

Waste water treatment : pH in Stabilisation-Digestion

application note



9135 transmitter



8350 probe



8380 probe

1. THE PROCESS

This is the phase where the sludges coming from processes such as primary and secondary clarification will be treated, generally just before thickening operations.

The treated sludges are generally used for :

- agriculture
- incineration
- dumping

At least for agriculture & dumping, the sludges must be low in fermentable organic matter : they must be stabilised. There are 3 ways to do that :

- aerobic stabilisation

- chemical stabilisation
- anaerobic stabilisation (digestion)

Aerobic stabilisation consists in multiplying the microorganism activity, until they oxydise themselves (doesn't work at low temperature).

The chemical stabilisation consists in killing the bacterias in just increasing the pH until 11 by lime injection : the advantage is that it is a cheap process.

Digestion is used when there is a high level of organic matters : this is made in a reactor under the following conditions :

- pH between 6,8 & 7,2
- temperature : 35°C
- retention time : 3 weeks

One advantage of digestion is the production of methane, which can be used as a source of energy for the plant.

2. Interest of pH measurement

Difficulties to be solved

➤ **Interest :**

As indicated hereover, the pH must be within a fixed range for an efficient chemical stabilisation & digestion. Some users will therefore need to control directly that parameter, but it is not mandatory.

➤ **Difficulties :**

For the chemical stabilisation, the medium is dirty and a way to clean the sensor will be appreciated.

For the digestion, the process occurs in a closed reactor and a retractable system is needed. Here also, the medium is quite dirty. The temperature has also to be measured.

3. Chemical stabilisation : pH loop : 9135 + 8350 immersion

➤ **System configuration :**

It is made of 3 parts in standard: the 9135 transmitter + the 8350 combined sensor with its 10m cable + an immersion probe equiped with a loose flange (3 lengthes are proposed). These complete loops can be ordered under the following references:

9135/P06/1 or 9135/P06/2 : 0.5 m immersion
9135/P07/1 or 9135/P07/2 : 1 m immersion
9135/P08/1 or 9135/P08/2 : 1.5 m immersion

➤ **Description of the optional cleaning device :**

Air, water or chemical cleaning available.

➤ **Advantages :**

The 8350 is a combined pH probe constituted by the following parts :

- a glass bulb installed in a recessed area in order to protect it from shocks
- a double junction reference system (KNO_3 then KCl)
- an integrated Pt100 for automatic temperature compensation by the transmitter
- a built-in low noise 10 m cable

The process liquid junction is made of a special porous Teflon and the first stage of reference system of KNO_3 : these 2 features allows excellent results against polluting ions.
For very dirty samples (coating mediums), the optional chemical cleaning kit can be installed.
There is no maintenance needs on reference part (electrolyte supply).

➤ **Digestion : pH loop : 9135 + 8380 + 8416**

* **System configuration :**

It is made of 4 parts in standard: the 9135 transmitter + the 8380 extractable probe + 8416 combined electrode + 10 m cable.

* **Advantages :**

The 8380 is a manually retractable probe allowing the electrode maintenance without interruption of the process (cleaning, calibration ...).
Its installation can be made at a tank bottom, in using a standard threaded bushing G 1 1/4".
The system can work until 6 bars and 110°C.
The 8416 combined electrode, thanks to its special solid electrolyte, is maintenance free regarding the reference system and specially protected against polluting ions.

