



pH in MICA – colour pigment manufacturing

Industry: Chemical (Colour – Paint industry)
Product: pH

Introduction

Pigment producer manufacture produces pigments to supply to paints, plastics, inks, construction, textile and cosmetics manufacturers etc. The pigments come under wide range - general purpose grades, high performance, and specialist hard-to make colours and effect pigments.



Pigments and chemicals form an intrinsic part of many industries. They serve as raw materials in the manufacturing of Plastic, Rubber, Paint, Paper, Textile, Tiles, Detergent Powder and Soaps, Inks, and Photo Films etc.

Pigments come in a wide variety of colors and some are water-soluble. For these reasons, many of these compounds have been produced, isolated, and characterized.

Among the most important variables affecting processes, pH and temperature are environmental conditions with a strong effect on the pigments. Thus, it is very important to control them in industrial bioprocesses.

Balancing the pH

The degree of acidity or alkalinity of a solution, known as pH, is measured from 0 to 14. Acid solutions measure 0 to 7. Alkaline (smells like ammonia) solutions measure 7 to 14. Pure distilled water measures 7. There are instruments to measure pH, or you can rely on sense of smell. The binder should have a slight ammonia odor. We are shooting for a pH range of 8.0 to 8.8. The acrylic polymer used to make paint becomes unstable at a pH below 7.5. Adding a dispersion may lower the pH below the optimum range. Also, adding thickeners will typically lower the pH. If polymer binder starts looking and acting like cottage cheese then chances are pH is too low. Try raising the pH to salvage the batch. Do this with the drop-wise addition of Ammonium Hydroxide (NH4OH) while mixing. If the mixture does not respond to the pH correction, allow it to dry out for disposal.

Controlling Viscosity and Rheology

Thickness or viscosity is generally well understood. Rheology usually bears a bit of explanation. Long rheology refers to a stringy, resinous, quality, like that of honey. Industrial enamels and automotive paints often exemplify these qualities. Short rheology refers to a smoother, less "ropy" paint formulation, typical of what acrylics and oil paints are known to be. To create different rheologies, you can choose the appropriate gel or medium to combine with the dispersion. These are pH sensitive polymers that swell up when the paint's pH is 8.0 - 9.5 (It is critical to keep the paint in this range.)

Ammonia is used to maintain the pH in the acceptable range. Ideally, this is determined with a pH meter, and is characterized by a slight ammonia odor. You will feel the mixture get thicker as you proceed. (If you are getting chunks it may be a result of adding the Thickeners too quickly or insufficient mixing.) Blend until the mixture is smooth and of the desired thickness.

Typical Process details as an example:

List of different applications:			
Sr.	Service	PH range	Temp.DegC
1	MICA (Hcl +SnCl4 +TiOCl2 + NaOH	1.4 to 1.7	95
		1.4 to 1.7	95
		1.4 to 1.7	95
		1.4 to 1.7	95
2	MICA + FeCl3	3.5 to 4.2	95
	MICA (Hcl +SnCl4 +TiOCl2 + NaOH	1.4 to 1.7	95
		1.4 to 1.7	95
		1.4 to 1.7	95
		1.4 to 1.7	95
3	MICA + Basic Chromium Sulphate	1.4 to 1.7 and 5.8 to 6.5	95
4	MICA (Hcl +SnCl4 +TiOCl2 + NaOH	1.4 to 1.7	95
5	MICA + NH4OH	5.5 to 6.5	95
		5.5 to 6.5	95

Typical problems:

- 1) What is the concentration of these chemicals?
Customer may say it is difficult to give concentration of these chemicals.
- 2) What is the process pressure?
Process pressure: atmospheric pressure
- 3) Calibration frequency
Once in a day. Customer has observed drift of @1 PH every day i.e. why calibration is done daily.
- 4) Scaling?
Yes scaling shall be observed on electrode
- 5) CIP/SIP
No.
- 6) Typical sensor life @1 1/2 months to max. 2 months
- 7) Process temp. varies from -5 to +105 deg C, typical batch process temp. will be 95 degC (changes from manufacturer to manufacturer)

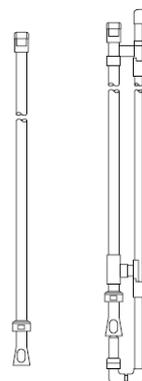
Remedies: Use sensor with most chemically resistant Ryton body.

Product Recommendation**Sensor Selection:**

pH immersion fitting like PH8HS / equivalent with PH8EFP sensor.

Features:

- With the body made of Ryton, a strong engineering plastic, which is comparable to Teflon in terms of corrosion resistance and heat resistance, it allows for a wide range of applications.
- The integrated-sensor design simplifies calibration with standard solutions and maintenance.
- The pH glass electrode of a pH sensor, the platinum or gold electrode of a ORP sensor and junction can be individually replaced.

**PH8HS****Sensor Selection:**

Option #1: 4 wire pH converter



Type: 4 wire type

Features

- Easy touchscreen operation
- Trending display up to 2 weeks
- Advanced Process Temperature Compensation

Option #2: 2 wire pH transmitter



Type: 2 wire type

Features

- Dual sensor measurement on 2-wire type analyser
- Indication of sensor wellness

Tangible benefit: More reliable and accurate analysis of pH which helps to improve end product quality and total operation cost is less.