## AirSolution and Chemical Reactions

Most sites with problematic odors require solutions that will permanently neutralize the odors and not be confused with perfumes or masking agents. Successful treatment is measured by a lack of odor, less complaints, or occasionally detection of a pleasant note in the air.

### Technology behind AirSolution and XStreme Solution

AirSolution and XStreme odour neutralizers uses Two-Aldehyde technology, which blends two classes of aldehydes to permanently and significantly neutralize the unpleasant odors. The patented two aldehyde technology permanently reacts with these common malodors to produce either a new odorless compound that is heavier and less volatile, or a modified reaction compound that smells much more pleasant but is quickly volatilized. Two Aldehyde technology has proven very effective against sulfur compounds (rotten egg), organic acids such as capric acid, caproic acid and valeric acid (perspiration, cheesy and vomit odors) and various amines generated in the breakdown of proteins (decay and urine odor). Many malodor molecules are sulfur compounds, or primary or secondary amines and are chemically reactive with the aldehydes of AirSolution or XStreme Solution.

Examples of naturally occurring aldehydes and ketones include vanillin (from Vanilla bean), cinnamaldehyde (from cinnamon bark), benzaldehyde (from bitter almond), camphor, (R)-carvone (spearmint oil), (S)-carvone (caraway seed oil), Z-jasmone (scent of jasmine). Ecolo Odour Neutralizing products are composed of a blend of plant extracted materials in a format appropriate for the application. These materials vary from highly complex mixtures (essential oils), to single chemicals. Below is a list of the most important materials incorporated in AirSolution.

**Essential Oils**

Camphor Oil
Cinnamon Leaf Oil
Cedarwood Oil
Cornmint Oil
Eucalyptus Oil
Lemon Oil
Lime Oil
Orange Oil
Peppermint Oil
Pine Oil
Rosemary Oil
Spearmint Oil

**Single Chemicals**

Amyl Acetate
Aldehyde C12
Cinnamic Aldehyde
Citral
Cirtronellal
Coumarin
Ethyl Acetate
Eugenol
Geraniol
Methyl Salicylate

Every AirSolution and XStreme Solution has its specific formula that has been designed to eliminate some particular odor. Therefore, the difference between AirSolution varieties is in specific materials required in the formula and their individual concentration.

4540 EASTGATE PARKWAY, UNIT 2, MISSISSAUGA,ON L4W 3W6
TEL: 905-625-4533 FAX: 905-625-4595

## Method of Application

This permanent neutralization of odors is aided by the method of AirSolution application; high pressure misting, fogging, or vaporization allows the product to achieve intimate contact with the odorous air to effectively contact the odorous molecules. This is generally the most efficient and economical method of neutralization. The reaction occurs nearly instantly when the prepared and misted solution contacts the odorous air stream. If the solution were to require 10 seconds of contact time to completely mix with the air from an odorous site in a 20km/h wind (6m/s), the reaction would be complete within 60 meters of the installed distribution method.

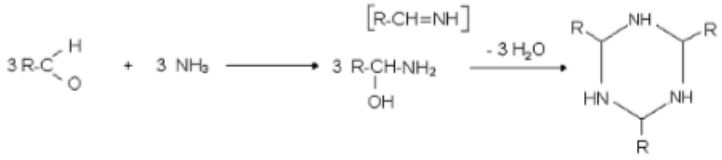
In some cases, direct addition to waste water may be recommended. This method can be useful in scrubber applications and are associated with complete utilization of the product as it is metered in as required. This is useful when a scrubber stack is the point source releasing the odors. The Two-Aldehyde technology has been tested in many field applications against a variety of odors when being finely dispersed by air or when added directly to the waste.

## Chemical Equations:

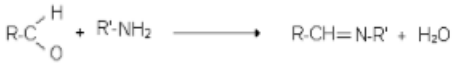
AirSolution will be presented with a wide array of odors. Rarely will only one offensive odor be present in an air stream, so the complexity of the formulation helps combat real world odors.

**Reaction of an aldehyde with:**

- Ammonia (in gas phase)

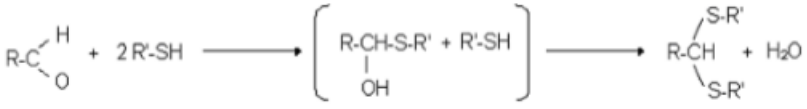



- A primary amine



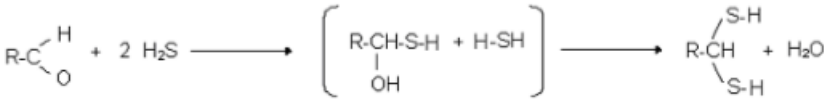

- A secondary amine


- A mercaptan




(Thioacetal)

- Hydrogen sulfide

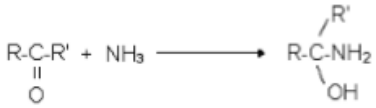



(Thioacetal)

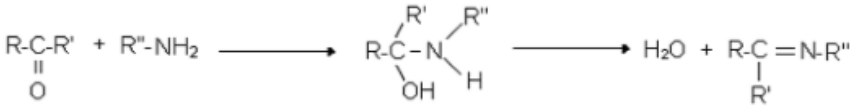
4540 EASTGATE PARKWAY, UNIT 2, MISSISSAUGA,ON L4W 3W6
TEL: 905-625-4533 FAX: 905-625-4595

**The reaction of a ketone with:**

- Ammonia

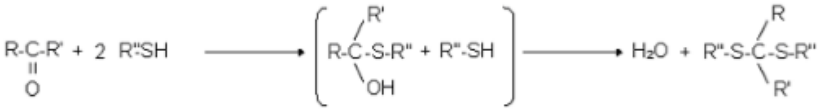


- A primary amine



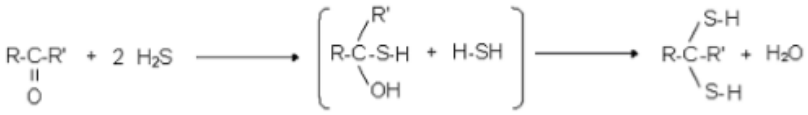
- A secondary amine

- A mercaptan



(Thioacetal)

- Hydrogen sulfide



(Thioacetal)

The end products are generally larger and heavier, with the change resulting in a new molecule without the original odor characteristics. The product is safe, biodegradable and environmentally sound. The permanent removal of the odors from the air stream significant improves the quality of air

4540 EASTGATE PARKWAY, UNIT 2, MISSISSAUGA,ON L4W 3W6
TEL: 905-625-4533 FAX: 905-625-4595