

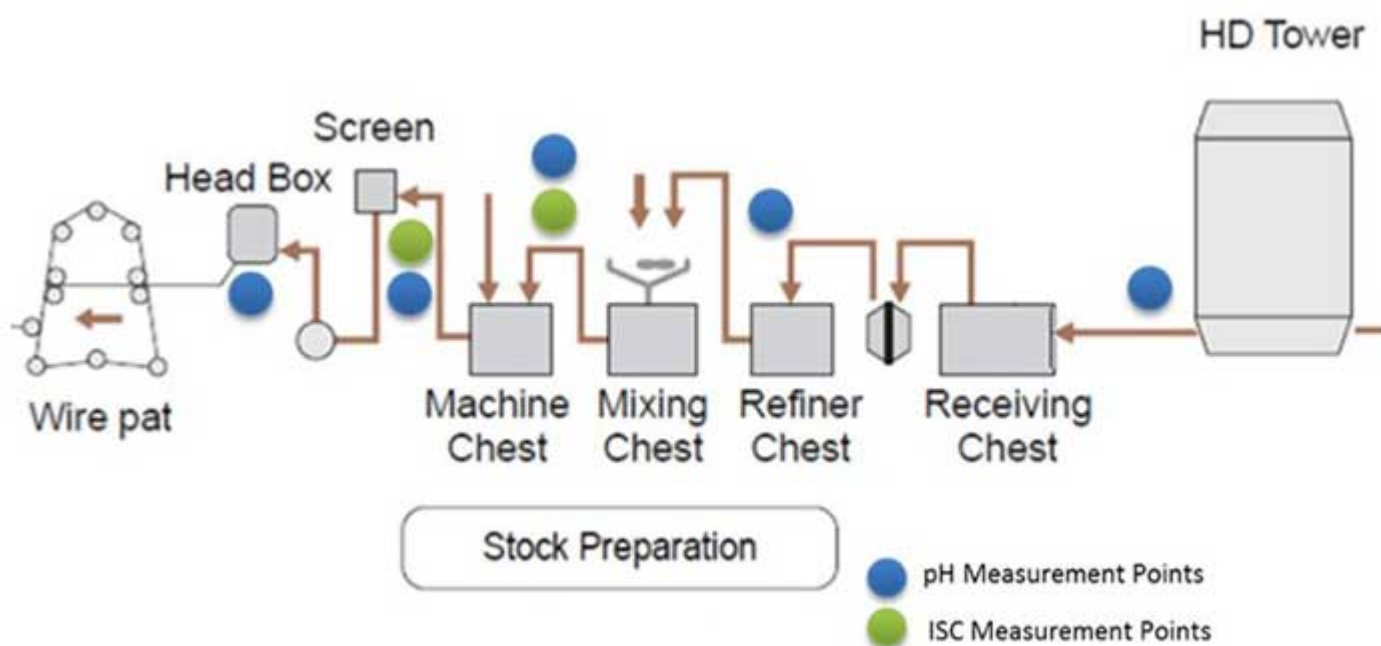
## Introduction

Continuous technology improvement is ongoing in the pulp & paper industry to obtain the best possible performance. Problems at the wet end (stock preparation) can rarely be corrected downstream. That is why monitoring and controlling pH in pulp stock is critical to the paper making process. Essentially, at every stage in the manufacture of paper, correct pH values play a vital role.

## Process

The Kraft Process is a cyclical, self-sustaining process. As a result of the process, a byproduct called black liquor (tall oil) is formed. There are two different forms of pulping process: Chemical pulping and Mechanical Pulping. Maintaining proper pH measurements in the stock preparation is important for producing quality finished product. The stages will vary depending on the type of paper that the end product will require; however, each will have some form of refining, chemical addition and screening of the pulp.

Typically the pulp is diluted and passed thru a refiner. The pH is typically maintained  $>8$  pH. Inaccurate pH measurement at the first refiner can have an effect on the strength of the pulp. The purpose of the refiner is to shred and flatten the pulp. After the stock passes thru the refiner it enters a mixing tank where chemical additives are introduced. Once the correct pH is achieved the stock enters the machine chest, where the consistency of the stock is then set. Once the consistency is accurate, the pH is monitored again before the stock is pumped thru the final screening before the stock reaches the headbox. The headbox is the final point to ensure proper pH of the pulp stock before the paper machine. Once the stock enters the paper machine it cannot be corrected.



## Product Recommendations Measurement System

### Transmitter/Analyzer

- 2-wire FLXA202/FLXA21 pH/ ORP measurement system
- 4-wire FLXA402 pH/ORP measurement system



### Option 1:



Yokogawa has extensive experience dealing with the clogging and fouling problems that occur with pH measurements in paper mills. This has led us to select the Model PH97/DP sensor which has a solid state reference resistant to clogging and fouling. The PH97 is designed as a replaceable 4-1 sensor used in conjunction with the Model PH87 retractable assembly. The PH97 includes a pH (glass) electrode, solid state reference electrode, solution ground and a Pt 1000 temperature element. All these components are sealed in a rugged Ryton™ body.

The Model PH87 assemblies are constructed of chemically-resistant titanium and include blowout safety protection utilizing a flared tip design which provides a metal to metal stop during retraction. Integral junction boxes are provided for simple installation and wiring. The retractable assembly is suitable for removal from a process line or vessel at pressures up to 70 PSI without interrupting the flow or draining the tank. The PH87 comes in different lengths to simplify proper insertion in the process line or tank.

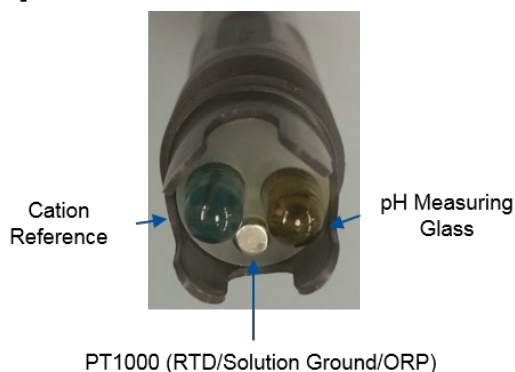
### Option 2:

Another alternative Yokogawa offers is the model PH18 differential pH sensor that is constructed of an enamel coated steel rod. The PH18 consists of a pH sensitive enamel and a sodium ion enamel combined with an integral temperature element, to form a probe without internal solutions. Therefore, the PH18 contains no reference electrode or junction that could become clogged or give way to fouling. This sensor has very little maintenance, once it is initially installed and calibrated in place for the first time.



# pH Monitoring of Pulp Stock

## Option 3:



Another alternative Yokogawa offers to the model PH18 differential pH sensor is the SC24V cation differential pH sensor. The reference portion of the SC24V is made entirely of a glass which provides a mV output corresponding to the Cation concentration of the process or solution it is in. Therefore, there is no liquid junction to be coated or clogged and no path for the process to affect the electrolyte or the internal Ag/AgCl element. This sensor has very little maintenance, once it is initially installed and calibrated in place for the first time.

## Option 4:

Another alternative Yokogawa offers is the all-in-one style FU20/FU24. The wide body sensor holds four separate measuring elements in one unbreakable and chemical resistant PPS 40GF (Ryton™) body. Installation is simple with the integrated industrial 3/4" or 1" tapered thread connections.

**Note:** For additional information or assistance on this application, please contact the Yokogawa Analytical Product Marketing.



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