



Department of the Air Force
HQ AEDC (AFMC)
Arnold AFB, TN 37389

Safety, Health, and Environmental Standard

Title: LOCAL EXHAUST VENTILATION

Standard No.: C3

Effective Date: 11/17/2014

Releasability: There are no releasability restrictions on this publication.

The provisions and requirements of this standard are mandatory for use by all personnel engaged in work tasks necessary to fulfill the AEDC mission. Please contact your safety, industrial health and/or environmental representative for clarification or questions regarding this standard.

Approved:

Contractor/ATA Director
Safety, Health and Environmental

Air Force Functional Chief

Record of Review/Revision

(Current revisions are highlighted in yellow and marked with a vertical line in the right margin.)

Date/POC	Description
10/17/14 B. Bragg	Three year review; administrative updates to reflect Base Operating Contractor organizational changes; no change to process.
03/26/13	Added NFAC supplement; no other change.
11/2011 B. Bragg	Two-year review; no change required.
01/2010 B. Bragg	Minor revisions as indicated. Changes made to clarify.
10/2008 S. Lowe	Annual review; no change required
03/2007 S. Lowe	Added additional reference. No additional changes made.
03/2006 S. Lowe	Removed definitions of face velocity and static pressure. Edited content in sections 4.1, 4.2 and 4.4.
04/2004 G. Bragg	Revised Standard to COI format, minor changes throughout standard text; added "Uncontrolled Copy" statement to standard.



Safety, Health, and Environmental Standard

LOCAL EXHAUST VENTILATION

1.0 INTRODUCTION/SCOPE/APPLICATION

This standard applies to the design, use, and maintenance of local exhaust ventilation systems for protection from hazardous vapors, gases, mists, fumes, and dusts. It does not apply to dilution ventilation systems.

2.0 BASIC HAZARDS/HUMAN FACTORS

Traditionally, heating, ventilating, and air conditioning (HVAC) systems were intended to provide comfort such as temperature, humidity and odor control. Industrial ventilation may serve these comfort needs; however, its primary function is to provide air contaminant control.

3.0 DEFINITIONS

Baseline Ventilation System Testing – A mandatory test and balance required on all new or modified systems. Includes measurement of air volume, fan static pressure, motor revolutions per minute (rpm) and amperes and pressure drops across components such as coils, fittings, and air cleaning equipment.

Base Operating Contractor – A long-term contractor directly accountable to the Air Force for the AEDC mission.

Dilution Ventilation – A system that dilutes contaminated air with uncontaminated air in a general area, room, or building for the purpose of health hazard or nuisance control.

Emission Control Device (Hood) – An opening, canopy, booth, slot, or open end of a hose or duct designed to capture contaminated air and conduct it into an exhaust duct system.

Local Exhaust Ventilation – Control of airborne contaminants at the point of generation to prevent their release within the workplace. Typical local ventilation systems are welding booths, trunk systems, paint spray booths, and plating tanks.

Visual Inspection – Observation and logging of exhaust system conditions, noting whether: 1) the system is battered or altered, 2) settling of material is occurring in ducting; and 3) the process for which the system was designed has been changed.

Ventilation Survey - The evaluation of a local exhaust system with instrumentation to measure air flow for capture velocity or visual evaluation with smoke tube to determine effectiveness of operation against a legal or recommended standard or guideline identified in Reference Section 7.0.

4.0 REQUIREMENTS/RESPONSIBILITIES

All personnel involved in specifying the use of hazardous materials shall consider process change or substitution of less hazardous materials as alternatives to local exhaust ventilation.

4.1 Designer of local exhaust ventilation system (in-house or contracted) shall

- 4.1.1 Design the hood to ensure maximum enclosure of the source of the operation producing the contaminant incorporating the standards and guidelines identified in Reference Section 7.0 below.
- 4.1.2 Ensure the magnitude of the airflow through the system is sufficient to carry the contaminant into the hood.
- 4.1.3 Direct air flow so that the contaminant is carried away from the worker's breathing zone.
- 4.1.4 Position exhaust outlets to ensure that contaminated air is not reintroduced into the work environment through return air systems.
- 4.1.5 Design local exhaust systems to meet the requirements of applicable Federal, State, and local regulations.
- 4.1.6 Shall submit design plans to Base Operating Contractor Safety, Health and Environmental for review prior to implementation.

4.2 Organization overseeing installation of a local exhaust system shall have the system tested upon installation to ensure it is providing adequate air flow as compared to design criteria. This should be done as part of the acceptance testing for those systems installed by outside contractors. For in-house installed or modified systems, coordination with Industrial Hygiene shall be made so that evaluations of the new or modified systems may be conducted to determine if the new system or changed systems meet design criteria and recommended compliance of consensus standards.

4.3 Organization using a local exhaust system shall

4.3.1 Ensure baseline system testing is performed and measurements of airflow are consistent with design calculations.

4.3.2 Maintain a copy of baseline test data and current ventilation surveys.

4.3.3 Perform routine visual inspection of local exhaust systems at least quarterly to determine if the system needs cleaning, filter replacement or other modifications.

4.3.4 Initiate work requests for non-routine maintenance needs.

4.3.5 Notify **Base Operating Contractor Safety, Health and Environmental** of process or operational changes that may affect the local exhaust system.

4.4 Base Operating Contractor Facilities O&M HVAC shop personnel shall

4.4.1 Provide scheduled, routine mechanical inspections and maintenance of local exhaust ventilation systems.

4.4.2 Initiate corrective maintenance when airflow measurements taken during routine maintenance indicate a deficiency in the system.

4.4.3 Provide non-routine inspections and maintenance as requested.

4.5 Base Operating Contractor Safety, Health and Environmental shall

4.5.1 Provide assistance to determine the necessity of installing or improving local exhaust systems.

4.5.2 Review designs for new and modified local exhaust systems.

4.5.3 Conduct ventilation surveys and air sampling as necessary to ensure proper system operation.

4.5.4 Conduct baseline and periodic ventilation surveys of local exhaust systems to include semi-annual ventilation surveys for the **Base Operating Contractor** Chemical Laboratory.

4.5.5 Evaluate the identified source for air quality.

4.5.6 Determine if the identified source needs to be included in the Title V Air Permit or appropriately classify the source as an insignificant source not requiring permitting.

5.0 TRAINING REQUIREMENTS

No specific training requirements are necessary. The ability to complete ventilation surveys is a basic skill set of the industrial hygienist. The ability to perform maintenance and repairs of the ventilation systems is a basic skill set of the HVAC shop personnel.

6.0 INSPECTION REQUIREMENTS

Inspection requirements are addressed in Section 4 above and are performed by the user of the local exhaust, the **Base Operating Contractor** HVAC shop personnel that perform maintenance and **Base Operating Contractor Safety, Health and Environmental** Industrial Hygiene Section that evaluates effectiveness of the systems.

7.0 REFERENCES

American Conference of Governmental Industrial Hygienists, Industrial Ventilation: A Manual of Recommended Practice 28th Edition.

American National Standards Institute (ANSI) / American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE) Standard 110-1995, Method of Testing Performance of Laboratory Fume Hoods

ANSI/AIHA Z9.1-2006 Ventilation and Control of Airborne Contaminants during Open Surface Tank Operations.

ANSI/AIHA Standard Z9.5-2003, Laboratory Ventilation

Code of Federal Regulations (CFR), Title 29 standards:

- 1910.94(a) Abrasive Blasting
- 1910.94(b) Grinding, Polishing, and buffing
- 1910.94(c) Spray Finishing Operations
- 1910.106 Flammable and Combustible Liquids
- 1910.252(c), Welding, Cutting, and Brazing
- 1910.1000 series, Air Contaminants
- 1910.1450, Occupational Exposure to Hazardous Chemicals in Laboratories
- 1926.57, Ventilation

National Fire Protection Association, Manual 91, Standard for Exhaust System for Air Conveying of Vapors, Gases, Mists, and Noncombustible Particulate Solids Hoods (latest version)

Tennessee Department of Environment and Conservation (TDEC), Tennessee Air Pollution Control Regulations, Division 1200-03

8.0 SUPPLEMENT

A321-0801-XSP C3 Local Exhaust Ventilation

A321-0801-XSP C3 Local Exhaust Ventilation Supplement

This supplement has been approved for the NFAC Site.

Review: This supplement will be reviewed and updated using the same cycle as AEDC Safety, Health, and Environmental (SHE) Standard C3 Local Exhaust Ventilation.

References: AEDC Safety Standard C3 Local Exhaust Ventilation at the AEDC NFAC Site
Ames Procedural Requirement APR 1700.1 Chapter 37 Indoor Air Quality

Scope:

This supplement applies to the design, use, and maintenance of local exhaust ventilation systems for protection from hazardous vapors, gases, mists, fumes, and dusts. It does not apply to dilution ventilation systems.

Traditionally, heating, ventilating, and air conditioning (HVAC) systems were intended to provide comfort such as temperature, humidity and odor control. Industrial ventilation may serve these comfort needs; however, its primary function is to provide air contaminant control.

This supplement applies to all personnel conducting operations, maintenance, testing and support at NFAC, NASA AMES.

NFAC Worksite Application:

NFAC will follow Ames Procedural Requirement APR 1700.1 Chapter 37 Indoor Air Quality

Requirements/Responsibilities:

- I. NFAC Site Management shall ensure this supplement is followed.
- II. NFAC Supervisors and Test Directors shall
 1. Ensure this supplement is followed.
 2. Ensure staff, customers, and vendors do not
 - a. Disturb ventilation systems.
 - b. Create a hazard that could enter the ventilation system.
 3. Use special ventilation techniques for tasks that could produce a hazard within the building (i.e., welding)
- III. NFAC Facility Support Manager (FSM) shall
 1. Ensure HVAC systems are maintained by the Ames Facility Support Group.
 2. Notify Ames Facility Support group on any problems with the HVAC.
- IV. NFAC Safety Engineer/Management Designee shall
 1. Assess special ventilation requirements and/or implement PPE requirements.
 2. Arrange/Perform air sampling as needed.
- V. NFAC Staff shall
 1. Follow this supplement.
 2. Not disturb ventilation system or create a hazard that could enter the ventilation system.