



Tips to Reduce Energy Consumption of HVAC Systems in Schools

Equipment Selection Tips:

1. A life cycle cost analysis should be used whenever comparing HVAC system choices. As long-term owners, school districts can significantly reduce their overall cost of owning and operating their HVAC system by selecting more energy-efficient equipment. In many cases the first cost premium for more efficient equipment will be paid back through reduced operating costs in the first 1-2 years.
2. Scientific studies indicate a strong correlation between the background sound levels in classrooms and a child's academic performance. Software analysis tools, such as the Trane Acoustics Program, are available today which can predict sound levels in the classroom based on the HVAC equipment and ceiling and duct configuration used. Make sure the system designer is aware of your acoustical requirements.

Installation Tips:

- 1) Air leaks in the roof curb and/or the return and supply duct system reduces heating and cooling capacity and wastes conditioned air needlessly increasing operating energy costs. The entire air distribution path should be carefully inspected for leakage at the time of start-up and all air leaks plugged. After that, the system should be inspected annually for leakage.
- 2) Air filtration plays a key role in delivering good indoor air quality. Make sure that the proper filters are used and installed to minimize air bypass.
- 3) Make sure the system is thoroughly commissioned prior to occupancy to assure the system is operating as the designer intended. Of specific importance is that the proper amount of outdoor ventilation air is brought into each classroom at all system operating conditions.

Operational Tips

- 1) Room thermostats should be checked for proper set point, operation and calibration at least twice per year.
- 2) Programmable thermostats can be highly cost-effective devices if they are programmed and maintained properly. Make sure the teachers and staff are properly trained to use them.
- 3) Make sure the discharge and return air openings of HVAC systems are not blocked with books or other obstructions. In addition to starving the affected space of ventilation air, it can create an unbalanced condition for the entire system.
- 4) Central EMS (Energy Management Systems) or BAS (Building Automation Systems) are not "set-it and forget-it" systems. Building operating and maintenance personnel must be properly trained, including refresher courses, on their use.
- 5) Inspect and maintain air filters as specified by the equipment manufacturer. Optimally, they should be replaced every one to three months.



- 6) Inspect fan blades and bearings, adjust/replace belts and check fan current periodically. Dirt build-up on fan blades can reduce the amount of air moved by the fan. Defective bearings can cause excessive noise, vibration and/or heat.
- 7) One of the most common causes for efficiency loss and poor indoor air quality in HVAC systems is improperly functioning or leaking outside air dampers. Clean, lubricate and calibrate damper actuators every 3-6 months.
- 8) Dirty condenser and evaporator coils reduce cooling capacity and make the compressor(s) work harder and run longer. They should be inspected and cleaned at least once a year or as necessary.
- 9) Ventilation is essential to maintaining a healthy, comfortable indoor environment. Codes base the amount of outdoor air that must be brought into a classroom on the number of occupants (students, teachers) that are normally in the room. This ventilation set point should be periodically reviewed to assure it matches the current occupancy and usage pattern of the room. Dynamic ventilation control strategies based on schedule, carbon dioxide levels and supply airflow are available and can significantly reduce ventilation levels in classrooms.

Many of these tips and guidelines were taken from the Publication: *School Operations and Maintenance: Best Practices for Controlling Energy Cost* dated August 2004, prepared by the Alliance to Save Energy with a grant from the U.S. Department of Energy and the Office of Energy Efficiency and Renewable Energy.