

# APPLICATIONS BULLETIN

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(Revised 1/20/06)

**ABIL.9**

## USING THE ROYCE SERIES 2500 INTERFACE LEVEL ANALYZER IN CLARIFIERS WHERE BUBBLES ARE PRESENT

Royce wants to call your attention to several points regarding the application of the Series 2500 Interface Level Analyzers where bubbles are present in the clarifier being measured. All ultrasonic transducers, when used under liquids, are subject to "blinding" by air bubbles. The bubbles on, or below the sensor face will absorb the ultrasound signal emanated from the sensor and it should be realized that bubbles can come from a variety of sources, such as:

- The possibility of the settled material giving off gas which rises to the surface of the tank.
- A liquid, which may not be considered "High Temperature" (i.e.: -120 degrees F.), may give off gas depending on atmospheric conditions and materials dissolved in the liquid.
- The liquid could have entrained air from pump cavitation, etc.
- Liquids that are kept at or just below their boiling point in the clarifier.

In tanks where liquid temperatures are being kept very close to boiling it is quite possible to visually see no evidence of bubbles breaking the surface because all boiling liquids go through a period of vaporization before they boil. These vapor bubbles may actually be collecting on the sensor face and combining to form an air layer between the liquid and the sensor.

Many wastewater treatment clarifiers actually have nitrification taking place in the settled sludge, this can be recognized by large individual bubbles occasionally breaking the surface of the liquid. These large bubbles will also become trapped on the face of the Series 25 sensors being used with the Royce ILA.

In all situations where air has a tendency to become trapped on the face of the sensor, it must be realized that the sensor must be occasionally moved or some method of "washing" the face of the sensor with a liquid must be utilized.

Moving the sensor is a natural occurrence in clarifiers which have scum skimmers to collect surface debris on the surface of the clarifier. Using the Royce Swingarm Bracket, the sensor is slowly raised over the skimmer as it passes under the sensor support, thus freeing entrained air from the sensor face. But in clarifiers where a scum skimmer is not used, freeing the sensor of collected bubbles is a little more involved. Many imaginative operators have found other ways to occasionally move the sensor.

Another method that is successfully employed is the use of a small liquid pump that “washes” the face of the sensor either continuously or intermittently (at least every 15 minutes). The pump can be installed on the rail above the sensor or right on the sensor itself. Some pumps run continually, while others are controlled with timers to intermittently wash the sensor face.

Entrapped air on the sensor face can always be identified by a rising Gain number located on the profile which is displayed on the face of the Models 2501A and 2511A ILAs. Also, if the analyzer displays the “Err” error code on the digital display while noting “NO INTERFACE FOUND” on the profile display, by just moving the sensor from side to side, just a few inches, may be all that is necessary to free the sensor face of bubbles. Once this problem is recognized, a method of automatically removing the bubbles should be considered.



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