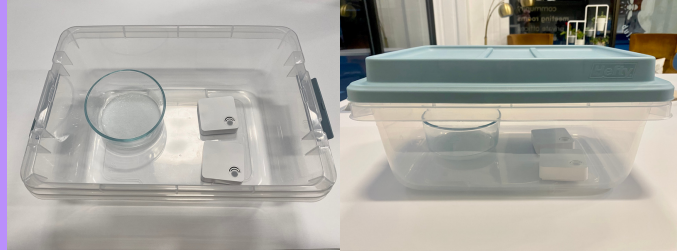


Testing the Calibration of Sensors Using Saturated Salt Solutions



OVERVIEW

Sensors that measure Relative Humidity (RH) can drift over time or when exposed to pollutants in the air and may become inaccurate. It's helpful to know how to measure the accuracy of these sensors to determine if it's time to recalibrate or if you need a consensus on what the correct reading is between multiple sensors.

It's easy and inexpensive to create a saturated salt chamber to test the calibration of your sensors! Saturated salt solutions hold a specific RH level in a sealed environment:

Lithium chloride - 11% RH
Magnesium chloride - 33% RH
Sodium chloride (common table salt) - 75% RH

Ideally you would test three different types of saturated salts in order to achieve a "3-point calibration" since RH sensors may report differently at higher and lower RH levels. For a quick sanity check, however, you can easily acquire sodium chloride (table salt) to run the experiment.

Conserv

References:

- Conservation Wiki (Samantha Alderson and Rachael Arenstein)
- Greenspan L. Humidity fixed points of binary saturated aqueous solutions. J Res NBS A Phys Ch. 1977;81A(1):89-96. <https://doi.org/10.6028/jres.081A.011>.

WHAT YOU NEED

- Salts (ideally all three listed to the left), but at the very least, sodium chloride (table salt).
- 1 Small dish or open glass container (for the saturated salt) around 4" high.
- 1 sealed polypropylene container large enough (at least 6" high) to hold multiple sensors and the small container OR a very large polypropylene Ziploc bag.



INSTRUCTIONS

- 1 In the small container, pour the salt until it is about 1" high in the container. Add tap water until the salt is completely saturated with no standing water.
- 2 Place the small container into the large container ensuring that the opening to the small container has enough room above when the large container is sealed to have good airflow. You'll also want to be careful that this small container doesn't spill as it could damage the sensors.
- 3 Place the sensors into the large container (being sure not to spill the saturated salt) and seal the large container. NOTE: Ideally the whole assembly is stored in an area with consistent temperature as that can impact the humidity level for the salts.
- 4 Leave the sensors recording data in the sealed container for at least 96 hours in order to allow the salts to stabilize the humidity.
- 5 The sensor readings towards the end of the experiment should be around the known RH for the salt. For example, for Sodium Chloride it should be 75% plus or minus the sensors margin of error. If a sensor is rated +/- 5% the readings should be between 70 and 80% RH.