



Formaldehyde Vapors and Keratin Treatments

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The salon industry is notorious for having improper ventilation in place to protect salon workers from overexposure to salon chemical vapors, mists and dusts. An incomplete understanding of salon ventilation control measures and OSHA regulatory requirements are factors which often contribute to respiratory illness of hair stylists who are exposed to airborne chemical contaminants on a daily basis. Recent advancements in salon ventilation technologies have been introduced to the salon industry, which when used and maintained properly, can allow salon workers to provide all types of salon chemical services in a safe working environment without compromising their health.

There are two types of ventilation:

Source capture ventilation is designed to capture salon chemical vapors and dusts at or near its source, protecting the hair stylists' breathing zone, and preventing inhalation of, or dispersing of contaminants into the salon air.

General exhaust ventilation (also called dilution ventilation) is different from source capture ventilation because instead of capturing emissions at their source and removing them from the air, general exhaust ventilation allows the chemical vapors & dusts to be emitted into the salon air and breathing zone of the hair stylist, and then possibly inhaled into the cosmetologist's respiratory system. General ventilation then dilutes the concentration of contaminants to an acceptable level.

Salon ventilation has become a hot topic with the introduction of keratin hair smoothing services. Formaldehyde vapors are released into the air when heat is applied during blow drying and flat ironing of the hair, as well as during application of keratin hair smoothing products which contain formaldehyde releasing ingredients. Repeated overexposure to formaldehyde vapors can cause "sensory irritation", (i.e. burning / watery eyes, scratchy throat and runny nose). Other symptoms may include difficulty breathing, occupation-related asthma and other related skin allergic sensitivity. Without proper ventilation the salon can be sued by booth renters and/or employees who experience these adverse health reactions.

OSHA has provided a list of what it calls "synonyms" for formaldehyde, and is listed below:

- Methylene glycol
- Formalin
- Methylene oxide
- Paraform
- Formic aldehyde
- Methanal
- Oxomethane
- Oxymethylene
- Timonacic acid
- Thiazolidinecarboxylic acid



Use of appropriate ventilation is necessary in the salon to control vapors and minimize the potential for "sensory irritation" and adverse health reactions. Salons that are not equipped with the appropriate ventilation needed to prevent sensory irritation should NOT provide these services until the situation is

corrected. Proper ventilation that is appropriate for the services being performed is VERY important for both the client and salon professional. The best way to prevent clients' and stylists' overexposure to formaldehyde vapors is to use local source capture ventilation, as stated by the Professional Keratin Smoothing Council in its Oct. 2011 press release. The PKSC numerous air monitoring tests all show the greatest spikes in formaldehyde exposure occur during blow drying, especially when a high heat setting is used. Using a medium or low heat setting is recommended to assist reducing formaldehyde exposure. Keratin smoothing formaldehyde vapors are also off-gassing into the stylists breathing zone during product application, which produces the next greatest spike in formaldehyde exposure. Flat ironing produces the least amount of exposure to formaldehyde of the three keratin hair smoothing service sequences. Source capture ventilation should be provided during all three sequences.



It is impossible to capture 100% of the keratin hair smoothing fumes & vapors, so additional salon ventilation control measures are recommended. It is helpful to consider there being three zones to be concerned with. Once the breathing zone (Zone 1) is protected, we should consider the work station or the room hair chemical services are being provided in, as (Zone 2). We want to scrub all migratory chemical vapors or dusts from the air everyone is breathing, and replace with a continuous supply of clean and fresh air provided by a room air purifier designed specifically to remove salon vapors and dust. One of the most common errors made in the salon industry is the use of residential or commercial filters in the buildings' HVAC system (heating, ventilation & air conditioning), (Zone 3). Salon chemical vapors/odors are continuously re-circulated in salons using filters not designed to trap and remove chemical vapors & very fine dusts. Vapors & odors enter the cold air returns and re-circulate throughout the salon. Proper Salon HVAC filtration should be provided designed to remove salon vapors & dusts. Another common HVAC system error salons make is turning the fan to "off"!

Whether the salon is being heated, air conditioned or neither, the HVAC fan should be in the "on" position, if the building is occupied. The proper filtration in the system allows a constant cleansing of the salon air, and replenishes with fresh clean air for everyone to breathe.

As the OSHA RECOMMENDED FORMALDEHYDE EXPOSURE ENGINEERING CONTROLS: Toxic and Hazardous Substances ~ 1910.1048 App A; Engineering Controls states: **Ventilation** is the most widely applied engineering control method for reducing the concentration of airborne substances in the breathing zones of workers. Use of ceiling fans, opening windows and air conditioning, although they do circulate air and will reduce concentrations of salon chemical vapors, mists and dust, are not proper salon ventilation control measures.

Proper Salon Ventilation Control Measures Appropriate For All Salon Chemical Services

These recommended control measures include a "Three Zone Protection" approach to salon ventilation:

1. Your Breathing Zone

Source capture ventilation is designed to protect both the stylist's and client's breathing zone and prevent overexposure to excessive levels of formaldehyde, or other salon vapors & dusts.

The easiest and most efficient way to prevent vapors and dust from getting into the salon is to provide the hair stylist with a source capture ventilation system. A source capture system protects the "breathing zone" of the stylist --- the two-foot radius in front of the mouth. Every breath we take comes from the breathing zone. It is important to keep that area clean. And, if that area is clean --- if the vapors and dust are captured immediately --- then they don't become inhaled or make it past the work station and into the salon. If anything does get past the source capture system, it would be absorbed by the whole-salon unit (salon room air purifier). Source capture systems intake the





chemical vapors that are created when stylists apply chemical treatments to the hair, during blow drying, and flat ironing. Then they adsorb and contain the vapors. As with the larger, whole-salon ventilator (room air purifier), the adsorbent material needs to be changed regularly as it becomes saturated with salon chemicals. While source capture systems are all meant to accomplish the same thing, the quality of them dramatically differs.

"These are not magic boxes," says Doug Schoon of Schoon Scientific Regulatory Consulting LLC. He recommends stylists choose a unit with a four inch bed of adsorbent material that the air has to pass through. New technologies use a high energy field (ionizer) to enhance the filtration, adsorption and decomposition of airborne contaminants. Together, "source capture" and salon air purification systems minimize what becomes part of the air. Stylists benefit in two ways. First, they will breathe clean air --- which makes for happier lungs while helping to eliminate sensory irritation (burning eyes, scratchy throat, runny nose, headaches). Second, they will never have to be concerned about the smell of the salon.

2. Your Salon Zone

Room air purification to cleanse the work station air and further reduce the potential of overexposure to formaldehyde or other salon vapors and dusts found in the salon.

All salon chemical vapors including formaldehyde are heavier than air and tend to migrate to the floor. It is important to choose a unit which not only contains sufficient amount of adsorbent material, (i.e. 8 lbs activated carbon), but also moves a sufficient volume of air, (400 to 600 cubic ft. per minute) A unit which provides a "Fountain Flow" of air by forcing clean air towards the ceiling will create the necessary airflow pattern to scrub contaminants from the salon air. Because salon vapors are in greatest concentrations at floor level, choose a unit designed to capture pollutants at the floor level.



3. Your Building Zone

HVAC filters designed specifically to remove formaldehyde and other salon vapors and dusts from the building's heating, ventilation and air conditioning system.



A building's ventilation system, whether in a strip mall or a stand-alone structure, is called the HVAC system. This stands for Heating, Ventilating, and Air Conditioning. This is your first line of attack. The HVAC system brings fresh air to the salon and pushes it from one room to another. An HVAC system removes mold, mildew, dust, etc., providing relatively fresh air to a building. Most salons are only using residential, standard HVAC fiberglass filters, which are inadequate for the removal of salon specific chemical vapors and dust. Special Salon HVAC filters are available which have an increased dust holding capacity and are composed of rinse-able layers of electrostatic polypropylene grids that collect and trap dust. Designed specifically for salons these filters are composed of an interchangeable activated carbon panels which captures and removes

salon specific chemical vapors. Source capture ventilation, room air purifiers and HVAC filters designed specifically for removing salon vapors, mists and dusts have been developed and are highly effective for improving salon air quality. This has been an often overlooked tool that all salons need in order to protect workers and clients. Salons must begin to consider ventilation as an important tool. You can't cut hair without shears; and you can't have a safe salon environment without proper and effective ventilation.

For additional information on air ventilation challenges and solutions, please visit AerovexSystems.com, or contact Jeff Cardarella directly at info@aerovexsystems.com