Thermal Office Conditions Guidelines

Temperature preferences vary greatly among individuals and there is no one temperature that can satisfy everyone. Nevertheless, an office which is too warm makes its occupants feel tired; on the other hand, one that is too cold causes the occupants' attention to drift, making them restless and easily distracted.

Maintaining constant thermal conditions in the offices is important. To have “thermal comfort” means that a person wearing a normal amount of clothing feels neither too cold nor too warm. Thermal comfort is important both for one's well-being and for productivity. Minor deviation from comfort may be stressful and affect performance and safety. Workers already under stress are less tolerant of uncomfortable conditions.

Thermal comfort is determined by six factors:

1. **Metabolic rate (of the persons in the room):** varies with the number of occupants, and the amount of activity done by occupants (e.g., sitting in a restaurant versus serving the customers).
2. **Clothing:** varies by individual’s choices in clothing or by work requirements (e.g., chemical protective clothing or rain gear).
3. **Air temperature:** air temperature is a measure of how hot or cold the air is; it affects relative humidity and the rate of evaporation.
4. **Radiant temperature:** a complex term, but generally described as how the heat transfers between the body and other objects in the area (e.g., radiation is the process by which the body gains heat from surrounding hot objects, such as hot metal, furnaces or steam pipes, and loses heat to cold objects, such as chilled metallic surfaces, **without contact** with them).
5. **Air speed (velocity):** the rate of air movement.
6. **Humidity:** a general description of the moisture content of the air.

In Saskatchewan, thermal comfort in workplaces is controlled by the Occupational Health and Safety Regulations which provides measures for employers to provide “reasonable thermal comfort” for workers.

Safety Resources uses the Canadian Standards Association (CSA) Standard CAN/CSA Z412-00 – Office Ergonomics as the baseline for thermal comfort at the University of Saskatchewan. This standard provides acceptable ranges of temperature and relative humidity for offices in Canada. These values are based on the recommendations of the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Standard 55 - 2010 "Thermal Environmental Conditions for Human Occupancy".

A general recommendation provided by CSA Z412-00 (R2106) Guideline on Office Ergonomics is that the temperature be maintained at a summertime range of 23-26°C and a wintertime range of 20-23.5°C at 50% relative humidity. In the summer, when outdoor temperatures are higher, it is advisable to keep air-conditioned offices slightly warmer to minimize the temperature discrepancy between indoors and outdoors.

These recommended temperature ranges have been found to meet the needs of at least 80% of individuals. It is important to note that some people may still feel uncomfortable even if these values are met. In those situations, additional measures may be required.

Temperature / Humidity Ranges for Comfort			
Conditions	**Relative Humidity**	**Acceptable Operating Temperatures**	
		°C	**°F**
Summer (light clothing)	If 30%, then If 60%, then	24.5 - 28 23 - 25.5	76 - 82 74 - 78
Winter (warm clothing)	If 30%, then If 60%, then	20.5 - 25.5 20 - 24	69 - 78 68 - 75

Source: Adapted from ASHRAE 55-2010.

If the acceptable operating temperature exceeds the baseline shown in the chart above there are a number of things that can be done to mitigate the hazard. They include:

- Open a door or window (if available).
- Use a portable fan to increase air movement and lower relative humidity.
- Take frequent micro-breaks out of the environment
- Drink lots of water and avoid caffeinated or sugary drinks.
- Plan more sedentary, focused tasks that require longer periods in the environment for times of the day when the temperature is lower.
- Wear looser fitting, breathable clothing on warmer days when you anticipate the environment to be warmer.

If the operating temperatures are above the acceptable rate, personnel should be discussing the situation with their immediate supervisor to determine an effective short and long term solution.

Safety Resources can support this process by evaluating the environment to determine the operating temperatures, however we *cannot* advise someone as to whether they should or should not remain in the working environment. That conversation and responsibility remains with the immediate supervisor.

For assistance with evaluating thermal office conditions, please contact Safety Resources at 966-4675 or safetyresources@usask.ca.