

21-4.9 DENTAL VENTILATION

21-4.9.1 PURPOSE

This section provides design guidelines for dental ventilation systems in Indian Health Service (IHS) facilities. These guidelines provide criteria that address comfort, asepsis and odor control.

21-4.9.2 BACKGROUND

The Health Facilities Advisory Committee (HFAC) reviewed and approved the final draft of the "Dental HVAC Criteria" dated April 9, 1997, subject to editorial revisions and adopted it on January 6, 1999. The criteria was updated and approved by the HFAC on April 6, 2005.

21-4.9.3 DESIGN CRITERIA

Design of dental facilities must comply with the requirements set forth in Table 1, "Ventilation Requirements for Areas in Dental Facilities, on page 2. The ventilation rates in this table cover ventilation for comfort, as well as for asepsis and odor control in areas of dental facilities that directly affect patient care and are determined based on health care facilities being "No Smoking" facilities. Areas where specific ventilation rates are not given in the table shall be ventilated in accordance with American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHREA) Standard 62.1, latest edition, "Ventilation for Acceptable Indoor Air Quality," and ASHRAE Handbook of HVAC Applications. OSHA standards and/or NIOSH criteria require special ventilation requirements for employee health and safety. Central systems shall be provided with 90% filters (ASHRAE dust spot efficiency). Refer to the footnotes beginning on page 2 for fuller explanation of specific requirements.

21-4.9.4 BIBLIOGRAPHY

ASHRAE Applications Handbook, 2003. Chapter 7, Health Care Facilities. American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Atlanta.

Ninomura, P. and Byrns, G. ASHRAE Journal, Dental Ventilation, Theory and Applications. American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Atlanta, Feb 1998.

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Table 1 Ventilation Requirements for Areas in Dental Facilities

Area Designation	Air movement relation-ship to adjacent area ¹	Minimum air changes of outdoor air per hour ²	Minimum total air changes per hour ³	All air exhaust-ed directly to outdoors ⁴	Relative humidity ⁵	Design temperature ⁶ (degrees F/C)
Enclosed Dental Operatory (w/nitrous oxide) ^{7,8,9}	In	3	12	Yes	30-60%	75 (24)
Open Dental Operatory (w/nitrous oxide) ¹⁰	---	---	---	---	---	---
Open Dental Operatory (w/o nitrous oxide)	---	2	6	---	30-60%	75 (24)
Cleanup/ Sterilization	In	2	10	Yes	---	75 (24)
Laboratory	In	2	6	Yes	---	75 (24)
Dark Room	In	2	10	Yes	---	75 (24)

Notes

¹ Design of the ventilation system shall provide air movement which is generally from clean to less clean areas except in the enclosed dental operatory where containment of nitrous oxide is desired. If any form of variable air volume or load shedding system is used for energy conservation, it must not compromise the corridor-to-room pressure balancing relationships or the minimum air changes required by the table.

² To satisfy exhaust needs, replacement air from the outside is necessary. The Table does not attempt to describe specific amounts of outside air to be supplied to individual spaces except for those listed. Distribution of the outside air, added to the system to balance required exhaust, shall be as required by good engineering practice. Minimum outside air quantities shall remain constant while the system is in operation.

³ Number of air changes may be reduced when the room is unoccupied if provisions are made to ensure that the number of air changes indicated is reestablished any time the space is being utilized. Adjustments shall include provisions so that the direction of air movement shall remain the same when the number of air changes is reduced. Areas not indicated as having continuous directional control may have ventilation systems shut down when space is unoccupied and ventilation is not otherwise needed, if adjacent pressure balancing relationships are not compromised.

⁴ Air from areas with contamination (i.e. bioaerosals, respirable particulates, nitrous oxide, and/or odor problems) shall be exhausted to the outside and not recirculated to other areas.

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⁵ The ranges listed are the minimum and maximum limits where control is specifically needed.

⁶ A single figure indicates a heating or cooling capacity of at least the indicated temperature. Nothing in these guidelines shall be construed as precluding the use of temperatures lower than those noted when the patients' comfort and medical conditions make lower temperatures desirable.

⁷ National Institute for Occupational Safety and Health (NIOSH) "Technical Report: Control of Nitrous Oxide in Dental Operatories" indicates a need for both local exhaust (scavenging) systems and general ventilation of the areas in which the respective gases are utilized.

⁸ Air flow patterns shall be controlled to reduce nitrous oxide exposure to the staff. Supply registers shall be located in the ceiling. Supply registers shall be selected to provide airflow that provides air mixing.

⁹ Exhaust grilles shall be located in the wall, at a height between 6 to 12-inches above the floor (bottom of grille).

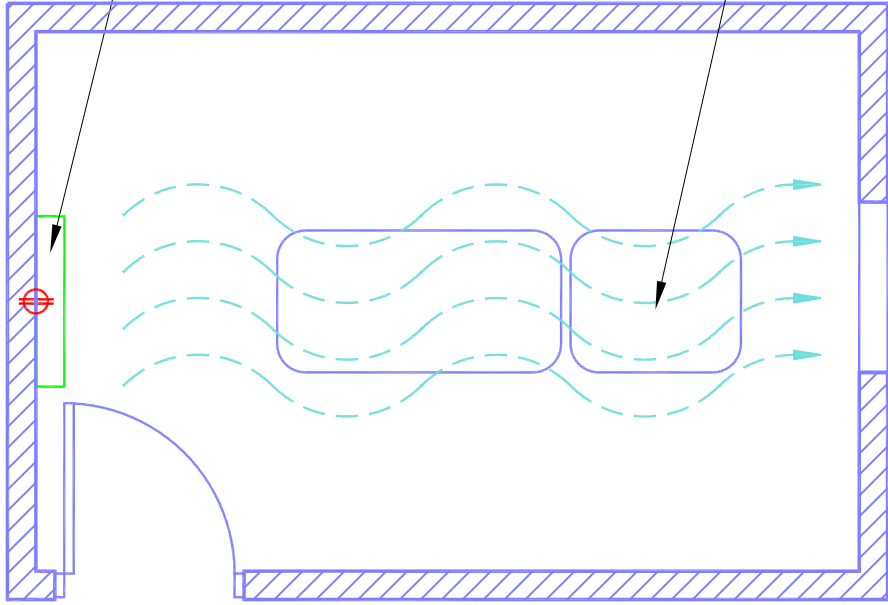
¹⁰ Nitrous oxide administration in an open dental operator is not allowed. Nitrous oxide exposure to staff cannot be effectively controlled in this setting.

¹¹ As an option, provisions for sweep fans may be provided. If sweep fans are provided, fans should be selected to provide a velocity of approximately 25 to 75 fpm in the vicinity of the breathing zone of the dental staff. The fan should be located so the air is blown past the dentist toward the patient. The effectiveness of the sweep fan can be maximized by locating the exhaust grille in the wall opposite from the location of the sweep fan. Refer to the attached sketch on page 4.

SUPPLEMENTAL SWEEP FAN CONFIGURATION

ELECTRICAL OUTLET –
6 FOOT ABOVE FLOOR
WITH SHELF FOR
SMALL BOX FAN.

PATIENT BREATHING ZONE



LOW WALL
EXHAUST VENT