Scale Deposition Sensor

Model 58T Series
Photo-X Transmitter

Custom Sensors & Technology has produced a versatile scale deposition transmitter* and probe for monitoring the onset of scale deposition in processing plants that use large amounts of water. The system incorporates state of the art electronics and a retractable insitu fiber optic based probe that monitors the onset of scale formation. The transmitter can then send a signal to a pump that automatically controls the dosing of scale inhibitor used to chelate scale thus preventing scale formation in pipes, valves, and pumps.

Industrial Scale Problems

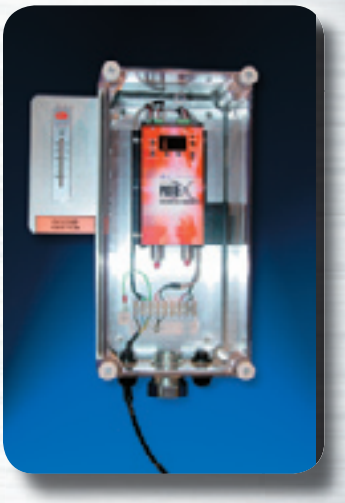
Detection of Scale formation in produced water, process boilers, cooling towers, nanofiltration and reverse osmosis membrane systems is an important measurement in combating the economic consequences of scale buildup. Crystallization of inorganic salts having inverse solubility is one of the most common reasons for Scale. High levels of calcium and other salts in water can deposit and form an insulating layer on pipes progressively narrowing the internal diameter, impeding flow and increasing plant energy expenditure. Other problems associated with scale formation are:

- Increased operating costs caused by running at higher chemical inhibitor levels to combat scale
- Cost of repair, and returning equipment to operating condition after scale cleaning/removal
- Increased energy consumption & chemical cleaning frequency
- Environmental "Green Affect" because of overfeeding chemical inhibitor
- Reduced permeability of filter membrane filters

Photo-X Scale Transmitter

Custom Sensors & Technology manufactures a low cost Photonic Transmitter that measures the signal from the Scale probe. This reading is based on the amount of optical attenuation from the fiber optic Scale probe.

As shown, the transmitter is compact and is designed to connect to the scale probe via two fiber optic cables. A local digital display is provided and the transmitter offers a 4-20mA output signal to other devices. In addition, the transmitter is supplied with a means of automatically checking the calibration. A reference filter is inserted into the measuring beam either locally or remotely to verify the transmitter is working properly.



Model 58T Scale SentryTransmitter

Economics

Scaling can increase cost in production plants dramatically if it is not monitored and controlled properly. In boilers, a scale layer of 0.1" may increase fuel costs by up to 20%. Increasing scale layers to 0.3" may increase fuel costs by up to 50%.

As the scale continues to build up on the surface it can eventually reach a point at which the heat transfer is inadequate and the boiler is shut down.

Scale Probe

The CST Scale Probe is a fiber optic based insitu probe that allows the deposition of scale to form on the probe optical surface. This scale deposition correlates to scale formation in the produced water and can be used (in conjunction with the transmitter) to control scale inhibitor into a process line.

**Co patent with Baker Hughes, U.S. Patent # 6,891,606 B2*

Custom Sensors & Technology is a manufacturer of process photometric and electrochemical based process transmitters

Typical Scale Transmitter/Probe Product Specifications

Transmitter

Measured parameter	Scale Deposition
Resolution	0.020 AU
Temperature Range	-5°C to +40°C
Response time	< 3 sec
Maximum Zero shift	0.010 AU (over 25 to +35°C)
Long term output drift	<3% signal loss/yr.
Repeatability	1% of full scale
Lamp	LED (5 year minimum life guarantee)

User Display & control

Type of display	LED display
Display numerical format	3-1/2 digits in user defined engineering units

Electrical

Power requirement	24VDC (9-32VDC) If 110/220 VAC is available CST can supply an (optional) AC/DC power supply
Power consumption	350mA @ 24VDC
Analog outputs	4-20mA isolated
Analog loop resistance	500Ohms, nominally @ 24V
Alarms	optional
Certification	Available upon request

Mechanical

Transmitter weight	1.5 lbs.
Enclosure construction	Extruded Aluminum (Nema enclosures optional) 8" x 3-7/8" x 71-1/2" (HWD")

Probe

Materials	316SS
Temperature rating	300C
Pressure rating	10,000 psig

Probe options;

1. 6, 12, or 24" in length
2. Alternate materials of construction: Titanium, Hastelloy B/C, others please contact factory.

Transmitter options;

1. Display in user defined units
2. Alarms using third party devices
3. Pakaging to meet customer area classification

Custom Sensors & Technology is a full service provider. We also supply photometric transmitters, fiber optic probes & flow cells, O_2 transmitters, sample handling systems, and services including: application engineering, commissioning & start-ups, product validation, factory acceptance testing, process stream GAP Analysis, and in-house repair.

Custom Sensors and Technology is a Division of Custom Sample Systems, Inc.
531 Axminister Drive, Fenton, MO. 63026, Phone: 636.305.0666, Fax: 636.305.1096
E-Mail: cstinfo@customsensors.com