



# Indoor Air Review

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## RELATIVE HUMIDITY REQUIREMENTS FOR ACCEPTABLE INDOOR AIR QUALITY

The ideal humidity guideline for indoor air quality should specify a relative humidity range that minimizes deleterious effects on human health and comfort as well as reduces, as much as possible, the speed of chemical reactions or the growth of biological contaminants (which will impact human health and comfort).

The bar graph in the figure from "Criteria for Human exposure to Humidity in Occupied Buildings" by Sterling et al in ASHRAE Transactions 1985 Vol. 91 Part 1 graphically summarizes the apparent association between relative humidity ranges and factors that affect health of occupants at normal room temperatures. The figure

above 90%. Mites require humidity for survival. Growth in the mite population responds directly to humidity levels in excess of 50%.

Respiratory infections increase at relative humidity below 40%; however, there is little information on effects of humidity in excess of 50%. The incidence of allergic rhinitis due to exposure to allergens increases at relative humidities above 60% and severity of asthmatic reactions increases at relative humidities below 40%.

Most chemical interactions increase as the relative humidity rises above 30% though ozone production is inversely proportional to the relative humidity.

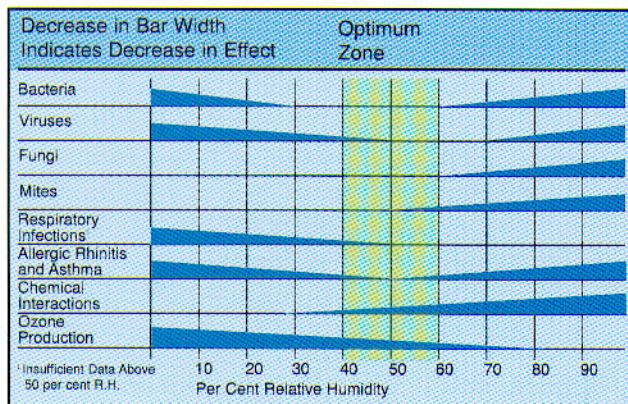
The evidence suggest that the optimal conditions to enhance human health by minimizing the growth of biological organisms and the speed of chemical interactions occur in the narrow range between 40% and 60% relative humidity at normal room temperature. That narrow range is represented by the optimum zone

in the shaded region of the graph. The graph was assembled based on research conducted by the author for Health Canada and has been adopted by the American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE) as guidance for the design, construction



and operation and maintenance of heating ventilation and air conditioning systems and equipment. The graph is included in the ASHRAE handbook of fundamentals and has been referenced as the basis for Thermal Comfort Requirements of the new Workers' Compensation Board of British Columbia Indoor Air Quality Regulation. Compliance with these thermal comfort criteria must now be documented for all non industrial workplaces in British Columbia as a measure of acceptable Indoor Air Quality.

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by Sterling et al in ASHRAE Transactions 1985 Vol. 91 Part 1

is constructed as a bar graph relating relative humidity levels from 0% to 100% (shown along the horizontal axis) to (1) biological organisms (bacteria, viruses, fungi, and mites), (2) pathogens causing respiratory problems (respiratory infections, asthma, and allergies), and (3) chemical interactions and ozone production. The decreasing width of the bars represents decreasing effects.

The bacterial population increases below 30% and above 60% relative humidity. The viral population increases at relative humidity below 50% and above 70%. Fungi do not cause a problem at low humidity; however, growth becomes apparent at 60%, increase between 80% and 90%, and shows a dramatic rise

### IAQ SEMINAR

You can learn more about these and other issues at the  
**Indoor Air Quality Conference**  
October 5, 1999  
at the Coast Hotel, Kelowna, BC.  
..see reverse



*The Alliance is the single source for a complete range of Indoor Air Quality Services. They are designed to achieve a balance between cost effective IAQ solutions, and the well being of occupants within all buildings in British Columbia.*

*The Alliance provides proactive IAQ Services, including education, information gathering, documentation and dissemination covering legislation, regulation, and industry standards.*

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