Benzaco Scientific
ENGINEERED ODOR MANAGEMENT

FAQ on Odor Control

1) What makes Odor Armor® so different from other essential oil odor control products?

One of the critical things to understand about essential oil technology for odor control is that not all essential oils are created equal. Essential oils used in odor control are extracts of many different fruits, vegetables and other plant material. There are thousands of these oils available and many find their way into perfumes and fragrances as well as solvents, flavor enhancers, cooking oils and other uses. However, there are a very limited number of these oils effective for the process of odor elimination.

The oils used in odor control display certain critical chemical properties that allow the oil to have a physical or chemical effect on odorous compounds. The effectiveness of any odor control product is directly dependent on how well the oils are chosen and blended to effect the correct chemical or physical reaction on those odorous compounds. Benzaco has spent years in the pursuit the IDEAL formula for odor control using essential oil technology. We believe that Odor Armor® is the best technology on the market today.

Benzaco has developed a line of odor control products that is more effective, in terms of both odor elimination and cost effectiveness, than any of our competitors' products.

2) How does essential oil technology work to eliminate odor?

Three simple reactions occur allowing Odor Armor® to effectively and safely eliminate odors.

1) chemical absorption of the malodor
2) chemical solubility of the odorous compounds
3) counteracting odor through antagonistic pairing

The chemistry involved utilizes the unique characteristics of each oil in the product to optimize the simple reactions. The result is complete odor elimination without harmful byproducts or the use of hazardous chemicals.

3) I've been told that essential oils are perfumes and fragrances; is Odor Armor® a masking type of product?

Many essential oils are indeed fragrances and are used in perfume formulations; however, not all essential oils are fragrant or used as fragrances. Odor Armor® is a blend of oils that though having some fragrance is not suitable to mask an odor. It simply does not contain a high enough level of fragrance to do so. Even at very high dosage without the presence of odorous compounds Odor Armor® is only mildly fragrant and the fragrance is nondescript. A masking agent is usually made up of one distinct fragrance that is readily detectable and

increases in intensity as the dosage is elevated. Masking agents add to the overall odor intensity by introducing an odor greater than the offending malodor often resulting in an even greater odorous condition. Odor Armor® is true neutralizing chemistry that reduces and eliminates odor.

4) What is the best way to determine if a product will work to eliminate my odor?

The best instrument yet devised for odor monitoring is still the human nose. A simple lab test using a sample of the odor causing material and a dilution of Odor Armor® at the expected dosage for treatment is all that's needed to get a good notion of whether the product will work. A simple testing procedure is available on request. Beyond that simple lab test, an actual trial on the offending area of the plant or site can also be arranged and easily accomplished with minimal expense. If the product is going to work either of the above methods will easily determine that.

5) How many others offer vapor phase technology?

A number of companies operate in the odor control market. Those companies are scattered throughout the U.S. and are generally regional in scope. We are aware of 15 to 20 small companies offering limited products, equipment and expertise. Often their offering is not a true neutralizing technology, but a combination of masking technology, perfume and some degree of neutralizing capability. There are also a tremendous number of janitorial service companies that dabble in odor control. The offerings are usually masking agents.

6) What do you mean "not a true neutralizer"?

Most companies offer a neutralizing product or line of products that are a blend of only a handful of essential oils. Often the primary component is pine oil or some other commodity essential oil. Though pine oil is effective in some cases, it falls far short of complete effectiveness. Because the products are not effective at odor neutralization, the products are blended to contain a fragrance to compensate for the shortfall. These products have limited applications and are not effective on most odors. In addition, the products require very high dosages to achieve even limited effectiveness, yet they often cost as much or more as Odor Armor®.

7) Is Odor Armor® safe to use?

Odor Armor® is nontoxic, non-hazardous and absolutely safe to use.

8) How quickly will Odor Armor® work?

Lab data has shown that the reactions occur within seconds of contact with odorous gasses and go to completion within seconds more. That means that you can be sure that the product will neutralize odor before it leaves your site thus eliminating odor complaints. Further, unlike masking agents, which can separate from the odor, the Odor Armor® reactions are nonreversible and will not separate from the Odor Armor® and cause problems downwind of the site.

9) Is the same product good for all applications?

Odor Armor® is formulated to address a broad spectrum of odorous conditions because odors are seldom-simple one or two component gasses. The design of the product is such that it will effectively respond under changing odor intensity as well as changing odor characteristics. Because of this, it is unusual to find an application where Odor Armor® will not work.

10) Will Odor Armor® work under all conditions?

As long as the conditions being treated do not change too dramatically from moment to moment, Odor Armor® will work beautifully and without much attention to the dosage. However, if there are large swings in odor causing conditions the product may need dosage adjustment, as would any chemistry that works by neutralization.

11) Will Odor Armor® work on all odors?

In tests and applications, Odor Armor® has worked on nearly all odors. Some applications have required a different combination of ingredients because of a particular odorous compound. Benzaco can formulate to any application needing a unique product for odor control.

12) Can I test the treated air to determine effectiveness?

No. There are no easy or economical ways to quantify the treatment. However, the best test is using your nose. If it works, you won't smell anything. If it doesn't work, you will smell the odor. If it's overfed you may get a slight smell of a nondescript fragrance that's very slight but pleasant. If it's underfed, you will get odor that will be at a reduced level from before treatment. In that case, all that's needed is some slight dosage adjustment.

13) What about winter operations, does the product freeze?

The product in its concentrated form freezes at about 25 degrees F but there is no detrimental effect on the efficacy or stability of the product. In its diluted form, the solution will freeze at about 30 degrees F. Since the diluted form is a water solution, it must be freeze protected by heat tracing if freezing is a potential.

14) What references do you have and what have you treated with your products?

Benzaco has been in the odor control business for over twenty years. We have treated everything from smoke odor in airplanes to rendering plants to solid waste and sewage. We have extensive experience in odor control from every aspect - chemical, mechanical, equipment and application. We CAN engineer a solution to your odor control problem. References are available upon request.

15) Can I add Odor Armor® to my system water to affect odor control?

Though the product can be used in the water phase it is not the most effective or economical method for its use. The chemistry of neutralization requires intimate contact of the oils and odorous compounds in the vapor phase. The volatility of the oils changes

dramatically when added to a water stream. More product would be required to effect the same results as a fraction of product use in the vapor phase. It's just not economical.

16) Can I add Odor Armor® to my sludge/compost/working face etc to affect odor control at the surface?

Absolutely. Odor Armor® is an exceptional odor control agent when added to surfaces emitting odorous compounds. You would get excellent odor control as long as there was Odor Armor® present on the surface in question. Because the Odor Armor® would evaporate along with the odorous compounds, a fresh dosage should be added when odor returns.

17) Can I spray Odor Armor® on odorous equipment and containers?

Yes. Surfaces treated with Odor Armor® remain odorless as long as the product remains on the surface.

18) I am considering using a scrubber on my exhaust gasses; do I still need to treat?

Scrubbing is an excellent mechanical method of removing the bulk of the odorous gas coming from a process. However, there are certain limitations to scrubbers that one needs to consider before buying and utilizing a scrubber as a means of odor control.

1) Is the odorous gas water soluble to the levels that are below the odor detection limit for that compound?
2) What will be required to establish and maintain the proper water chemistry to allow efficient operation of the scrubber?
3) What are my ongoing operational and maintenance costs?
4) What will I need to do during scrubber downtime?

The use of scrubbing can indeed reduce the requirement for odor control but often it will not eliminate it. The question then becomes which method is more economical and easier to administer or is a combination of the two the best way to go?

19) Can I use activated carbon as a means of odor control?

Activated Carbon can be a suitable means of mechanical odor control as long as the limitations of the applications are considered. Activated carbon is really only suitable for the elimination of hydrogen sulfide. Beyond that, the method either does not work at all or is severely limited in its ability to adsorb odorous gases. Processes that may have high voc content or are high in oils and greases also limit the carbon. Fouling of the carbon bed by the oils or rapid use of the bed capacity by the volatile organics would require frequent cleaning and regeneration of the carbon beds thus adding to the overall cost of the program of odor control.