

# How Humidity Affects Air Density

Jennifer Wagner, Ph.D., et al., wrote an article in the September 2025 issue of *ASHRAE Journal* called “Comparison of RH Levels in the OR Using the EQI Method of Dynamic Simulated Surgical Procedures.” It appears to contain a technical inaccuracy. On page 27, it states:

- “A higher moisture content means the air mixture is less dense;” and
- “Buoyant forces on objects in air are the result of pressure exerted by the fluid on all sides of the immersed object. Generally, objects in air with higher humidity experience slightly more buoyancy than objects in air with lower humidity, meaning they will remain in the air longer.”

The first statement is correct—moist air is less dense than dry air at the same temperature and pressure. However, the second statement misapplies Archimedes’ principle. Buoyant force equals the weight of the displaced fluid. When the fluid is less dense, the

displaced weight is lower, which means the buoyant force is reduced, not increased. Therefore, objects in humid air actually experience less buoyancy compared to those in drier air.

I recognize that other particle-level phenomena may influence suspension time in humid air, but the fluid dynamics explanation cited in the article suggests the opposite of what was written.

*Michael Gorham, Associate Member ASHRAE,  
Woodstock, Md.*

## WAGNER RESPONDS

We appreciate the clarification and apologize for any confusion. We agree that as humidity decreases, the density of air increases as it has less water vapor, which increases buoyant forces.

*Jennifer Wagner, Ph.D.,  
Discovery Bay, Calif.*