

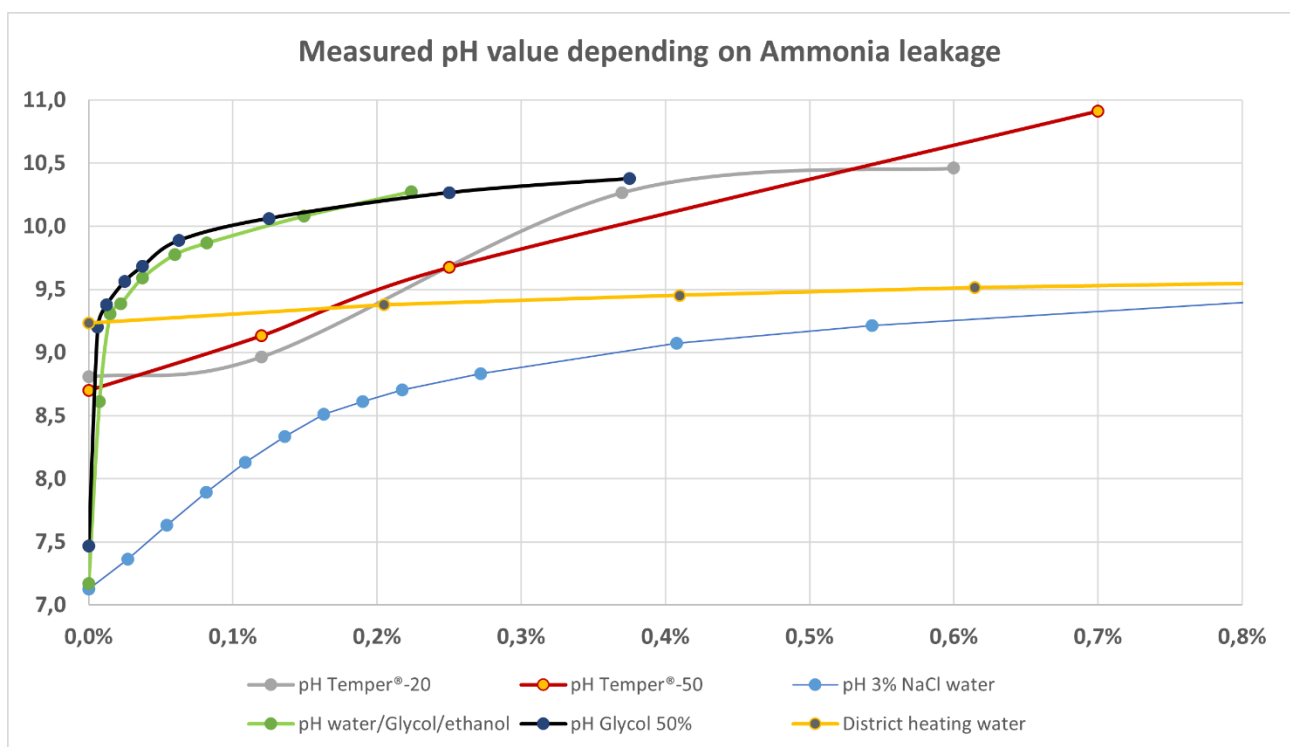
How to use a pH sensor for detection of ammonia leakage into brine.

When ammonia leaks into brine, it causes an increase in the pH level, which can be detected by the pH sensor. This sensor is ideal for monitoring the pH of most brines used in chillers and refrigeration systems. Various chemical additives are used to lower the freezing point of water in these systems, but they also influence the pH when ammonia is present. Salts like NaCl and potassium salts act as buffers, slowing down the reaction, while glycol and ethanol do not affect pH development.

The sensor is not suitable for systems without water, such as those using hydrocarbon liquids. For other liquids, please consult the brine supplier or HB Products for further details.

In fresh water and mixtures of water with ethanol, methanol, or glycol, an ammonia leakage of 1 ml per liter will cause a rapid pH to increase from 7 to 10. In brines with NaCl, the starting pH is also around 7, but the reaction is slower compared to pure water. Brine systems using potassium formate or potassium acetate start with a pH above 8, with a similar reaction curve to NaCl brines.

The diagram shows the pH development in different brines when ammonia is added. Freshwater follows a similar curve to glycol/ethanol/water mixtures. Temper® is a brine from Temper Technologies using potassium formate or potassium acetate, with an initial pH between 8.5 and 9.

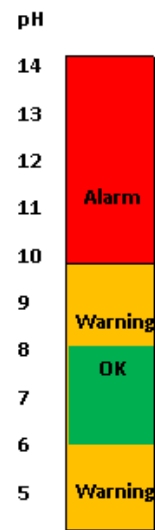


The HBPH sensor is a two-wire solution with a 4-20 mA analog output, designed for temperatures as low as -15°C (5°F). For colder conditions, the sensor must be installed in a bypass system where the brine passing through can be heated.

Alarm and warnings

A pH sensor will gradually drift in calibration over time, depending on the fluid it is exposed to. If you want to be notified when the sensor starts drifting, you can set up a two-level warning and alarm system. This system provides an early warning when the sensor calibration needs checking, followed by a second level alarm for potential leakage. For example, if the base pH value is 7, you might set a warning for values above 8 or below 6, with an alarm triggered at pH 9. This approach minimizes the need for frequent checks, although we recommend an annual calibration review.

For more complex brine systems, such as those using NaCl, potassium formate, or potassium acetate, the thresholds will differ, and adjustments should be made accordingly.



Alarm settings for water, and glycol brines

The need for calibration

The sensor is delivered with a basic calibration. If precise measurements are required, additional calibration may be needed, especially for non-standard applications. When using the sensor to detect ammonia leaks in fresh water or water mixtures with ethanol, methanol, or glycol, no extra calibration is usually necessary. However, for brines with higher pH or NaCl-based brines, calibration is highly recommended since these fluids buffer the pH changes caused by ammonia leaks.

How to check functionality

For a quick functionality check in fresh water or ethanol/methanol/glycol mixtures, you can simply dip the sensor into a 0.1% ammonia solution.

For any inquiries or further information, please don't hesitate to contact us at info@hbproducts.dk

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