HV14 *Control Strategies* (Climate Zones: all)

Control strategies can be designed to help reduce energy. Time-of-day scheduling is useful when it is known which portions of the building will have reduced occupancy. Control of the ventilation air system can be tied into this control strategy.

Having a setback temperature for unoccupied periods during the heating season or setup temperature during the cooling season will help to save energy. A pre-occupancy operation period will help to purge the building of contaminants that build up overnight from the outgassing of products and packaging materials. In hot, humid climates, care should be taken to avoid excessive relative humidity conditions during unoccupied periods.

HV15 *Testing, Adjusting, and Balancing (TAB)* (Climate Zones: all)

After the system has been installed, cleaned, and placed in operation, the system should be tested, adjusted, and balanced for proper operation. This procedure will help to ensure that the correctly sized diffusers, registers, and grilles have been installed, that each space receives the required airflow, that the equipment meets the intended performance, and that the controls operate as intended. The TAB subcontractor should certify that the instruments used in the measurement have been calibrated within 12 months prior to use. A written report should be submitted for inclusion in the O&M manuals.

HV16 *Filters* (Climate Zones: all)

Air-conditioning and heat pump unit filters are included as part of the factory-assembled unit and should be at least MERV 8, based on ASHRAE Standard 52.2. Use a filter differential pressure gauge to monitor the pressure drop across the filters. The gauge should be checked and the filter should be inspected on a routine basis. Filters should be replaced when their pressure drop exceeds the filter manufacturer's recommendations for replacement or when visual inspection indicates the need. A monitor should be included to send an alarm if the predetermined pressure drop is exceeded. Upon completion of construction, all filters should be replaced prior to building occupancy.

Cautions

HV17 *Heating Sources* (Climate Zones: all)

Forced-air electric resistance and gas-fired heaters require a minimum airflow rate to operate safely. These systems, whether stand-alone or incorporated into an air-conditioning or heat pump unit, should include factory-installed controls to shut down the heater when there is inadequate airflow resulting in high air temperatures.

HV18 *Return and Relief Air* (Climate Zones: all)

Relief (rather than return) fans or blowers should be used when necessary to maintain building pressurization during economizer operation. However, where return duct static pressure exceeds 0.5 in. of water, return fans should be used.

HV19 *Noise Control* (Climate Zones: all)

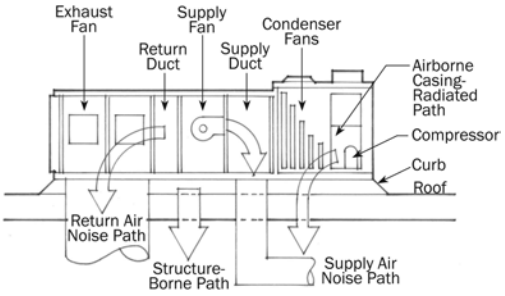

Figure 5-29. (HV19) Typical noise paths for roof-top-mounted HVAC units.

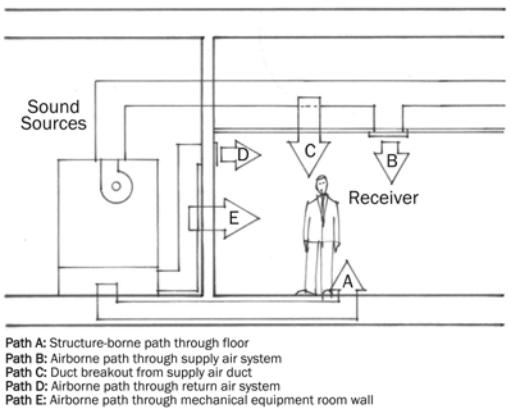

Figure 5-30. (HV19) Typical noise paths for interior-mounted HVAC units.

Acoustical requirements may necessitate attenuation of the noise associated with the supply and/or return air, but the impact on fan energy consumption should also be considered and, if possible, compensated for in other duct or fan components. Acoustical concerns may be particularly critical in short, direct runs of ductwork between the fan and supply or return outlet.

Where practical, avoid installation of the air-conditioning or heat pump units above areas that customers visit. Consider locations above less critical spaces such as storage areas, restrooms, corridors, etc. (See Figures 5-29 and 5-30 for typical noise paths for HVAC units.)

HV20 *Heating Supply Air Temperatures* (Climate Zones: all)

Ducts and supply air registers should be selected based on discharge air temperature and flow rate.

HV21 *Zone Temperature Control* (Climate Zones: all)

The number of spaces in a zone and the location of the temperature-sensing point will affect the control of temperature in the various spaces of a zone. Locating the thermostat in one room of a zone with multiple spaces provides feedback based only on the conditions of that room. Locating a single thermostat in a large open area may provide a better response to the conditions of the zone with multiple spaces. Selecting the room or space that will best represent the thermal characteristics of the space due to both external and internal loads will provide the greatest comfort level.

To prevent misreading of the space temperature, zone thermostats should not be mounted on an exterior wall. Where this is unavoidable, use an insulated sub-base for the thermostat.