

## Measurements In Fluids - RC Models

### Question

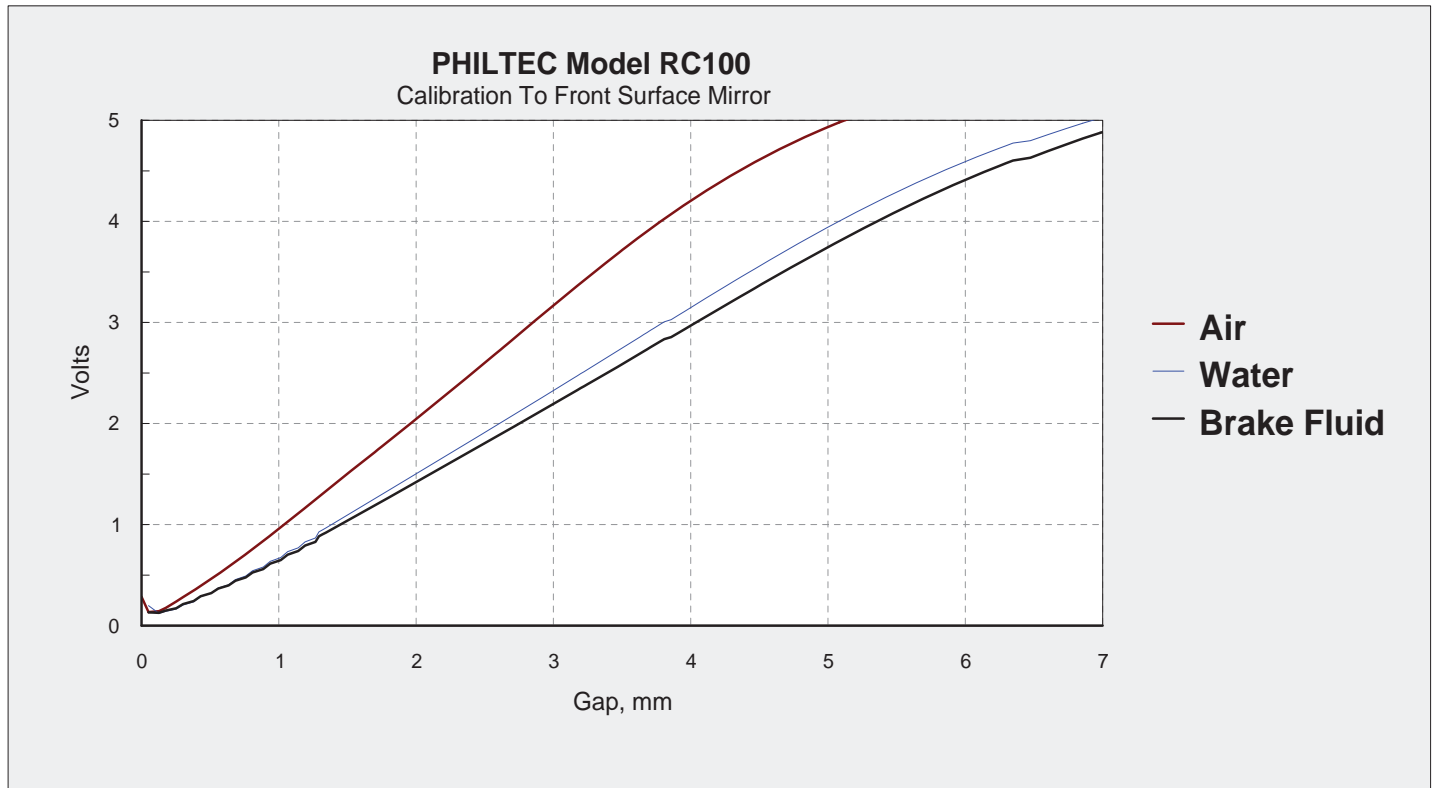
The target and sensor tip will be submerged in a fluid. How will the RC type sensor respond?

### Answer

When the sensor is submersed in a fluid, light rays diverging from the probe tip are more collimated than they would be in air. This increases the operating range of the sensor. The degree of collimation is proportional to the index of refraction of the fluid.

For example, the chart below shows the output function of a model RC100 sensor in three different fluids: air, water and DOT 5 silicone brake fluid. **The fluids increase the operating range by approximately 30%.** To be precise, the sensor must be calibrated in the same medium in which the measurements will be made.

Reflectance compensation works in air - or in any fluid - because it is a ratiometric measurement of two independent signals. Although the path lengths of the light rays in a fluid are different than in air, the RC principle still works: RC distance measurements are independent of the intensity of light reflection from the target surface.



## EXAMPLE

A model RC171 sensor was setup and calibrated to a mirror target submerged in a MIL-PRF-7024 Type II calibration fluid. The sensor was removed from the oil and then calibrated in air. The charted calibrations show the following changes from air to oil:

- A 31% decrease in sensitivity
- A 29% increase in linear range
- A 49% increase in the gap to the middle of the linear range

