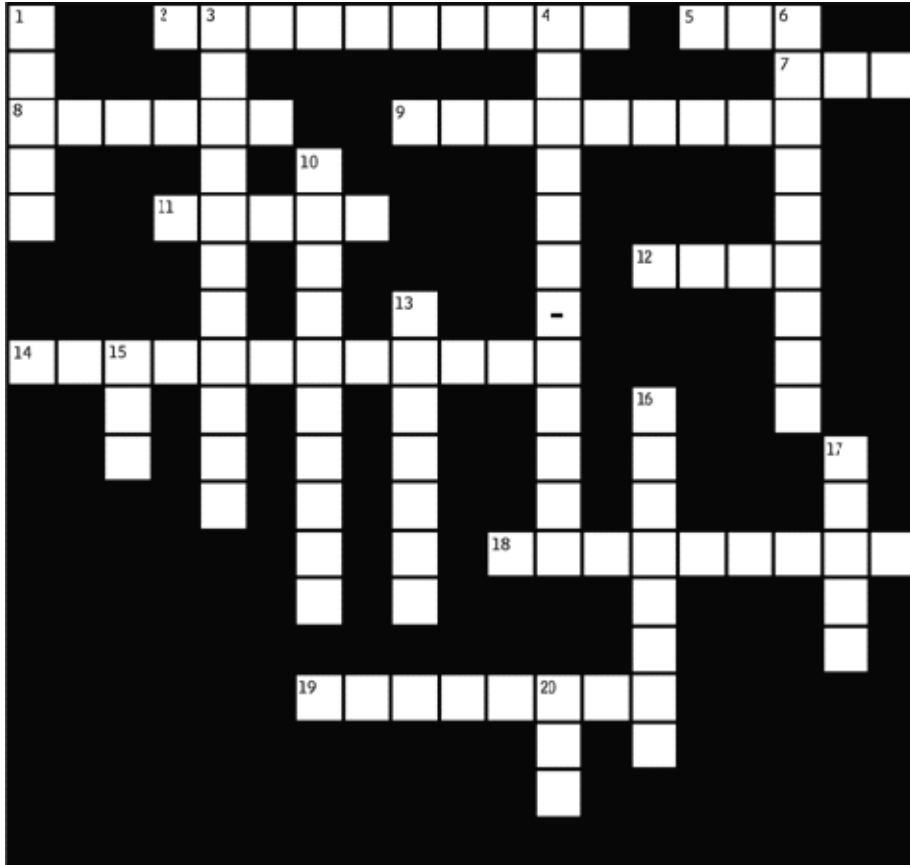


## Crossword Puzzle: Thermal Comfort



### ACROSS

2. This decreases slightly with age; therefore, comfort conditions based on experiments with young and healthy subjects cannot be used for other age groups.

5. This organization publishes Standard 7730: Moderate Thermal Environments - Determination of the PMV and PPD Indices and Specification of the Conditions for Thermal Comfort.

7. Along with the predicted mean vote, this factor is used in a model and accepted for design and field assessment of comfort conditions.

8. This organization publishes Standard 55: Thermal Environmental Conditions for Human Occupancy.

9. This temperature index is probably the most common environmental index and has the widest range of application.

11. ASHRAE has developed a graph showing these winter and summer comfort \_ \_ \_ \_ which are considered acceptable ranges of operative temperature and humidity for people in typical clothing during sedentary activity.

12. This is an environmental heat stress index that combines drybulb temperature, a naturally ventilated wetbulb temperature, and black globe temperature.

14. This section of the brain has hot and cold temperature sensors that are bathed by arterial blood and is the central control of body temperature.

18. The ASHRAE scale ranges from “+3 Hot” to “-3 Cold” and in general it takes about a 5.4 °F (3 °C) change in temperature or a 0.44 psi (3 kPa) change in water vapor pressure to change a thermal \_ \_ \_ \_ \_ vote by one unit.

19. In most spaces in a building, the air temperature normally increases in this direction and can cause discomfort if the gradient is too large.

## **DOWN**

1. This is an undesired local cooling of the human body caused by air movement.

3. This form of heat loss from the skin depends on the difference between the water vapor pressure at the skin and in the ambient environment and on the amount of moisture on the skin.

4. The energy balance point which, at a given level of metabolic activity and when the body is not far from thermal neutrality, the mean skin temperature and sweat rate are the only physiological parameters influencing the heat balance.

6. This is the humid temperature of a uniform environment at 100% rh in which a person loses the same total amount of heat from the skin as in the actual environment.

10. The maximum amount of this efficiency of a body is 20% to 24% and it is commonly assumed to be zero to give a more conservative estimate when designing air-conditioning equipment for upper comfort and health limits.

13. This mean temperature is a key variable in making thermal calculations for the human body.

15. This index predicts the mean response of a large group of people according to the ASHRAE thermal sensation scale.

16. This form of heat must pass from the skin surface and through clothing to the surrounding environment.

17. The temperature at this plane of the room has a significant influence on the mean radiant temperature in a room.

20. Clothing insulation value may be expressed in these units. One of these units is equivalent to  $0.155 \text{ m}^2 \cdot \text{°C/W}$ .

To brush up on the facts behind this month's clues, refer to Chapter 8 (“Thermal Comfort”) of the *2001 ASHRAE Fundamentals*.

(\* Adapted from the journal *Engineered Systems*, May 2000)