = 2856 cm3/day | |
| Example | - mist scrubber – domestic, 12,000 CFM (340m3), 18 hour day | |
| | - 1.0 fl. oz. x 1.2 (12,000 ÷ 10,000 = 1.2) = 1.2 fl. oz./hour x 18 hours = 21.6 fl. oz./day | |
| | - 10.5 cm3 x 3.4 (340 m3 ÷ 100 = 3.4) = 35.7 cm3/hour x 18 hours = 642.6 cm3/day | |

## RECIRCULATING PACKED BED SCRUBBERS

The treatment solution is sprayed over the packed bed where it falls through the packing to a sump beneath. Malodors transfer from the gaseous phase to the liquid phase when collected air is forced through the moistened packing. Air residence time through the bed is often only a few seconds, so sufficient air pressure is critical to the transfer.




From the sump, the treatment solution is recirculated over the top of the packing. Fresh solution is added on the way to retain needed strength. This feed loop includes a chemical solution tank, metering pump and piping, a recirculation pump and associated piping and valves.

A portion of the spent solution in the reservoir is wasted (bled) in order to remove treated malodors and accumulated solids. To make up for bleed loss and evaporation loss, fresh water is added.

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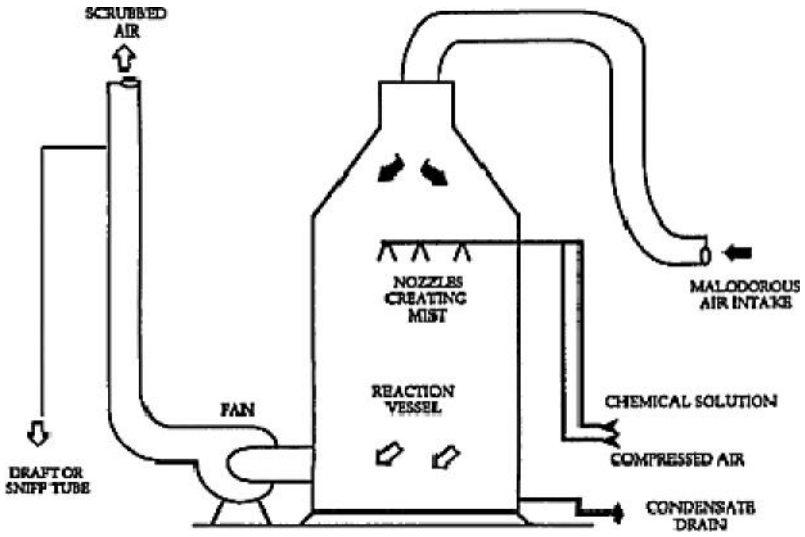
## MIST SCRUBBERS

Mist systems operate on similar principles to the recirculating packed bed systems except there is no recirculation of the spent solution, and considerably less water is used. The treatment solution is atomized or sprayed through nozzles to achieve maximum solution break-up. The malodorous air is mixed with the mist particles in a reaction vessel, where the malodors are transferred into solution. Condensate from the reaction vessel is wasted.The fine mist particles are primarily discharged with the treated airstream. The size of mist particles required for a specific degree of malodor control is not yet well defined. However, the smaller the particle size, the greater the total surface area produced, promoting maximum gas transfer. Typical residence time within the reaction vessel is 10 to 15 seconds.




| PHYSICAL AND SAFETY DATA | |
|---|---|
| Weight per Gallon<br>Weight per Liter | 8.37 lbs<br>2.21 lbs. |
| Specific Gravity @ 77° F<br>Specific Gravity @ 25° C | 1.004<br>1.004 |
| Boiling Point ° F<br>Boiling Point ° C | 205°<br>95.2° |
| Flash Point ° F<br>Flash Point ° C | > 200°<br>> 93.3° |
| Solubility in Water @ 77° F<br>Solubility in Water @ 25° C | Soluble<br>Soluble |
| Color | Green |
| Toxicity | Non-toxic, non-hazardous. Good housekeeping procedures and general principles of safety should be observed when handling any chemical product. |
| First Aid | Skin contact – in cases of prolonged skin contact, wash off with soap and water. If any irritation exists, seek medical advice. |

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|---|---|
| | Eye contact – wash eyes with lots of water for at least 10 minutes and seek medical advice.<br>If swallowed – drink lots of water and seek medical advice immediately. Consult material safety data sheet. |
| pH | 7.4 – 7.6 |
| Corrosivity | Non-corrosive |
| Biodegradability | Fully biodegradable |
| Packaging | 5 U.S. gallon pails, 55 U.S. gallon drums |
| Shelf Life | 12 months in unopened containers |
| Storage | Protect from freezing. Do not store in temperatures above 120° F, 48.9 ° C. |

Limited Warranty:
Our only obligation shall be to replace or pay for any material proved defective. Beyond the purchase price of materials supplied by us, we assume no liability for damages of any kind and the user accepts the product "as is" and without warranties, expressed or implied. The suitability of the product for an intended use shall be solely up to the user.