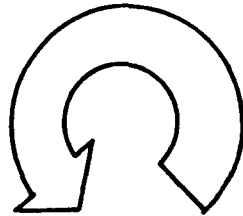


HVAC

SUMMARY



The primary objective of the HVAC system is to provide an atmospheric environment including proper thermal conditions, air movement and humidity, responsive to the activities within the building.

Although excellent control of the above attributes is now standard practice in terms of design and installation, the actual operational effect of these attributes has been less studied especially in terms of relationships with other factors such as orientation, windows and performance over time.

PERFORMANCE OBJECTIVE: PROVIDE PROPER THERMAL ENVIRONMENT

TEST # 1: Control Dry Bulb Temperature

Test Method: Use a recording thermometer. Long term measurements are made during all seasons of the year in all space types and orientations of the building. Measurements are made at the 5 foot level in the center of the area.

Measures: Dry bulb temperature

- Dry bulb temperature in major spaces during all seasons
- Outside dry bulb temperature during the same period
- Inside dry bulb temperatures for different orientations
- Weather colorations, strong sun, partly cloudy, overcast, storm

TEST # 2: Control Dry Bulb Temperature

Test Method: Use Test Method #1.

Measure: Thermostat temperature.

-Record thermostat thermometer reading and thermostat setting at the time the dry bulb measurement is made with the recording thermometer.

TEST # 3: Provide Proper Dry Bulb Temperature in Occupied Zone

Test Method: Same as Test #1. Additional measurements are made five feet above floor level.

Measure: Dry bulb temperature

-Dry bulb temperature at one inch and six feet five inches above floor level.

TEST # 4: Control Radiant Temperature

Test Method: Use a surface thermometer (Pacific Transducer Corporation, Model 309F: about \$10). Measurements are made directly on outside walls and windows.

Measure: Radiant temperature

-Mean radiant temperatures on room surfaces exposed to outdoor environment.

TEST # 5: Control Humidity

Test Method: Using a Whirling Psychrometer or equivalent gauges, record dry bulb and wet bulb temperatures. Use the same schedule as provided on Test #1.

Measures: Dry bulb, wet bulb temperatures

- Dry bulb and wet bulb temperatures
- Relative humidity using psychrometer chart
- Outdoor relative humidity

TEST # 6: Control Air Circulation

Test Method: Use either a deflecting air anemometer or smoke from titanium tetrachloride to measure air velocities in occupied zone. Measurements should be made at ankle and neck regions - 2 inches and 5 feet above floor at 1/3 points on both diagonals of the room.

Measure: Air velocity

- Record air velocity in feet per minute

PERFORMANCE OBJECTIVE: MAINTAIN HEALTH AND SAFETY STANDARDS IN HVAC SYSTEM

TEST # 7: Control Safety Hazards to Maintenance Staff and Users

Test Method: Interviews with maintenance staff and inspection of facilities and equipment.

Measure: Safety hazards

- Uninsulated 'hot' piping
- Unshielded moving equipment
- Adequate guards and barriers
- Adequate monitoring equipment

Test Method: Same as Test #6

Measure: Frequency of repairs

- Note quantity and quality of unusual maintenance and repairs

REFERENCES

ASHRAE Standard 55-66 Thermal Environment Standards were helpful as well as:

"The Performance Concept", VI., Staff of the National Bureau of Standards, Report 9849, June 1968

"Equipment Test Code I06ZR3", Air Diffusion Council, Chicago, 1972

Another excellent source of HVAC Test Procedures

SUMMARY OF HVAC PERFORMANCE TESTS

PERFORMANCE OBJECTIVE: PROVIDE PROPER THERMAL ENVIRONMENT

TEST # 1: Control Dry Bulb Temperature

TEST # 2: Control Dry Bulb Temperature

TEST # 3: Provide Proper Dry Bulb Temperature in Occupied Zone

TEST # 4: Control Radiant Temperature

TEST # 5: Control Humidity

TEST # 6: Control Air Circulation

PERFORMANCE OBJECTIVE: MAINTAIN HEALTH AND SAFETY STANDARDS IN HVAC SYSTEM

TEST # 7: Control Safety Hazards to Maintenance Staff and Users