

440-1300-56		Sht. 1 of 2	APP'D BY JRB
ISSUE	EDO NO.	APP'D	DATE
1	10-99-245	JRB	10-8-99
2	11-99-248		

Sludge Blanket and Clarity Loss Monitor Bid Specification

Measurement Objective

- Provide instrumentation that will consistently measure and control the level of sludge in primary and secondary clarifiers, thickeners, and other similar vessels.
- In addition to measuring and controlling the level of the sludge and measuring the rag layer level, the instrumentation shall also provide advance warning of a process upset with a clarity loss readout, (the relative change in percent solids in a selected zone above the sludge level).
- The software measurement algorithm and signal processing technique must be capable of adapting to a broad range of vessel conditions and rejecting false and interfering signals that often occur in clarifier/thickener vessels.

Physical Configuration

- The system shall be comprised of a microprocessor-based controller, transducer/transceiver assembly, connecting cable and mounting hardware.
- The system shall be capable of multiplexing up to four (4) ultrasonic transducer/transceiver assemblies. The system can be expanded in the field from one (1) to up to four (4) channels.
- Transducer shall be of a flexible cable design allowing for installation on all standard and non-standard vessels.
- The system shall be supplied with all necessary 316 SS hardware for mounting the transducer/transceiver assemblies and cabling to effect a complete installation.

Transducer/Transceiver Assembly

- The transducer/transceiver assembly shall be a separately contained remote module, which consists of a transceiver electronic chassis mounted in an explosion-proof housing and an integrally connected transducer.
- The transceiver/transducer assembly shall require no on-site adjustments, and have provisions to protect the transducer from surface skimmer action. The mounting assembly shall be all 316 SS.

Micro-processor Based Controller

- The microprocessor-based controller shall provide power and signal control to up to four (4) transducer/transceiver assemblies and shall accept conditioned analog echo signals and perform signal and control process functioning.
- The micro-processor controller shall have a 64 x 240 LCD graphical display with LED backlighting for **real time readout selectable for Sludge Blanket Level or Depth, Rag Layer Level or Depth and Clarity Loss (%)**. The display shall also display the tank profile, and give status of all setpoints, relays, and signal quality.
- The system shall have on-screen programming instructions for each parameter.
- Display shall be capable of showing 1, 2, 3 or 4 channels of data on one screen and shall have data scrolling capability.
- All parameters shall be capable of being displayed in English or metric units.
- System configuration shall be protected by a user-defined password.
- A built-in keypad shall be used for display and menu select/editing functions.

- Power requirements for the micro-processor based controller shall be 120/240 VAC, 50/60 Hz and shall be in a fiberglass housing that meets NEMA 1-4X, 5 and 12. Housing shall have locking capabilities.
- The controller shall have an on/off switch and re-settable circuit breaker.
- Compensation shall be provided to correct for changes in sound velocity due to changes in liquid temperature.
- The controller unit shall power two (2) 4-20 mA current outputs per channel (source or sink selectable) and be user assignable.
- The controller shall have two (2) individual 5 amp SPDT relays per channel and be user assignable.
- There shall be two (2) additional 5 amp SPDT relays; one for common alarm and one for system fault.
- The common alarm relay can be enabled or disabled and is tied to all alarm setpoints.
- The system fault relay shall be activated upon a system malfunction such as, signal loss, poor signal quality or transducer/transceiver failure.

Performance

- Accuracy 1% of tank depth or 1.0" (25.4 mm) whichever is greater
- Resolution 0.1 ft. (30 mm)
- Linearity 0.5% of span, or 0.1 ft. whichever is greater
- Max tank depth 30 ft (9.1 m)
- Near Zone 1ft (.3 m)
- Dead Zone 3 inches (76 mm)
- Minimum detectable density 0.1%

Temperature Ratings

- Transceiver operating temperature: -40 to 185 °F (-40 to 85°C)
- Transducer operating temperature: 20 to 160 °F (-6 to 71°C)
- Controller operating temperature: -28 to 140 °F (-20 to 60°C)

Data Logging & Communications Software

There shall be a password protected PC software program. The communication software shall be able to communicate with the microprocessor, and allow the system to be configured remotely. There shall also be a graphical display of the tank profile waveform, as well as archived traces of sludge level or depth, rag level or depth, clarity loss and signal quality. This software shall collect sludge level or depth, rag layer level or depth, clarity loss and signal quality data and save this information to a file in text or Excel format.

The system shall be Drexelbrook CCS4000 Series.