

Outdoor Air Intakes

Survey the project site and adjacent areas for potential sources of contamination that may make the outside air unacceptable for use indoors with respect to odor and sensory irritation. Exhaust stacks and vents of adjacent facilities, loading docks, and vehicle traffic are a few examples of potential contamination sources.

Consider the location of fresh air intakes to prevent introducing pollutants to the building's air supply. Maximal distance from pollutant sources is ideal. At minimum, fresh air intakes shall be located away from potential sources of pollutants as indicated on Table 1.

Design planning must also ensure the building does not introduce any of the objects listed on Table 1 within the minimum distance to air intakes for existing buildings adjacent to the construction site.

Protect outside air intakes from rain entrapment using louvers, mist-eliminators or rain hoods. Cover outside air intakes with ¼ inch bird screening.

Modulated damper systems for outside air must account for occupancy, or be provided with mechanical stops in order to provide a minimum adequate amount of outside air for the building occupancy at all times.

Mechanical Equipment

Use sealed air filter cells to prevent infiltration of by-pass air. Locate filters upstream of cooling coil(s) and humidifiers.

Air handler housings are to be double wall construction with internal insulation.

Condensate pans located under coils must be stainless steel and double wall-insulated construction. They shall be pitched, tapered, and bottom drained to prevent water stagnation.

Pan drains must be air-gapped to a trapped sanitary or storm drain line.

Provide sufficient clearance on all sides of equipment to perform maintenance activities. Install walkways for access to elevated equipment.

Economizer systems must provide for dehumidification of the air. System controls shall sense space humidity and initiate cooling and provide reheat for dehumidification as necessary during periods when there is no sensible cooling load.

Package units typically only provide ventilation and outside air when there is a temperature demand. Where package units are used, they should be used for heating and cooling only, and paired with a dedicated outside air unit to provide outside air for ventilation and building pressurization.

Object	Minimum Distance
	in feet to Air Intake
Roof or grade	0.75
Mantles or ledges	3
Driveway	10
Landscaped grade	10
Building exhaust outlets	12
Plumbing Vent Outlets	12
Cooling Towers	15
Street or highway	25
Standing traffic	50
Garbage	
Storage/Treatment Area	50

Table 1

Duct Systems

Ductwork utilized for supply, return, or outside air must have a metal, or other hard internal surface with no internal lining. Specific sections of duct with internal insulation and Mylar® or other moisture repellant surface may be used for sound attenuating.

The supply and return duct system must be constructed in a manner to be considered a sealed duct.

Flexible duct may be used only in lengths of six feet or less to make the connection to diffusers. The use of extended or convoluted runs of flexible ducting for the purpose of sound deadening is not allowed.

The cavity space above ceiling tiles and below the deck of the roof or floor above shall not be utilized as an air supply or return plenum.

Hallways may not be used as a return air plenum.

Supply air diffusers are very important with regard to both occupant comfort and effective contaminant control. Ensure through field verification that the diffusers will adequately throw and mix the air, while minimizing drafts on occupants. Any system resulting in gross short-circuiting between supply and return grills is prohibited.

Supply and return diffuser grills shall not be located on the end of a duct run. Instead, use branches near the end of a run.

HVAC Controls

Manual damper controls located on the supply and return ducts must have their full open and shut positions marked with indelible ink or paint, and be locked or fixed in place after final balance.

Temperature control zones shall not combine areas with very different heating and/or cooling loads.

Thermostats shall not be located where they are subject to drafts, direct sunlight, or heat from nearby equipment.

Provide roof access by adequate openings with stairs, not ladders if there is equipment that requires service on the roof.

Ventilation Requirements

Spaces utilized for contaminant or odor-generating activities must be isolated from the return air system, and provided with exhaust air of adequate quantity to remove the generated contaminants and odors, and provide negative pressure relative to surrounding office or reception areas. Examples of these types of areas include, but are not limited to spaces used for: cooking, reprographics, high volume copying, laboratories, lavatories, animal holding facilities, and autoclaving.

Design local-exhaust ventilation systems utilizing a recent version of the American Conference of Governmental Industrial Hygienists' *Industrial Ventilation, a Manual of Recommended Practice*.

Exhaust stack discharge design and height must be in accordance with the American Conference of Governmental Industrial Hygienists' *INDUSTRIAL VENTILATION, a Manual of Recommended Practice*.

The overall building pressure differential must be slightly positive in relation to the outside atmosphere.

Protection of Materials

Protect all stored materials from moisture and microbial growth. Discard and replace all water-damaged materials.

Protect installed air handling equipment from dust, insect, vertebrate, moisture and microbial contamination. Air handling equipment, including ductwork, which becomes contaminated during construction must be cleaned or replaced prior to start-up.

Ducted supply air systems shall not be operated without filters in place. Filters used in air handling equipment operating during construction shall have a minimum dust spot rating of 80-85%.

Interior Finishes

After the building or room is fully weatherized, and before interior finishes are applied, the HVAC system should be operating and drywall and plaster should show less than 40 on the 0 – 100 reference scale of a Delmhorst or other similar moisture detector.

Alternatively, before applying interior finishes the HVAC system should be run 24 hours per day for a minimum of 3 days after a stable temperature and a constant humidity below 60% have been demonstrated. The HVAC system will remain in 24-hour operation throughout the installation of finishes.

Vinyl wallpaper and other water impermeable coverings are not permitted on the interior side of exterior walls.

Whenever possible, give preference to the use of low emission paints, glues, carpets, and solvents.

Renovation and Construction Adjacent to Occupied Spaces

Construction and renovation projects adjacent to occupied spaces present additional Indoor Environmental Quality concerns. It is common for odors, noise, and dust from projects to create problems for the adjacent occupants. Even levels of contaminants that are well below toxic levels can cause asthma attacks, allergic reactions, headaches, and mucous membrane irritation in building occupants. The following recommendations are intended to prevent these reactions.

Separate renovation areas and occupied spaces with solid, full height barriers. The intent of these barriers is to block the transmission of dust, odors, and other contaminants from the worksite to the occupied spaces.

Adjust the air handling system to provide a slight positive pressure in the occupied spaces relative to the construction space. Do not draw return air from the construction space.

After the renovation has been completed, provide a system test and balance to correct adjustments made during renovation.

Perform regular housekeeping to prevent the transport of dust and dirt from the construction zone into occupied spaces by tracking.

Internal combustion powered equipment, tar pots, paintbrush-cleaning stations, construction site lavatories, smoking facilities, and other sources of pollutants shall be located with consideration of building outside air intakes.