

# YOUR BLUEPRINT TO INDOOR COMFORT

## 1. AT-A-GLANCE

According to the United States Environmental Protection Agency (EPA), people in the U.S. spend about **87%**<sup>1</sup> of their time indoors.

**69% at home**



**18% at work/  
other locations**

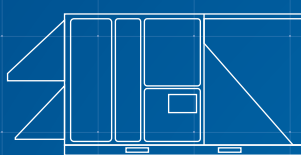


So, how does HVAC play a role in ensuring the time spent indoors is more comfortable and productive?

## 3. CONTROLLING INDOOR COMFORT



Residential



Commercial

There are different means available to help control the environmental factors that contribute to indoor comfort. Air conditioning systems, for instance, can help control air temperature, air circulation and humidity. However, not all types of air conditioning systems can control all three factors.



Single-stage

vs



Two-stage

vs



Variable speed

### a. SINGLE-STAGE -\$\$-



Like a light switch, the system is either on or off. These systems feature a fixed speed compressor that runs at **100%** capacity to reach desired temperature then turns off.



#### PROS

- Ability to meet desired air temperature when running at **100%** capacity
- Most affordable option

#### CON

- On/off cycles can cause broad temperature swings, low air circulation and poor humidity

## 2. FACTORS AFFECTING HUMAN COMFORT

Homeowners perceive indoor comfort from the air temperature surrounding them, the air circulation that prevents a room from feeling “stuffy,” humidity levels, and several other factors.

According to **ASHRAE Standard 55-2013**<sup>2</sup>, there are two factors that affect thermal comfort, environmental and personal.

### PERSONAL FACTORS



**Metabolic Rate** - level of activity, i.e. sitting, sleeping, working out



**Clothing** - too much or too little clothing

### ENVIRONMENTAL FACTORS



**Air Temperature** - temperature of the air surrounding the body. This is the one we think about the most and is controlled with heating and cooling systems.



**Air Circulation** - the speed of air moving across a person or in an environment. For example, still or stagnant air may cause people to feel stuffy.



**Humidity Levels** - the amount of moisture in the air. For example, high humidity slows evaporation from the skin, which doesn't allow the body to cool naturally.



**Radiant Effects** - heat that radiates from warm objects, like the sun, ovens, clothes dryers, etc.

### b. TWO-STAGE -\$\$\$-



Similar to a fan switch, two-stage systems can be off, low speed or high speed. These systems have a two-stage scroll compressor that modulates between either **65%** capacity or **100%** capacity allowing two levels of operation: high for hot summer days and low for milder days.



#### PROS

- Longer runtimes provide more even temperature as well as removal of moisture from the air
- Ability to efficiently shift to **100%** to quickly meet desired temperature setting
- Multiple compressor combinations offer additional stages of cooling capacity

### c. VARIABLE SPEED -\$\$\$\$-



Variable speed systems modulate by varying the speed of the compressor motor, where capacity output increases and decreases with motor speed. These systems feature an indoor variable speed fan as well as the compressor that operates anywhere between **20-120%** capacity/**900-7,000 RPMs**.



#### PROS

- Wide turndown capability delivers more even and consistent temperature
- Turndown to **900 RPM** in cooling mode means less cycling and better dehumidification
- **7,000 RPM** overspeed capability in heating mode provides hot air supply even in extreme cold weather

## 4. GUIDE TO HELPING YOU SELL ON COMFORT

### a. Define comfort

The easiest way to define something is by describing what it isn't. Ask your customers about the following:

- Temperature swings on humid days between cycles
- Hot and/or cold spots
- Trouble sleeping in the summer
- Building occupancy throughout the day



### b. Introduce the concept of air quality

A properly sized system with high quality air filtration can help:

- Enable the air flow within the home or building to remain fresh, clean and well ventilated
- Reduce changes for mold or allergy problems



### c. Discuss efficiency standards

Help customers better understand:

- Minimum SEER/IEER standards
- What higher efficiency means



### d. Connect the dots between efficiency and comfort

Explain how most high efficiency systems help deliver:

- More even, consistent temperatures
- Better humidity control
- Improved air quality



### e. Define different tiers of systems in terms of comfort

Discuss the various system options available (single-stage, two-stage, variable speed), focusing on the comfort factors including:

- Humidity control
- Consistent cooling
- Air circulation



### f. Discuss rebates

There are various types of rebates to help offset some of the costs for mid-tier and premium systems. Tell customers about:

- Utility rebates
- Manufacturer rebates
- Tax rebates



CLIENT: HVAC INDUSTRY | JOB: EMRSN-019474

YOUR BLUEPRINT FOR COMFORT

**COPELAND SCROLL**

**EMERSON**

Sources  
1. epa.gov and www.bls.gov/tus/charts/  
2. ANSI/ASHRAE Standard 55-2013: Thermal Environmental Conditions for Human Occupancy

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FINAL VERSION

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