

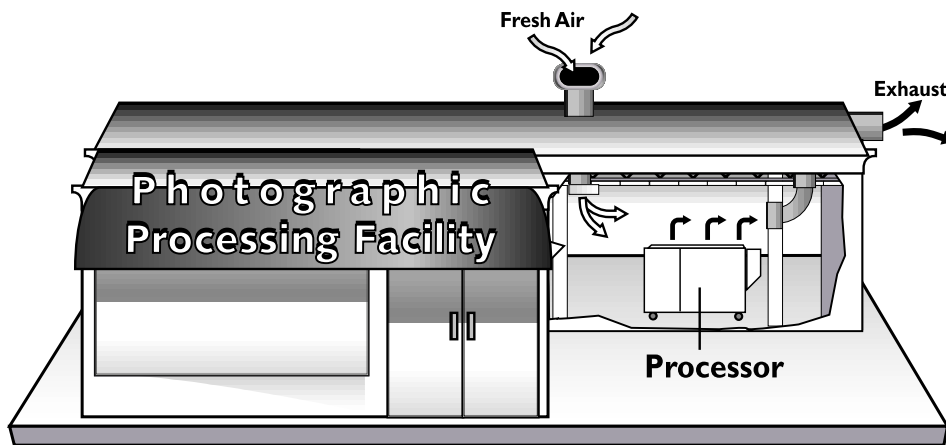


Environment

INFORMATION FROM KODAK

J-314(ENG) \$10.00

Indoor Air Quality and Ventilation in Photographic Processing Facilities



INTRODUCTION

The Occupational Safety and Health Administration (OSHA) presents a framework of federal regulations that set chemical exposure standards for the workplace environment. These standards outline allowable limits that employees may be safely exposed to during the work day. Effective ventilation systems are an important tool that will help minimize employee exposure to photographic processing chemicals. While photographic processing facilities are typically considered to be a low hazard

workplace, indoor air quality environment can be improved if well engineered ventilation systems are installed.

This publication will provide information on the following topics:

- Indoor air quality
- Exposure concepts
- Air contaminants
- Exposure standards and guidelines
- Methods of evaluation
- Ventilation and work practice control measures

This publication is meant to assist others with their compliance programs. However, this is not a comprehensive treatment of the issues. We cannot identify all possible situations and ultimately it is the reader's obligation to decide on the appropriateness of this information to his/her operation.

Kodak's health, safety, and environmental publications are available to help you manage your photographic processing operations in a safe, environmentally sound and cost-effective manner

This publication is a part of a series of publications on health and safety issues affecting photographic processing facilities.

It will help you understand the role and proper use of ventilation systems in the workplace.



INDOOR AIR QUALITY (IAQ)

The quality of the air in our homes, schools, and places of business is an important environmental health issue. It is estimated that we spend over 90% of our time indoors. It is also important to note that the design of buildings and ventilation systems has changed dramatically over the last 50 years as we have moved toward more energy efficient, climate controlled environments. New or remodeled buildings are more air tight, which leads to less air exchange between indoor air and fresh outdoor air. To ensure good indoor air quality, adequate fresh outdoor air must be brought indoors. You can no longer rely on leaking windows or other pathways for outdoor air infiltration. Indoor air quality (IAQ) depends upon the ability of a ventilation system to remove or control the contaminants generated within a space to acceptable levels. When there is insufficient fresh dilution air, IAQ problems can occur which may result in a variety of symptoms in building occupants including:

- headache
- sinus congestion
- nausea
- eye, nose and throat irritation
- sneezing
- a metallic or sweet taste in mouth
- dizziness

Two terms are used to describe IAQ health-related problems.

Sick Building Syndrome (SBS): describes cases in which building occupants experience acute health and comfort effects that are apparently linked to the time they spend in the building, but in which no specific illness or cause can be

identified. Basically, people enter the building and experience symptoms which clear up after they leave the building.

Building Related Illness (BRI): refers to symptoms of diagnosable illness that can be directly attributed to environmental agents (chemical, biological or physical) in the building air. In other words, people enter and become ill from a known agent in the building air but do not necessarily get better after they leave the building (examples: Legionnaire's disease, respiratory infections, and humidifier fume fever).

The causes of poor IAQ continue to be studied extensively. In the 1980s the National Institute of Occupational Safety and Health (NIOSH) studied over 600 buildings and identified the following as potential causes of poor IAQ:

Inadequate ventilation	52%
Inside sources	17%
Outside sources	11%
Biological	5%
Building fabric	3%
Unknown	12%

Recent studies have lead some experts to believe that biological contamination (molds, fungi, bacteria) may account for up to 30% of the IAQ problems in buildings.

To help prevent IAQ problems, we recommend that you assemble a comprehensive program that is preventive in focus. Specific performance elements of your IAQ program should include:

1. Developing and maintaining an IAQ profile for each building (year built, tenant operations, number of people, type of HVAC).
2. Developing and maintaining a thorough understanding of your IAQ requirements and processes.

3. Maintaining up-to-date line drawings and equipment schedules for each HVAC system.
4. Documenting the operational parameters for each HVAC system including scheduled time of operation, temperature and humidity set points, seasonal variations, outside air requirements, air flow parameters.
5. Providing a process to identify, investigate, track and respond to IAQ-related complaints.
6. Maintaining a written maintenance program and relevant history of each HVAC unit.
7. Providing a process to review all major projects in or near the building for their IAQ implications.
8. Ensuring that HVAC systems are commissioned and periodically balanced.
9. Ensuring that the performance of local exhaust systems are periodically assessed.
10. Providing a process to review health, safety and environmental implications of maintenance and housekeeping chemicals used in the facility for remodeling or construction activities that may impact IAQ.
11. Requiring compliance with local regulations or company standards regarding smoking in the workplace.
12. Requiring that personnel involved in the design, operation, evaluation and maintenance of HVAC systems are properly trained and aware of new IAQ regulations and trends.

EXPOSURE CONCEPTS

ROUTES OF EXPOSURE

In a work environment where chemicals are used, an individual may potentially be exposed in three ways:

- inhalation
- skin and eye contact
- ingestion

Inhalation is the most common route of exposure for airborne particulates, gases, and vapors. Inhalation exposures are important because many chemicals that enter the lungs can pass directly into the blood stream and be transported to other areas of the body.

Skin contact can also be a significant source of exposure which can lead to adverse health effects. Some chemicals can be absorbed into the body through the skin while others may cause irritation or rashes (dermatitis). In addition, some chemicals are potential eye irritants.

Ingestion is not considered to be a significant problem in the workplace. Inadvertent ingestion of chemicals may occur if food or beverages are consumed in chemical handling areas or if good personal hygiene practices are not followed, i.e., washing hands before eating, drinking, smoking, etc.

Air contaminants: are chemicals that may be present in the air that could be inhaled and may produce adverse effects. These effects can be divided into two classes:

- **acute** health effects—an adverse effect resulting from a single exposure with symptoms developing almost immediately or shortly after exposure; the effect is usually of short duration. Symptoms may include irritation, headache, dizziness, or nausea.

- **chronic** health effects—adverse effects resulting from repeated low level exposure, with symptoms that develop slowly over a long period of time. These may affect target organs such as the liver, kidney, or lungs or cause cancer.

Dose Response: All chemicals are toxic if taken into the body by the right route of exposure and at a high enough dose. As the dose increases, there is a corresponding effect or response.

Chemicals that require large doses or exposure concentrations to produce an adverse effect have a low toxicity, while chemicals that require smaller doses to produce an adverse effect are considered more toxic. For example, acetic acid is irritating to the eyes and upper respiratory system at low concentrations, about 10 ppm. Isopropyl alcohol is not irritating to the eyes until concentrations reach over 400 ppm. Based on this comparison, acetic acid causes an irritation at much lower concentrations than isopropyl alcohol.

AIR CONTAMINANTS

The air within buildings usually contains a variety of air contaminants. These contaminants can originate from outside sources (car/truck exhaust) or emissions from inside sources (office equipment, furnishings, carpet, people, kitchens, janitorial activities).

Whatever the source, contaminants in the air fall into one of two physical states of matter. They are either:

- gases and vapors, or
- solids (particulates)

Gases/Vapors: The difference between gases and vapors is their physical state at standard temperature and atmospheric pressure (STP, 22.5°C, and 760 mm Hg). A gas is in the gaseous state at STP (examples: nitrogen, carbon dioxide, sulfur dioxide). A vapor is a gas from a substance that at STP is a liquid (example, acetic acid).

Particulates: There are several forms of particulate matter that can be airborne. These include:

- dust
- fumes
- smoke
- mists

Dust results from the application of energy to matter, by grinding, sifting pouring solids, paper cutting, etc. Dust particles have to be small enough and light enough to be airborne.

Fumes are generated by the condensation of particles in the vapor state from heated metals. Fumes are typically smaller than dust, more soluble, and are more physiologically active. Fumes are not generated during normal photographic processing operations.

Smoke results from incomplete combustion and is made up of extremely fine particles, even smaller than fumes. Smoke is extremely complex chemically, containing thousands of chemical substances. Unless something is burning, smoke is not generated during photographic processing operations.

Mists result from the dispersion of fine droplets by aerosolization of any liquid (spray cans, nitrogen agitation of tanks, electroplating). Mists can be formed during the mixing, recirculation or pouring of liquids. Mist can also be generated from foam on the surface of a liquid.

As the bubbles burst, tiny droplets of the liquid are released into the air. The composition of a mist is usually the same as the liquid from which it was generated.

ANTICIPATED AIR CONTAMINANTS FROM PHOTOGRAPHIC PROCESSING OPERATIONS

Potential air contaminants associated with photographic processing operations will be determined by the *specific process chemistry* and the operating conditions of the equipment. Some photographic processing solutions release small amounts of vapors such as acetic acid and benzyl alcohol or gases such as ammonia, or sulfur dioxide. High-temperature processing and nitrogen-burst agitation of tank solutions may increase the release of chemicals into the air and generate mists from the photographic processing solutions. Depending on the concentration in the air, these chemicals could be irritating to the eyes and respiratory tract, or create odors. Although odor does not always indicate safe versus unsafe conditions, strong odors or the presence of eye and/or respiratory irritation can indicate that there is not sufficient general dilution ventilation or that the local exhaust systems may not be capturing the air contaminants effectively at their source.

In order to assess whether or not exposure to airborne chemicals presents a health and safety hazard, several exposure standards and guidelines are available for comparison.

EXPOSURE STANDARDS AND GUIDELINES

THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)

In 1970, OSHA reviewed existing exposure guidelines and consensus standards in the workplace, and adopted these as OSHA regulations. These exposure standards set airborne concentration limits and are legally enforceable. Two of the major references used by OSHA at that time were the 1968 Threshold Limits Values (TLVs) published by the American Conference of Governmental Industrial Hygienists (ACGIH) and Acceptable Concentrations of Toxic Dusts and Gases published by the American National Standards Institute (ANSI). Since 1970, OSHA has established approximately 28 new chemical-specific standards. These new standards such as the one for formaldehyde, are much more comprehensive and detailed. These new standards include additional requirements for written programs, training, personal protective equipment, control measures, medical surveillance, etc.

The airborne exposure limits established by OSHA include:

Permissible Exposure Limit (PEL): The allowable limit that is representative of a worker's exposure, averaged over an 8-hour day.

Short-term Exposure Limit (STEL): The allowable limit that is representative of a worker's exposure, averaged over 15 minutes.

Ceiling Limit (C): The airborne concentration that is representative of a worker's exposure that should not be exceeded.

Action Level (AL): For the comprehensive standards established by OSHA, an Action Level may be specified. The Action Level is typically 1/2 of the PEL and is the concentration at which you may have to address certain compliance requirements such as employee monitoring, training, or medical surveillance.

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)

ACGIH is a professional organization whose members work within the government or academia. This organization annually publishes a booklet entitled Threshold Limit Values (TLVs) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEIs). ACGIH TLVs are exposure guidelines and do not have the effect of law. These values change in response to new data and are usually more rapidly updated than OSHA limits.

The Threshold Limit Value (TLV) refers to airborne concentrations of substances and represents conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse health effects.

The ACGIH TLVs include:

Threshold Limit Value-Time-Weighted Average (TLV-TWA): The time-weighted average concentration for a normal 8-hour workday and a 40-hour work week, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.

Threshold Limit Value-Short-Term Exposure Limit (TLV-STEL): The 15-minute TWA concentration which should not be exceeded at any time during a workday even if the 8-hour TWA is within the TLV-TWA. Exposure above the TLV-TWA up to the STEL should not be longer than 15 minutes and should not occur more than four times per day with at least 60 minutes in between exposures in this range.

Threshold Limit Value-Ceiling (TLV-C): The concentration that should not be exceeded during any part of the working exposure.

OSHA Limits vs ACGIH Guidelines: OSHA limits are legally enforceable, whereas ACGIH limits are guidelines. In most cases, the ACGIH guidelines are the same or lower than OSHA limits (there are a few exceptions). When the values are not the same, it is prudent to follow the lower, more conservative value.

Examples:

Chemical	OSHA PEL 8-hour	ACGIH TLV 8-hour
Acetic acid	10 ppm	10 ppm
Ammonia	50 ppm	25 ppm
Formaldehyde	0.75 ppm	0.3 ppm (ceiling)
Sulfur dioxide	5 ppm	2 ppm

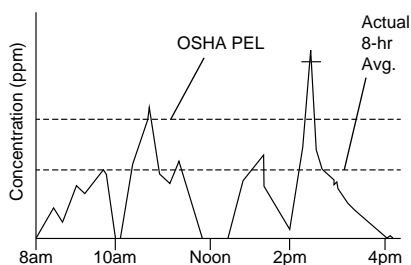
METHODS OF EVALUATION

THE PURPOSE OF COLLECTING AIR SAMPLES

Air samples are sometimes collected to evaluate potential worker exposure levels for comparison to published exposure standards or guidelines. The purpose of the

measurement may vary depending on whether you are interested in short-term exposure, full shift exposure, or the exposure incurred during a specific step or process. The measurements represent a sampling of the actual working conditions at the time of sampling. Generally, the more sampling data that are available for a certain job/process/task under a variety of conditions, the better understanding and confidence you will have in the exposure measurements during that process. As illustrated in Figure 1, actual exposure can vary substantially during the day. In some cases, full-shift monitoring may be the goal while in others, the goal may be to understand short-term exposure.

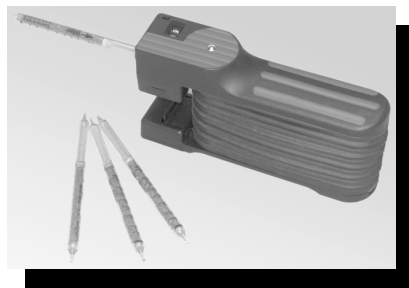
**Figure 1
Typical Exposure Scenario**



Basic Definitions
Sensitivity or Precision: how reproducible is the sampling method.
Accuracy: how close to the true value is the sampling method.

MEASUREMENT TECHNIQUES

Direct Reading
These are measurement techniques that can immediately indicate the concentration of aerosols, gases, or vapors by some means such as a dial or meter or noting the color change of an indicator chemical.



Colorimetric Detector Tubes
Several colorimetric, direct reading detector tubes are useful for quick assessments of airborne contaminants associated with photographic processing. A special pump draws a specific volume of room air through a detector tube. If the contaminant is present, a color change occurs along the length of the tube that is directly proportional to the concentration of the contaminant in the air. Tubes are available for acetic acid, sulfur dioxide, ammonia, and many other gases and vapors. The tubes are easy to use and generally have an accuracy of ± 25%. Other chemicals in the air may interfere with the accuracy and sensitivity of the tubes.

Direct Reading Instruments

Many different direct reading instruments are available for air sampling measurements. Some of these can be very specific to a chemical (e.g., sulfur dioxide analyzers) while others are nonspecific (e.g., organic vapor analyzer with photoionization [PID] or flame ionization [FID] detectors). Calibrate all instruments before and after making any measurements.

Samples with Subsequent Laboratory Analysis

There are many air sampling techniques that rely on collecting a known volume of air followed by laboratory analysis.



Passive diffusion badges are easy to use and excellent for measuring many volatile organic compounds. This method is most useful for measuring (quantifying) known airborne contaminants. Although passive badges are commonly employed for measuring full shift average exposures, they also can be useful for short-term exposure measurements.

Solid sorbent/tubes/bubblers are similar in many ways to passive badges except that air must be actively drawn through the sampling device using a calibrated sampling pump. Numerous laboratory techniques are available for specific chemical analysis following sample collection.

Grab samples refer to collecting a volume of air at a certain point in time. This technique can be useful

for assessing short-term exposures. New canister samplers allow for the sample to be drawn in over a much longer period of time, if desired. This technique is most useful for volatile organic hydrocarbons.

VENTILATION AND WORK PRACTICE CONTROL MEASURES

Proper ventilation is important to assure a safe and comfortable indoor environment for photographic processing areas. Several common potential indoor air contaminants can be associated with photographic processing. These include: acetic acid, sulfur dioxide, and ammonia. These chemicals may be eye and respiratory tract irritants depending on their airborne concentrations. Exposure guidelines and standards for these chemicals have been established to prevent significant eye or respiratory tract irritation in most workers. Significant eye or respiratory tract irritation during normal photographic processing or maintenance operations may indicate elevated levels of these materials and the need for better control.

General control strategies in order of preference include:

- chemical substitution (where possible)
- engineering controls (ventilation, enclosures, process isolation)
- work practices or administrative controls (operating procedures, employee rotation)
- personal protective equipment (safety glasses, gloves, respirators)

Engineering controls that have proven to be effective in minimizing airborne levels of photographic processing chemicals include:

- Good design and layout for process flow and ergonomic considerations
- Using dilution and local exhaust ventilation
- Providing covers for processing equipment tanks and chemical storage tanks

GOOD FACILITY DESIGN

The proper location and layout of photographic processing operations is an important element in designing a safe and healthy workplace.

General ventilation systems have the potential to recirculate a significant percentage of the air returning from the photographic processing areas. If the general ventilation system also supplies non-photographic processing work areas, it is possible that the photographic processing odors may also impact these areas.

VENTILATION

Kodak studies of potential worker exposure during automated photographic processing operations have indicated that vapors and gases can be controlled to acceptable levels through good general room ventilation (dilution ventilation). However, in some cases, local exhaust for enclosed and/or open tanks may be recommended.

DILUTION VENTILATION

Dilution or general ventilation is simply bringing in and distributing enough fresh, uncontaminated air (preferably outdoor air) to dilute the indoor air contaminants to an acceptable level.

Minimum recommendations for general ventilation for buildings and processes are provided by the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE).

For photographic processing operations, ASHRAE Standard 62-1989 recommends:

- 0.5 cubic feet per minute (cfm) of fresh outside air, per square foot (ft²) of floor area (0.5 cfm/ft²), assuming a maximum occupancy of 10 persons/1000 ft² in darkrooms.

For example, if the room where photoprocessing takes place is 10 ft x 20 ft x 8 ft, the floor area is 200 ft² and the room volume is 1600 ft³. Based on 0.5 cfm/ft², you would need to supply at least 200 x 0.5 or 100 cfm of fresh outside air to the space.

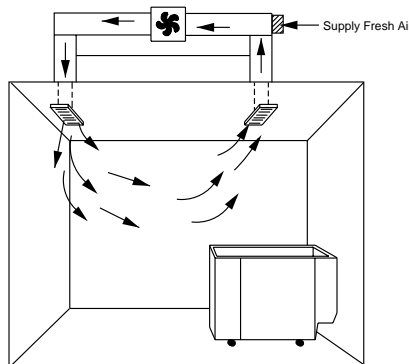
The number of "room air changes per hour" is determined by the fresh air supply rate. In the example, in one hour 6000 ft³ (100 ft³/min x 60 min) of fresh air entered the space (room volume: 1600 ft³). To calculate the room air changes per hour, you divide the total amount of fresh air that has entered the space by the volume of the room:

$6000 \text{ ft}^3/\text{hr} / 1600 \text{ ft}^3 \text{ room volume} = 3.75 \text{ air changes per hour.}$

It is important to note that the ASHRAE recommendations represent the *minimum* amount of fresh air that should be supplied to the space. Past recommendations from Kodak have been as high as ten air changes per hour.

When using dilution ventilation, airborne contaminants are not captured at the source. Instead, the contaminated air is turned over and replaced quickly enough to minimize potential exposure and related odors. To be most effective, make sure you properly position the supply air inlets and return air outlets for good mixing/dilution of the room air. Their placement must minimize the potential for "short-circuiting" or direct flow of supply air to return with minimum room air mixing (Figure 2). For a large room, you may need supply air inlets and return air outlets throughout the room. Do not position the inlet and outlets too close together.

Figure 2
Open tank processor with general room dilution ventilation



LOCAL EXHAUST VENTILATION

Local exhaust ventilation is used to capture air contaminants close to the source of generation, before they can enter the general work room air. This type of ventilation can be very effective at controlling airborne contaminants. A general room exhaust system will reduce airborne

levels but is not considered local exhaust ventilation. A local exhaust system may be more expensive to install than a general dilution ventilation system, but requires less air (and energy) to effectively control the airborne contaminants.

When designing local exhaust systems, the objective is to capture contaminants close to the source and draw the contaminated air stream away from the air you breathe. Avoid placing workstations between the source (photographic processor) and the inlet to the exhaust hood.

You can find information on the proper design of local exhaust systems in the ACGIH Industrial Ventilation Manual (ACGIH 2001).

The design must also consider the required "make-up" air system you'll need to replace and condition the air that is exhausted from the building. In addition, it is also important to review local laws and ordinances regarding local exhaust and any permit requirements with local, state, or federal regulators.

RECOMMENDATIONS

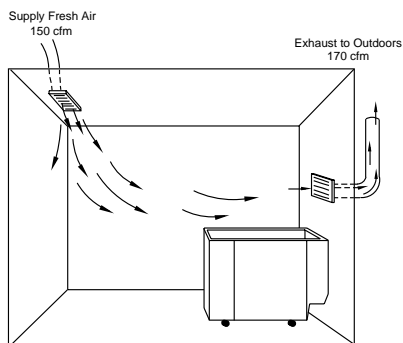
MINILABS

General dilution ventilation following the minimum fresh air recommendations from ASHRAE (0.5 cfm/ft² of floor area) should be effective at controlling air contaminants associated with minilab processes. In some cases, venting the dryer section of the processor to outdoors may be appropriate to prevent excessive humidity (greater than 60% relative humidity) and odors in the workplace. Consult with the processor manufacturer for specific venting requirements.

LARGE PHOTOGRAPHIC PROCESSING FACILITIES

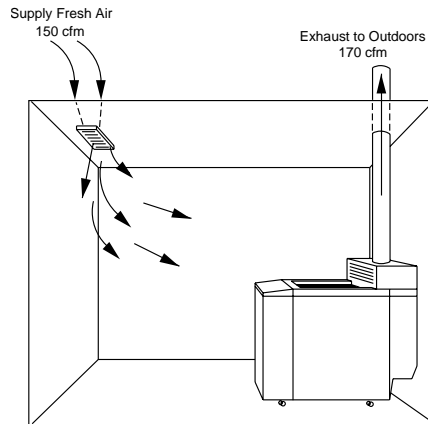
The most effective controls for minimizing potential airborne exposures and odors related to large photographic processing operations are a combination of both local exhaust and dilution ventilation (Figure 3). Fresh dilution air¹ should be supplied to the darkroom at a rate of 150 cfm per machine. If a machine extends through a barrier into another room, supply fresh dilution air to both rooms. Depending on the process chemistry, you may need local exhaust at uncovered stabilizer tanks or at the bleach fix tanks at a rate of 170 cfm per machine (Figure 4). In many cases, exhaust is also provided at the dryer section to help control heat and humidity in the room. An exhaust rate slightly greater than the supply rate results in a negative room air pressure which reduces the potential for air contaminants and odors for escaping from the photographic processing area to any adjacent areas.

Figure 3
Open-machine, general room exhaust ventilation



1. Means "uncontaminated air" which includes the ASHRAE recommendation of 0.5 cfm/ft².

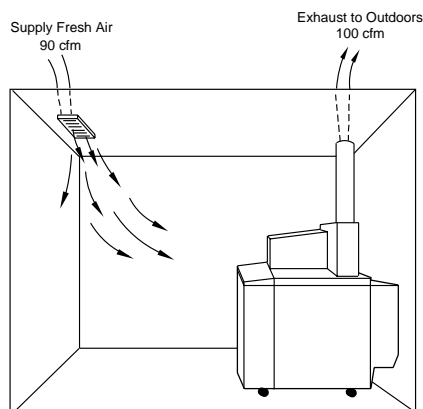
Figure 4
Open-machine with a slot hood ventilation



If solution tanks are enclosed or covered, the fresh air supply rate may be reduced to 90 cfm and the exhaust rate to 100 cfm per machine (Figure 5).



Figure 5
Enclosed-machine
ventilation



In addition, it is important to follow the processing equipment manufacturer's recommendations regarding venting of the dryer section of the processor. Whenever possible, dryer vents should be ducted to the outdoors to prevent the build up of excessive temperature and humidity in the workplace.

Install all local exhaust systems that vent to the outdoors in accordance with local, state, and federal regulations.

EFFECTIVE COVERS FOR PROCESSING EQUIPMENT AND CHEMICAL STORAGE TANKS

Covers on photographic processing equipment and chemical storage tanks can effectively minimize the amount of gases, vapors or mists that may enter the work area. In addition, covers also reduce the potential for contamination of the processing solutions. Covers should be fabricated from durable, non-reactive materials and should cover as much of the open surface of the tank as possible. In many cases, effective tank covers combined with good general room ventilation, and proper operation and maintenance may be all that is needed to control odors and airborne exposure to photographic processing chemicals. In situations where local exhaust is needed for a covered tank, 25 - 30 cubic feet per minute (cfm) per square foot of tank area is adequate.

Work practices controls:

- Proper operation and maintenance of photographic processing equipment;
- Prudent techniques for handling chemicals.

PROPER OPERATION AND MAINTENANCE OF PHOTOGRAPHIC PROCESSING EQUIPMENT

The level of airborne contamination generated from photographic processing solutions can be affected by how the processing equipment is operated. It is important to follow the manufacturer's recommended operating procedures for operating temperature, the agitation of processing solutions, and processing speeds.

In addition, draining and flushing processing equipment tanks with cold water prior to rack removal or maintenance operations can also be effective at controlling short-term exposures to processing solutions.

The health, comfort, and efficiency of personnel, as well as the proper conditions for processing, handling and storage of photographic materials depends on a suitable indoor air environment. Modern ventilation techniques include several factors: air supply, air movement; air distribution; air conditioning or control of temperature and humidity; air pressure adjustment; and air cleaning or filtration. If you plan a photographic plant of considerable size, consult a ventilation and air conditioning engineer as early as possible in the planning stages. If the designer has the opportunity to make suggestions in the early stages of planning, the result may be a better overall design, and lower installation and operating costs.

REGULATORY AND ASSOCIATED REFERENCES

Subject	Resource
Exposure Standard	OSHA, 29 CFR 1910.1000, Table Z1, Z2, and Z3
Formaldehyde Standard	OSHA, 29 CFR, 11910.1000-1048
Design of Ventilation Systems	ACGIH Industrial Ventilation Manual (ACGIH 2001)
Design of Ventilation Systems (Ventilation Recommendations)	American Society of Heating, Refrigeration and Air Condition Engineers Standard 62-1989
Theshold Limit Values	Threshold Limits Values (latest edition), American Conference of Governmental Industrial Hygienists
Indoor Air Quality	Building Air Quality, A Guide for Building Owners and Facility Managers, U.S. Environmental Protection Agency
Indoor Air Quality	Indoor Air Quality and HVAC Systems, David W. Bearg, Lewis Publishers, 1993

MORE INFORMATION

If you have environmental or safety questions about Kodak products, services, or publications, contact Kodak Environmental Services at 1-585-477-3194, or visit KES on-line at www.kodak.com/go/kes.

Kodak also maintains a 24-hour health hotline to answer questions about the safe handling of photographic chemicals. If you need health-related information about Kodak products, call 1-585-722-5151.

For questions concerning the safe transportation of Kodak products, call Kodak Transportation Services at 1-585-722-2400.

Additional information is available on the Kodak website and through the Canada faxback system.

The products and services described in this publication may not be available in all countries. In countries other than the U.S., contact your local Kodak representative, or your usual supplier of Kodak products.

- J-311 *Hazard Communication for Photographic Processing Facilities*
- J-312 *Personal Protective Equipment Requirements in Photographic Processing Facilities*
- J-313 *Occupational Noise Exposure Requirements for Photographic Processing Facilities*
- J-315 *Special Materials Management in Photographic Processing Facilities*
- J-316 *Emergency Preparedness for Photographic Processing Facilities*
- J-317 *Injury and Illness Management for Photographic Processing Facilities*



For more information about Kodak Environmental Services,
visit Kodak on-line at:
www.kodak.com/go/kes

Many technical support publications for
Kodak products can be sent to your fax machine
from the Kodak Information Center. Call:
Canada 1-800-295-5531
—Available 24 hours a day, 7 days a week—

If you have questions about KODAK products, call Kodak.
In the U.S.A.:
1-800-242-2424, Ext. 19, Monday–Friday
9 a.m.–7 p.m. (Eastern time)
In Canada:
1-800-465-6325, Monday–Friday
8 a.m.–5 p.m. (Eastern time)

This publication is a guide to the Federal Health and Safety Regulations
that apply to a typical photographic processing facility. Local or state
requirements may also apply. Verify the specific requirements for your
facility with your legal counsel.

**This publication is printed on recycled paper that contains
50 percent recycled fiber and 10 percent post-consumer material.**



EASTMAN KODAK COMPANY • ROCHESTER, NY 14650

Indoor Air Quality and Ventilation in
Photographic Processing Facilities
KODAK Publication No. J-314(ENG)

CAT No. 184 9298

Kodak and "e" mark are trademarks.

Revised 9/02
Printed in U.S.A.