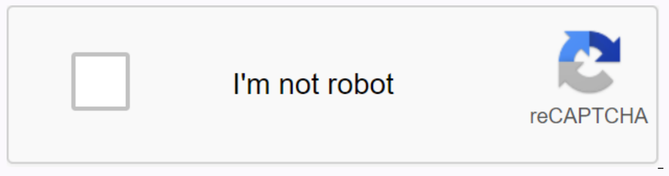

Continue

Osha fume hood face velocity requirements

Many organisations have adopted laboratory safety standards to determine the effectiveness of the hood in reducing occupational exposure. One such measurement for determining the effectiveness of the hood is the measurement of the speed of air entering the eaves (i.e. the speed of the face). Although facial velostro is not the only test method to determine whether the hood has the ability to adequately contain impurities (see ANSI/ASHRAE 110-1995 Laboratory Smoke Hood Performance Test Method), this is the only performance standard cited by the following organizations. OSHA – The overall airflow should not be turbulent and should be relatively uniform throughout the laboratory, without high speed or static areas (194, 195); should not be excessively turbulent (200); the speed of the face hood should be appropriate (usually 60-100 lfm) NIOSH - The current consensus of the literature is that the average face speed for a laboratory chemical hood should be in the range of 80-120 ft/min Cal OSHA - The exhaust system provides an average facial speed of at least 100 feet per minute at a minimum of 70 fpm at any point, except where stricter special requirements ANSI/AIHA Z9.5-2003 are required – Designing the frontal veloth for laboratory chemical hoods in the range of 80-100 fpm (0.41-0.51m/s) will provide adequate facial speed for most chemical hoods. Hoods with excellent encapsulation properties may operate at less than 80 fpm (0.41 m/s) respectively, while others may require higher facial speeds. Therefore, it is inappropriate to prescribe a range of permissible facial speeds for all eaves. The dynamics of the room and the operator have a significant impact on the performance of the hood at low facial speeds. Therefore, it is important to understand the impact of dynamic challenges on hood performance so that standard operating procedures and user constraints can be established. Operation of the hood below 60 fpm (0.30 m/s) is not recommended as encapsulation cannot be reliably quantified at low speeds, and there may be a significant risk of EXPOSURE to ACGIH – The Industrial Ventilation Manual recommends 80-100 fpm depending on various conditions including air distribution, proximity to foot traffic, etc. Sometimes it seems that almost everything in the lab is regulated by alphabet soup government agencies and regulations. We all know the acronyms OSHA, EPA, NIOSH and FDA and how they affect our laboratories. It's the same with hoods. Their installation, operation and maintenance are carried out by various government and industry organizations. Fortunately, understanding who and what determines the proper operation of the hood is not as difficult as it might seem. Codes, standards and recommended practices Here are the basic organizations and standards for smoke hoods: –OSHA Part OSHA stands for Occupational Safety and Health Administration. The agency's regulations regarding the operation of the exhaust hood are listed in the Code of Federal Regulations Tom 29 Part 1910.1450. This code covers several aspects of lab design and operation. When it comes to hoods, it's all about airflow on the eaves surface, monitoring, maintenance and exhaling. –ANSI/ASHRAE 110-1995. Method for testing the performance of laboratory hoods. This standard is published by the American National Standards Institute and the American Society of heating, refrigerating and air conditioning engineers, Inc. This applies primarily to methods of testing smoke hoods to check their performance. –ANSI/AIHA Z9.5. This standard, titled The American National Standard for Laboratory Ventilation, was published by ANSI and the American Industrial Hygiene Association. It covers many problems with laboratory ventilation, including eaves monitoring, facial speed and exhaust fumes. –NFPA 45. This standard is prepared by the National Fire Protection Association. Recommends hood construction, location, fire protection, specialized hoods, identification, inspection, testing and maintenance, and exhaust system. –SEFA 1.2-1996. SEFA is the Scientific Equipment & Furniture Association. His publication Laboratory Fume Hoods Recommended Practices covers the design requirements of hoods, facial speed and research. Of particular concern Items of direct interest to laboratory personnel, which are included in codes and standards, include: Airflow monitoring/alarms. Maintenance/inspection. Exhaust. 1. Airflow Normal airflow on the surface of the hood is probably the most common cause of confusion in the operation of the hood. Here's what the codes and standards say: OSHA: Overall airflow should not be turbulent and should be relatively uniform throughout the lab, without high speed or static areas; the air flow to and within the hood should not be excessively turbulent; the speed of the face of the hood should be adequate. (Usually 60-110 fpm.) ANSI/AIHA Z9.5: Each hood maintains an average face speed of 80-120 fpm without measuring face speed more than plus or minus 20% of the average. SEFA: The facial speeds of laboratory hoods can be determined on the basis of toxicity or hazard of the materials used or operations carried out within the vapour hood. Note: Government code policies and regulations may require specific face speeds. The frontal velocro of the 100 fpm vapour hood is considered acceptable in standard practice. In some situations, a facial speed of up to 125 fpm or as low as 75 fpm may be acceptable to meet the required eaves capture speeds. 2. Monitoring / Many older laboratories are equipped with hoods that do not have airflow monitoring devices. The device type is not specified, but according to the following codes and if you put on a hood or rebuild an older one, they are now required. Osha:.... each hood should have a continuous monitoring device to allow you to conveniently confirm the proper performance of the hood before use. If this is not possible, avoid working with substances of unknown toxicity or provide other types of local ventilation equipment. ANSI/AIHA Z9.5: New and rebuilt hoods must be equipped with a flow measuring device. NFPA 45: New and rebuilt hoods must be equipped with a flow measuring device. 3. Maintenance/inspection As for all equipment, maintenance is important for proper operation. OSHA: The quality and quantity of ventilation should be assessed during installation, regularly monitored (at least every 3 months) and reassessed whenever local ventilation equipment changes. ANSI/AIHA Z9.5: A route performance test shall be carried out on each smoke wailing at least once a year or whenever a significant change has been made to the operational characteristics of nfpa 45: After installation or modification, and at least once a year, laboratory hoods, laboratory exhaust systems and special laboratory exhaust systems shall be inspected and tested. NFPA 45: Special purpose laboratory hoods and local special purpose exhaust systems must be identified to indicate their intended use. On each hood is placed a sign containing the following information from the last inspection: inspection interval, date of last inspection, average face speed, fan location that serves the hood, the name of the inspectors. Exception: Instead of a character, it should be considered acceptable to properly keep a log of all shields from the above information. 4. Exhausts the old expression out of sight, from the mind is often relevant when discussing the exhaust of the hood. Lab workers rarely crawl on the roof to check their fans and exhaust piles. Knowing what standards, rules and codes have to say in exhaling can come in handy if there are smells in the lab or if you are considering a renovation or a new facility. ANSI/AIHA Z9.5: Discharged in a manner and place to avoid re-entry into the laboratory building or adjacent buildings at concentrations above 20 % of the permissible concentrations inside the laboratory under wind or atmospheric conditions. Exhaust stack: Be in a vertical upward direction at least 10 feet above the adjacent roof line, so located with respect to opening and air intakes in the laboratory or adjacent buildings to avoid re-entry. NFPA 45: Air depleted from laboratory hoods and other special local exhaust systems cannot be redistributed. Air from laboratory units and laboratory workplaces, including chemicals are found, it is constantly discharged by pressurised systems normally occupied areas of the building. If you have any questions, call me, Bruce Ciloski. You can contact me at 832.256.0014 or send me an email at bruce@laboratorydesign.com. This information is made available free of charge by the Department of Industrial Relations from its www.dir.ca.gov. These laws are for your convenience and there is a statement or warranty that the information is up-to-date or accurate. See the full disclaimer on . Subseap 7. General Industry Safety Orders Group 16. Control of dangerous substances Article 107. Dusts, fumes, mists, fumes and gases Back to index New query (a) Range. Where laboratory hoods, also known as laboratory hoods as defined below, are used to prevent harmful exposure to dangerous substances, these hoods must comply with all applicable provisions of Article 10. Exception No 1: Inspection doors or cleaning doors in exhaust ducts required in section 5143(a) of Regulation (EC) No 1782/2003 shall be replaced by the following: Exception No 2: The biological safety cabinets referred to below are exempt from the requirements of this Section. Class II biological safety cabinets may be used to prevent harmful exposure to cytotoxic agents during mixing or preparation for enteral use. Biological safety cabinets may be used to control the harmful exposure of aerosols and particulate matter, provided that the presence of the substance in the biological safety cabinet does not present a risk of fire or explosion. Where biological safety cabinets are used to control exposure to these hazards, they must comply with section 5154.2. (b) Definitions. Bio-indemnification means a pathogen capable of replicating, which is a disease that causes a microorganism and is capable of causing diseases in humans, including viruses, microbes and viral submovement. The measure covers a measure, products of infectious agents or components of infectious agents posing a risk of disease or injury. Biohazard materials are materials that feed on bio-important factors, such as human blood, body fluids or tissues, which can be contaminated with biological agents. Biological safety cabinet. Ventilated cabinet, which serves as a basic airtight device for operations involving biohazard agents or bio-inducing materials. Three classes of biological safety cabinets are described in section 5154.2. Dangerous substance. One which, due to explosive, flammable, poisonous, irritating or otherwise harmful, may cause injury or illness if not used by effective control methods. Laboratory hood. Closed device, except for the necessary purposes on three sides and top and bottom, designed to draw air inwards by mechanical ventilation, operated with a cartridge insert hands and arms of the user, as well as used to control exposure to dangerous substances. These devices are also known as laboratory hoods. (c) Ventilation indicators. (1) The front speeds of the laboratory hood must be sufficient to maintain internal airflow at all openings to the hood under operating conditions. The hood ensures the reduction of possible risks and protection of employees in the case of work performed. The exhaust system shall provide an average frontal speed of at least 100 ft/minute at a minimum of 70 rpm at any time, except where more stringent special requirements have been laid down in other sections of the General Industrial Safety Order, such as Section 5209. The minimum speed requirement does not cover measurements made up to 1 inch from the circumference of the working hole. (2) Where a laboratory hood is used to contain hazardous substances in the air and no worker is in the immediate vicinity of the hood opening, the ventilation speed may be reduced from a minimum average facial speed of at least 100 ft per minute to a minimum average facial speed of 60 ft per minute if the following conditions are met: (A) The reduction in frontal speed is controlled by an automatic system which does not require manual intervention. The automatic system increases the airflow to the flow required by c)(1) when accessing the hood. (B) The laboratory hood has been tested at reduced flow rate in accordance with the marker gas method specified in section 7, tracer gas test procedure, ANSI/ASHRAE 110-1995, laboratory performance test method of smoke hoods, which is hereby incorporated by reference, and has the performance rating of hood 4.0 AU 0.1 or less. The test may be carried out with or without the manikin described in the ANSI/ASHRAE 110-1995 marker gas method. The marker gas test must be carried out only once per hood. However, if employers have decided to carry out a marker gas test on subsequent occasions, this is the latest record of the test results and the configuration of the tests, which is maintained in accordance with subsection c) (2) (c) (C) A record of the latest results of the marker gas tests and the configuration of the test in the state used shall be maintained as long as the automatic system is in operation and there are then five years. (d) Action. Mechanical ventilation remains in operation at all times when hoods are used, and then for enough time to clean the hoods from airborne dangerous substances. If mechanical ventilation does not work, hazardous substances in the hood must be covered or restricted. (1) The frontal speed required in subsection c) should be reachable with fully open moving Where the required speed can only be achieved by partially closing the sash, the sash and/or door frames shall be marked in order to the opening at which the front velocro of the hood will meet the requirements of subsection c). Any hood not complying with subsection (c) and this paragraph shall be considered to be deficient in airflow and shall be affixed with clearly visible plates which prohibit the use of dangerous substances in the hood. (2) Where flammable gases or liquids are used or when combustible liquids are heated above their flash points, hoods must be designed, constructed and installed in such a way that the hood openings in all positions of the sash provide sufficient airflow to prevent ignition concentrations. Concentrations in the channel must not exceed 20 % of the lower limits of explosives. (3) In addition to the examination in accordance with the requirements of section 5143 (a) and (b), the competent authorities of the Member States shall ensure that: A quantitative airflow monitor measures the exact inward airflow rate or the relative amount of internal airflow. Examples of acceptable devices measuring the relative amount of inward air flow include diaphragm pressure gauges, inclined pressure gauges and blade indicators. The requirement for quantitative monitoring of airflow may also be met by the airflow alarm system if the system provides an audible or visual alarm when the airflow is reduced to less than 80 % of the airflow required by subsea c). (B) Qualitative airflow measurements which indicate the ability of the hood to maintain inward airflow at all hood openings, as required by subsection c)(1), shall be demonstrated using smoke pipes or other appropriate quality methods. This list shall be carried out: 1. Exception to subsection (3)(B)2: The frequency of tests may be reduced to every two years if there is a calibration and maintenance programme for a quantitative airflow monitor or alarm system. 3. after repair or renovation of the hood or ventilation system in that part of the facility where the hood is located; or 4. After adding large equipment to the hood. (4) Exhaust stacks shall be positioned in such a way as to respect the air intakes to exclude recirculation of laboratory hood emissions in the building. To protect workers on the roof, one of the observed methods is used: (A) chemical treatment, absorption of activated charcoal or scrubbers; (B) Dilution of toxic materials below recommended exposure limits before discharge; C) Closed gates, doors or other equivalent measures permitted by the Department which prevent workers from accessing the exhaust chimney drainage areas during the operation of the hoods, unless adequate breathing masks and other personal protection are provided to staff; or (D) piles extending at least 7 feet above the roof and discharging vertically upwards. Where rain protection is required, a high-speed discharge or concentric channel, self-sui sucking chimneys (Figure V-9) or equivalent may be used. Rain shields that direct exhaust fumes towards the roof are prohibited. FIGURE V-9 EXAMPLE OF A COAXIAL SELF-SUIMENTARY STACK (5) Where tailpipe emissions are likely to cause harmful exposure to workers, an effective air purification system shall be ensured. Where virulent pathogens can be released in the hood, incinerators or equally effective disposal agents are supplied in the exhaust system to prevent exposure of workers. The requirements for biological safety cabinets can be found in section 5154.2. (6) Exhaustive laboratory hood blowers in which dangerous substances are used are mounted outside the building or in service premises outside the work area. In the case of hoods with single, independent exhaust systems, blowers can be mounted inside the building, provided that corrosion-resistant sealed duct connections are used. (7) In the case of evaporation of perchloric acid in laboratory eaves, the provisions of Section 5143 (a) shall apply. Construction materials must be inert, smooth and non-absorbing. Organic polymers may not be used except for inert fluoropolymers such as politrafluoroethylene [PTFE] and tetrafluoroethylene-hexafluororopropylene copolymer [Teflon FEP] or similar non-reactive material. The hood and exhaust system should be washed down with water for disinfection and before opening for maintenance. Exception: Portable laboratory scrubbing equipment for scrubbing the etching of perchloric acid may be used instead of the special requirements of this paragraph. (f) Operator qualifications. The employer shall ensure that workers using laboratory hoods are trained in: (1) the safe use of the hood and its characteristics; (2) Specify the date of the last performance test carried out in accordance with subsection c)(2) (B) and whether the operation of the hood meets the requirements of this section; (3) understanding the general purpose of the hood, the characteristics of airflow and the possibility of turbulent airflow and escape of dangerous substances from the hood; and (4) know where the quantitative airflow monitor or alarm system is located on the mask and how it is used to indicate the airflow inwards during the operation of the hood. Note: Quoted Office: Article 142.3, Labour Code. Reference: Article 142.3, Labour Code. HISTORY 1. New compound section 8-12-76; 33rd day (Register 76, No 33). 2. Editorial correction of subsection (e)(4) (Register 76, No 48). 3. Amendment of subsections (b) and (e)(4) submitted 4-16-80; 80, No 16). 16). 5. Amendment submitted 7-31-2006; 8-30-2006 (Register 2006, No 31). 6. Change without adjustment effect providing a more legible illustration for figure V-9 composite 3-2-2009 in accordance with Section 100, Title 1, California Codeof Regulations (Register 2009, No. 10). Back to article 107