

White Paper #9 Comfort Envelope and Your Thermostat

Look at the Comfort Envelope, which represents opinions of comfort from all over the country, and see where your thermostat should be.

We are all creatures of habit. Sometimes we do things ‘just because we always have.’ Comfort is a subjective thing, and is influenced by several things including

- Temperature
- Relative humidity
- Air speed
- Clothing we wear
- Age
- Weight
- Activity level
- How close we are to something that is very hot or cold

Much testing has been done to establish what “comfortable conditions” are. From this testing, a range of typical indoor conditions has been developed, called the “Comfort Envelope”. Out of this testing, it has also been proved clearly that it is not possible to have 100 percent consensus on comfort. No matter what combination of temperature or humidity is chosen, someone will prefer it elsewhere. This is a fact of life.

The developers of the Comfort Envelope (ASHRAE) suggest a comfort acceptance criteria that is met if 90 percent of the people tested feel comfortable. Understanding that, it’s usually a safer bet to be somewhere in the middle of the envelope, and not at an edge.

In Colorado, our dry climate does two things for the Comfort envelope – it raises the expected comfort values of the cooling mode, and also raises the comfortable values of the heating mode. In other parts of the country where conditions are more humid, the reverse would occur.

For homes and some businesses, the energy consumed is driven, in large part, by the heat flows through the building walls, roof, and windows. This, in turn, is driven by the temperature difference between inside and outside.

We have all heard that lowering our thermostat setting in the winter and raising it in the summer will save energy. This is very true. In fact, you can expect to save about **2 percent** of your heating and cooling costs for each temperature you move the dial *closer* to the outside temperature and leave it there. For set-back thermostats, the savings are more like **1 percent** per degree. This is because the setting change is temporary.

For most of us, comfort comes before energy savings, but by understanding the comfort envelope, perhaps they can work together.

The comfort envelope has some suggested points plotted on it, based on normal relative humidity levels in summer and winter. These are not law, but do have scientific basis. Take a moment and look at the comfort envelope; then you decide!

ASHRAE PSYCHROMETRIC CHART NO. 5

NORMAL TEMPERATURE—HIGH ALTITUDE (7500 FT)

BAROMETRIC PRESSURE 22.85 INCHES OF MERCURY

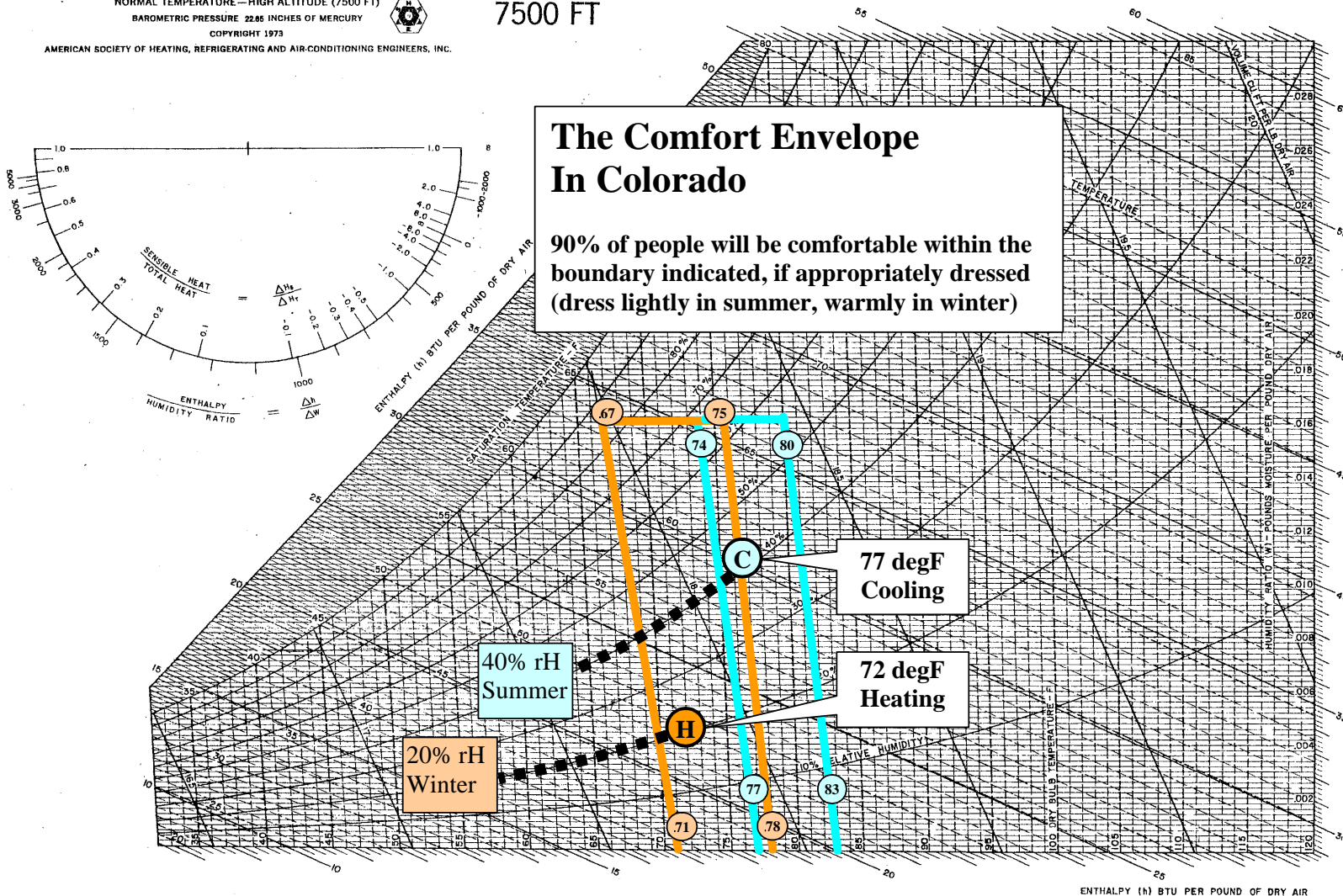
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AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS, INC.

7500 FT

The Comfort Envelope In Colorado

90% of people will be comfortable within the boundary indicated, if appropriately dressed (dress lightly in summer, warmly in winter)



ENTHALPY (h) BTU PER POUND OF DRY AIR