

SUBTRACTIVE ODOR CONTROL™

ODOR-ARMOR®

Many products, like masking agents, designed to control malodors using fragrances added to the air to overwhelm the malodor, actually ADD to the intensity of the malodor – additive masking technology. Many times the result is a fragrant version of the malodor AND a higher level of odor intensity.

The principle is simple...

Masking agents are additive ++++++ Odor intensity is increased

Benzaco Scientific **Subtractive Odor Control™** makes additive masking technologies obsolete. By using scientific odor neutralization concepts developed over the last 20 years, Benzaco Scientific is able to dramatically reduce or eliminate malodors completely.

Benzaco Scientific uses selected essential oils, intimately dispersed with the malodor in vapor phase delivery and through a combined process of chemical reaction, odor opposites (antagonistic pairs), absorption and adsorption, and pluralistic effects, the odor is neutralized and eliminated.

ODOR-ARMOR® is subtractive ----- *Odor intensity is decreased*

Basically, Benzaco Scientific changes the way one smells the odor. The shape of the odor molecule triggers odor perception. Odor molecules solubilize in mucous in the nasal cavities. The solubilized molecule attaches to a protein in one of millions of olfactory sensory receptors. This combined protein/molecule triggers a signal to the olfactory bulb, which acts like a switching station, sending signals to the brain. These signals are received by various areas of the brain including the temporal lobe, which houses memory. Memory plays a very significant role in odor perception. Smells are remembered and emotions are triggered by them.

Benzaco Scientific chemists use a number of techniques to modify malodors:

1. Modify the shape (chemical structure) of the odor molecule BEFORE it reaches the nose.
2. Modify the number and intensity of the triggering molecules reaching the nose.
3. Modify the perception of the odor.

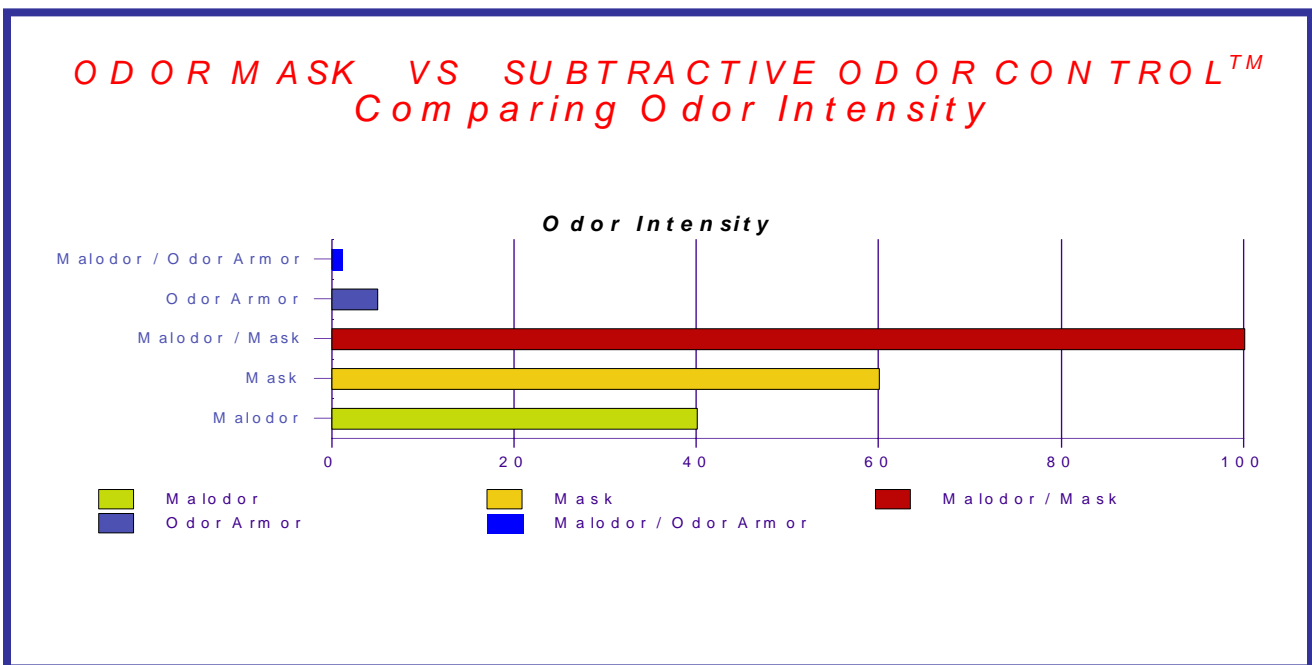
The chemical reactions between the molecules of malodour and the odor neutralizer creates a different molecule. If the new molecule reaches the nose, a different mechanism is triggered. Often, the reactions are catalyzed by other malodour molecules like hydrogen sulfide.

By selecting odor molecules which trigger an opposite signal to the malodor, both odors are cancelled. This effect known as antagonistic pairs or odor opposites, has been well studied and documented. The concept is used everyday in restaurants when lemon or orange is applied to cooked fish in order to negate the strong amine odors that can emanate. Antagonistic pairs exist, that work well outside of 1 to 1 stoichiometric chemistry. Benzaco Scientific chemists have discovered many odor opposites that work at a fraction of the level of the malodor they neutralize.

By correctly applying vapor phase technology, Benzaco Scientific is also able to take advantage of certain essential oils that solubilize (absorb) malodorous molecules, thus reducing the opportunity for these molecules to reach the sensory cells. Adsorption, a surface phenomena where molecules attach with a temporary electrical bond which in effect changes the shape of the molecules reaching odor receptors, is also used. Finally, many malodors have a dualistic or pluralistic effect. They are only malodorous when present at certain concentrations but when reduced in level, actually take on an acceptable odor.

Benzaco Scientific has many operational sites in the United States using Subtractive Odor Control™ Technology. The results are impressive. Analysis of air samples before and after treatment show reductions in odor intensity of 90% plus. Comparative tests on other vapor phase odor control technologies showed reductions of 40 to 60%

Benzaco Science chemists and engineers have combined to make Subtractive Odor Control™ an extremely effective method of odor management in municipal and industrial waste treatment plants. The right chemistry and the right engineering make the difference between unsatisfactory odor masking and complete odor reduction. Benzaco Scientific Subtractive Odor Control™ - tested and proven for over 20 years.



For more information on Benzaco Scientific engineered solutions for odor control, visit our website www.benzaco.com or contact us at 888.413.5800