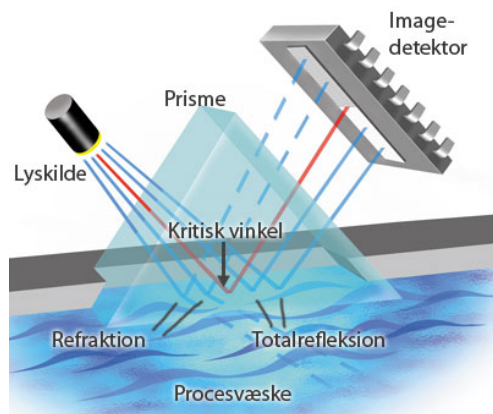


Refractometer measuring principle and technology

The refractive index n_D of a liquid solution vary with the concentration of dissolved solids. The relation between n_D and concentration is specific for each type of media and dissolved solids.

K-Patents refractometer determines the concentration of dissolved solids by making an optical measurement of a solution's refractive index (n_D). The refractometer measures the refractive index n_D and the temperature of the process medium. The measurement is based on the refraction of light in the process medium, called critical angle of refraction, using a yellow LED light source with the same wavelength (580 nm) as the sodium D line (hence n_D).

The "critical angle," is the angle where the incident light shifts from being partly refracted and reflected to total reflection. The critical angle corresponds to the borderline between the dark and the light area, which is measured by the image detector. The measured critical angle is converted to n_D based on the exact relation between the critical angle and the refractive index n_D . This equation is the law of Optical Physics known as Snells law.



The concentration is calculated based on the refractive index and temperature, taking pre-defined process conditions into account. K-Patents refractometer can indicate different scales, for example Brix, liquid density or concentration by weight.

Currently, K-Patents has 3 generation refractometer technology platforms in production. Most recent and advanced is the Platform 4 (P4), where up to 4 refractometers can be connected to one User interface via Ethernet or 4 to 20 mA connection. However, there are different product models with different features for particular industrial applications, and each model is adapted for different industrial requirements.