



Temperature Wars Savings vs. Comfort

Background

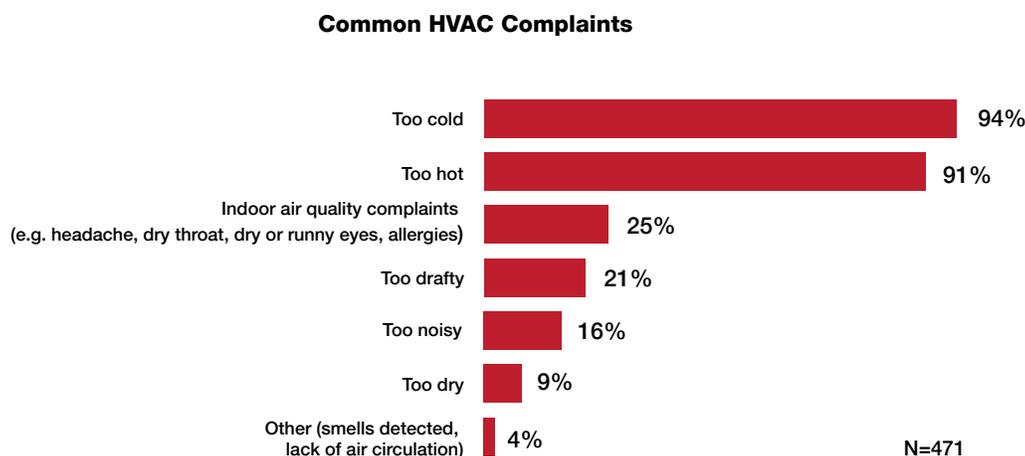
For many years, IFMA has conducted surveys of its facility management members to find out the top office complaints among employees. Common grievances offered include high noise levels, limited space and unusual odors. However, complaints of the temperature being too hot or too cold always top the list, often alternating from year to year. Research has shown that improvement to thermal comfort issues often results in higher tenant satisfaction scores, so building owners and operators take these concerns seriously.

Facility managers go to great lengths to keep facilities comfortable for workers, as this comfort is directly tied to worker productivity. Recent IFMA research has also uncovered the trend that many facility managers have adjusted the thermostat to higher settings in the summer and lower settings in the winter to reduce energy cost and consumption.

The purpose of this 2009 study is to identify when most thermal complaints occur, the nature of the complaints, and what building actions and improvements are made to make workers comfortable and able to concentrate on their jobs.

Occupant Comfort

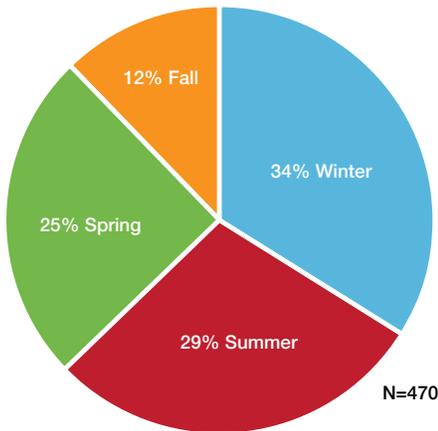
1. What type of HVAC complaints do you typically receive throughout the year?



As seen in previous IFMA studies, hot and cold complaints are almost equal. Complaints of too hot were recognized more at educational facilities than at other types of facilities.

2. In which season would you say you receive the most complaints?

Seasons For Most HVAC Complaints



When examining both the first and second questions together, we see that the most common complaint in winter is that the building is too cold. The most common complaint for the summer is too hot. During spring and fall, the shoulder seasons, outdoor temperatures can change rapidly, and the HVAC system cannot react as quickly. During these seasons, the complaints are equal – too hot and too cold.

3. Do you receive complaints in the summer that the facility is:

Summer HVAC Complaints

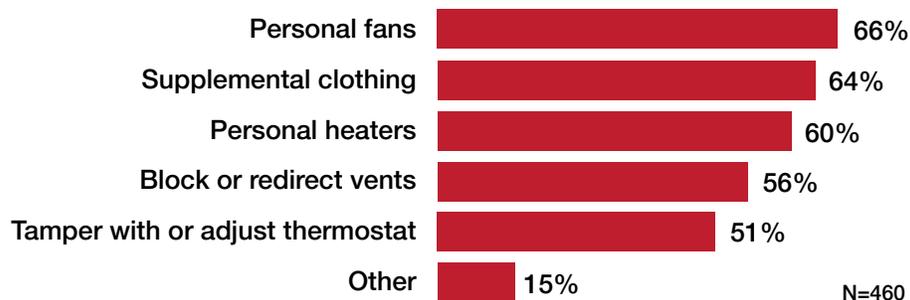


Those who manage offices are more apt to receive complaints from workers of being too cold, while others who manage educational facilities, call centers and industrial facilities are more apt to receive hot calls.

Other summer HVAC complaints include “humid,” “drafty,” “excessive noise from supply air diffusers,” and the humorous “It’s cold enough to hang meat in my office.”

4. What do occupants do to adjust to thermal comfort issues?

How Do Occupants Adjust to Thermal Comfort Issues?



Other responses include: complain, contact facilities department, keep blankets and sweaters within reach, and open windows. Many facility managers commented that personal heaters are not allowed because they are a fire hazard.

“Personal heaters are used frequently, but [are] not allowed. These cause unsafe conditions and power outages which require our in-house maintenance staff to continually reset breakers.”

Other comments:

“We recently finished a complete test and balance of our system and banned personal heaters. We have also attempted to educate occupants with regard to system design and why some of their ‘fixes’ make the problem worse.”

“Some people tape cardboard to the diffusers to redirect the air away from them. They also tape ribbons to the diffusers to show us that there is air blowing from them.”

“Unfortunately, more employees dress for summer (i.e. sleeveless tops/dresses, sandals, etc.) and are ill-equipped for the interior temperature.”

“Most of the complaints come from staff who are close to windows, so we ask them to keep their blinds closed if they are too hot or too cold.”

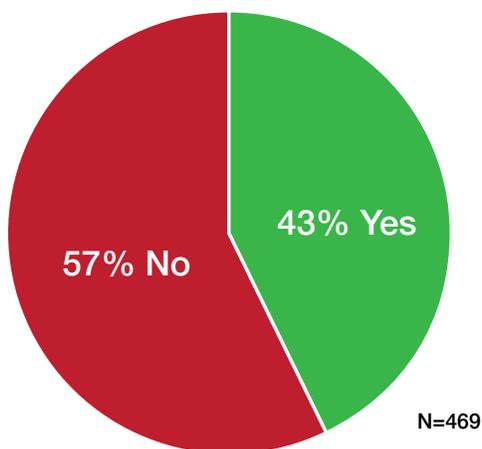
“We have people with lap blankets and fingerless gloves. Sad, isn’t it?”

“Stand alone AC units, large baseboard heaters, small wading pool under the desk to ‘paddle’ their feet ... [I] have seen most things ...”

“[Some people] call my phone with tape recordings of the Weather Channel forecast for today.”

5. Do you relax the company dress code in the summer to improve the comfort of occupants?

Relax Dress Code in Summer



Sixty four percent of respondents working at educational institutions reported the ability to relax dress code policy in the summer months.

Facility Operation

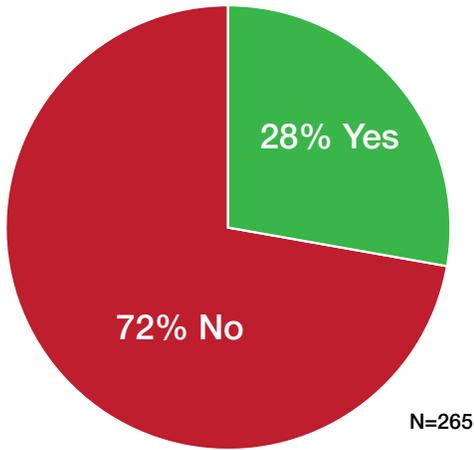
6. How is the temperature regulated in the facility?

- 56% Centrally controlled, no occupant control
- 42% Zone controlled, occupants can adjust thermostat
- 2% Zone controlled, each work station/occupant has individual control of temperature and/or air flow

Some facility managers mentioned they have the ability to control temperature in multiple zones, but occupants do not have the ability to adjust the thermostat.

7. Has your organization investigated newer systems that enable occupants to adjust temperature and air flow technology?

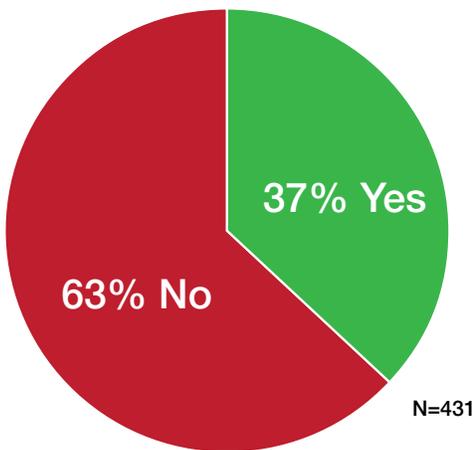
Investigate New Systems With Occupant Control



Those managing facilities with HVAC systems 30 years old or older were more likely to have looked into this new technology (39 percent versus 28 percent).

8. Can you control relative space humidity (RH) by humidification or dehumidification?

Relative Space Humidity (RH) Control



Facilities with newer HVAC systems, five years old or less, are more likely to have the option of controlling relative humidity (48 percent versus 37 percent).

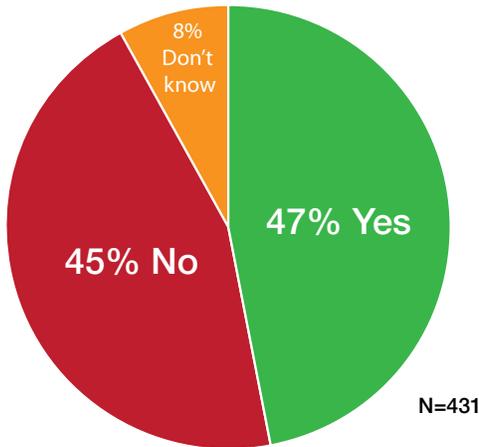
9. What is the average relative humidity (RH) level you are able to maintain in your facility in the summer and winter?

Relative Humidity	Summer	Winter
Below 30%	8%	22%
30% - 39%	18%	21%
40% - 49%	25%	18%
50% - 60%	14%	6%
Above 60%	2%	1%
Don't know	33%	32%

A target range of 40 to 45 percent relative humidity is good, but there is no ideal setting. Most people are comfortable with a relative humidity ranging from 30 to 50 percent, but can tolerate 20 to 60 percent. With lower humidity levels (such as 30 percent), thermostat temperatures can be set slightly higher.

10. In the summer months, do you “pre-cool” your building (i.e. operate outdoor air fans at night to bring in outdoor cooler air, reducing load on chiller plant)?

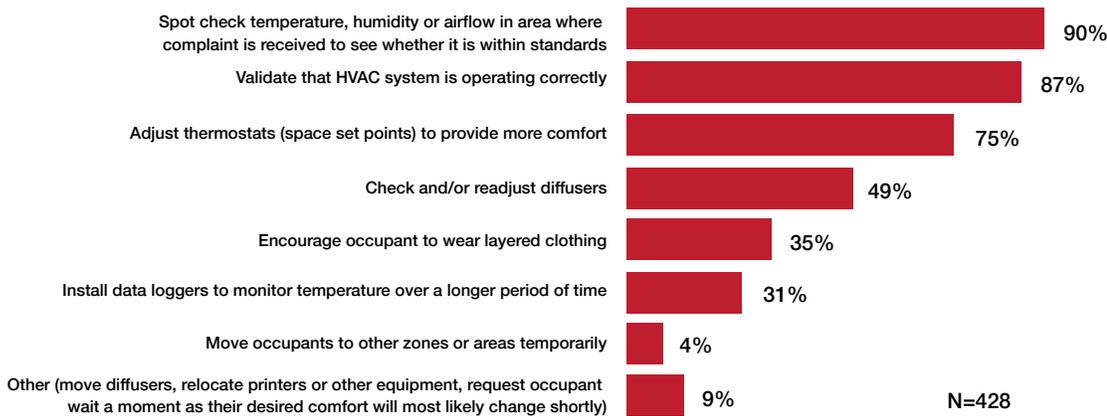
Pre-Cool Building in Summer Months



The practice of pre-cooling was seen more often within educational facilities (68 percent).

11. When occupants complain about thermal discomfort, what steps do you usually take?

Steps Taken To Address Thermal Complaints



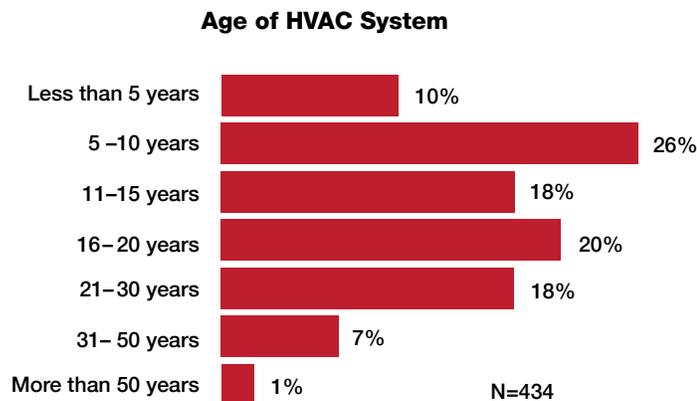
“Adjustments of temperature is the first remedy, and then an investigation into the system itself if problems persist for a particular unit.”

“A non-contact, handheld digital thermometer has been my most useful tool in determining actual temperatures and unit temperature output.”

“Take a vote of all occupants in a given control zone, and the majority rules.”

“Ask people for their budget code to charge them additional costs associated with units running more than agreed-upon parameters.”

12. What is the age of the HVAC system in your building?

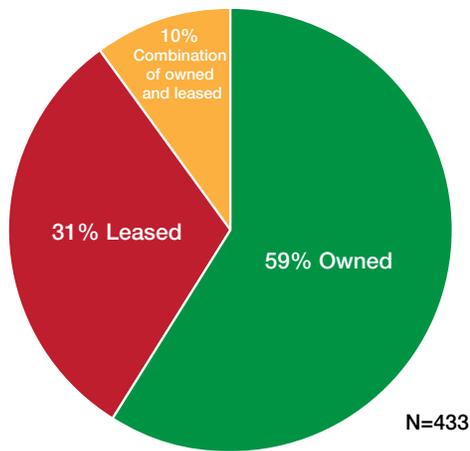


13. What initiatives have you implemented to increase the efficiency of your HVAC or the building envelope?

- 77% Updated or replaced HVAC components or system
- 73% Verified the building automation system (BAS) is working as designed
- 52% Installed more efficient light fixtures that reflect less heat
- 27% Modified ductwork
- 24% Installed new window shades
- 24% Added window film to improve thermal properties
- 18% Retro-commissioned the building
- 15% Provided more local control to occupants
- 10% Green initiatives such as green roofs, heat recovery and solar water heating
- 12% Other (see below)

- *Added energy management system to chillers*
- *Added new control systems*
- *Installed additional mini blinds in consistently problematic areas*
- *Because the system is so new, we have not done any of the above*
- *Called in an air balancer*
- *Central monitoring of HVAC system*
- *Communication/education campaign with the occupants*
- *Continually tweak direct digital control (DDC) system and BAS for better control*
- *Tied digital variable air volume (VAV) systems into building management system; implemented demand control ventilation*
- *Implemented an energy conservation policy. Among other things, it sets temperature standards of 70 degrees Fahrenheit (heating) and 73 degrees Fahrenheit (cooling). As long as the space temperature is in this range, no action is taken.*
- *Initiated more central control of thermostats versus local control*
- *Installed new, more efficient windows*
- *Managing to American Society of Heating, Refrigerating and Air-Conditioning Engineers standards*
- *Moved thermostats to more open locations to better sample area temperatures*
- *Reduced air handler output by zoning off at night*
- *Repaired ductwork in ceiling space, reviewed the BAS and made many minor adjustments*
- *Installed sun screens on outside perimeter*
- *Trimmed the building management control system for best energy maximization and occupant comfort*
- *Upgraded controls and installed new energy management system*
- *Applied night time set back in winter and summer. Turned off the electric base board heat in the winter during unoccupied times, unless it was 20 degrees Fahrenheit below zero or colder.*
- *Installed shades, tinted windows and overhangs, and a VAV system*

14. Facility ownership:



15. Facilities managed:

65%	Office
7%	Education
5%	Multi-use
5%	Industrial
4%	Call center
3%	Health care
2%	Retail
2%	Research center
2%	Data center
2%	Assembly
1%	Sports and entertainment
1%	Museum
1%	Courthouse
1%	Correctional
17%	Other (e.g. church, studio, warehouse, shelter, municipal facilities)

Methodology

This survey was drafted with the assistance of several HVAC subject matter experts. Once the questions were developed, the survey was sent to a sample of 3,357 IFMA members located in the United States and Canada. The survey was fielded June 2-4, 2009. A total of 452 responses were received by July 9, 2009. After subtracting the number of returned e-mails, the IFMA research department calculated a response rate of 15 percent.

A confidence level and margin of error give readers some measure of how much they can rely on survey responses to represent all IFMA member organizations. Given the response level to this survey, IFMA is 95 percent confident that the responses given can be generalized to all IFMA member organizations with a margin of error of approximately +/- 5 percent. For example, 43 percent of the respondents indicate their firms relax dress codes during the summer months. With a 5 percent margin of error for the sample of 452, the reader can be 95 percent certain that between 48 percent and 38 percent of facility managers work for firms that have implemented a summer dress code.