PART 1 GENERAL

1.1 Section includes

1. Process probe for continuous monitoring and measurement of turbidity and suspended solids.

1.2 Measurement Procedures

A. The method of measuring turbidity and suspended solids will be with combined multiple beam alternating light method with IR diode system and beam focusing.

1. For turbidity a 2-channel 90° scattered light measurement in accordance with DIN/ EN 27027/ISO 7027 at a wavelength of 860 nm is performed.

2. Suspended solids measurements use additional 120° scattered light measurement with a wavelength of 860 nm.

1.3 Alternates

1. Other methods of turbidity and suspended solids measurement, such as surface scatter methods, are not acceptable.
2. 8-channel multiple angle measurements provide more precise data.

1.4 System Description

A. Performance Requirements

1. Measurement range
   1. Turbidity: 0.001 - 9999 NTU/FNU
   2. Solids: 0.001 - 500 g/L, With SiO standard solution; depending on sludge characteristics
2. Accuracy
   1. Turbidity: Up to 1000 FNU/NTU: < 5 % of measurement value or ±0.01 NTU, whichever is greater
3. Repeatability
   1. Turbidity: < 3 %
   2. TSS content: < 4 %
4. Detection limit
   1. Turbidity: 0.001 NTU/FTU
   2. Suspended solids: 0.001 g/L
5. Response time: 1 s < T90 < 300 s (adjustable)
6. Signal Averaging Time: User selectable ranging from 1 to 300 seconds
7. Units of measure:
   1. Turbidity: User Selectable NTU, FNU and EBC
   2. Suspended Solids: User Selectable g/L, mg/L, ppm, or % solids

1.5 Certifications

1. CE, TÜV GS, ETL
2. ATEX certification for Model TSS Ex1 sc: 94/9/EC, ATEX Directive, CE 0035 // IBExU 09ATEX1156, CE certified to EN 61326-1:2006-05

1.6 Environmental Requirements

A. Operational Criteria

1. Flow rate: 3 m/s (9.8 ft./s) maximum
2. Pressure range:

TSS W sc: < 6 bar (< 87 PSI)

TSS sc, TSS HT sc, TSS Ti sc, TSS Ex1 sc: < 10 bar (< 145 PSI)

TSS Vari sc, TSS XL sc: < 16 bar (232 PSI)

1. Ambient Temperature

TSS W sc: 0 to 50°C

TSS sc, TSS Ti sc: 0 to 60°C

TSS Vari sc, TSS XL sc: 0 to 80°C

TSS HT sc: 0 to 90°C

TSS Ex1 sc: -10°C to 50°C

1.7 Warranty

A. The product includes a 24 month warranty, extendable to 5 years fulfilling the requested servicing intervals.

1.8 Maintenance Service

A. Scheduled maintenance:

1. Clean measurement windows: monthly

2. Check calibration: monthly (depending on the environmental conditions)

2. Inspections: Every six months (counter)

3. Replace wiper shaft gaskets: Every year (counter)

B. Unscheduled maintenance

1. Clean instrument enclosure (depending on application)

PART 2 PRODUCTS

2.1 Manufacturer

A. Hach Company, Berlin, Germany [select one]

1. Model TSS sc Turbidity and Suspended Solids probe available for immersion, with TriClamp or Inline-installation in clear water to highly concentrated sludges.
2. Model TSS W sc Turbidity and Suspended Solids probe equipped with a wiper available for immersion, with TriClamp or Inline-installation in clear water to highly concentrated sludges.
3. Model TSS HT sc Turbidity and Suspended Solids probe available for immersion or with TriClamp in high temperature media.
4. Model TSS Vari sc and TSS XL sc Turbidity and Suspended Solids probe available for the high hygienic requirements of the food and pharma industry.
5. Model TSS Ti sc Turbidity and Suspended Solids probe available for immersion or with TriClamp in aggressive and highly salt concentrated media.
6. Model TSS Ex 1 sc Turbidity and Suspended Solids probe available for immersion, with TriClamp or Inline-installation in hazardous locations with Class 1 Div 2 requirements.

2.2 Manufactured Unit

1. The TSS sc Turbidity and Suspended Solids probes consist of a sensor contained in stainless steel or Titanium, depending on model, and equipped with sapphire glass, a PA (GF), TPV-wiper (optional) and integral cable (Teflon, PTFE).

2.3 Equipment

1. The TSS sc Turbidity and Suspended Solids probes are digital sensors designed to connect to a universal controller (the sc200 or sc1000 controller).

B. The sensor provides sample color-independent measurement.

C. The sensor is equipped with a self-cleaning device (wiper) to prevent erroneous values and maintenance problems caused by biological activity, scum build-up, and gas bubbles (depending on model)

D. The signal average time for the sensor is user-selected from 1 to 300 seconds.

E. The sensor is factory calibrated for turbidity measurement and needs no calibration prior to use. It is

imperative to calibrate for solid matter measurement.

2.4 Components

A. Standard equipment:

1. Sensor with 33 ft. (10 m) cable

2. Manual

B. Dimensions

1. Basin models, installation sensor Inline:

a. Length: 13 inches (330 mm)

b. Diameter: 1.57 inches (40 mm)

2. Installation sensor TriClamp models:

a. Length: 13 inches (332 mm)

b. Diameter: 1.57 inches high (40 mm)

3. TSS Vari sc, TSS XL sc:

a. Length: 9.13 inches (232 mm)

b. Diameter: 1.57 inches high (40 mm)

C. Weight

1. Basin models, installation sensor Inline/TriClamp models: cca. 1.6 kg

2. TSS Vari, TSS XL sc: cca. 1.5 kg

2.5 Accessories

A. Wiper blades

B. Gaskets

C. Mounting Hardware (depending on model):

1. Welding connector (Tri-clamp)

2. 6-bar safety installation fitting (ball valve) (inline)

3. Sensor adapters

4. Clip with thumb screw

5. Rim mounting (immersion)

6. Ball valve fitting (Tri-clamp)

D. Cable extension kit

E. Measuring tube

PART 3 EXECUTION

3.1 Preparation

Probe can be mounted by immersion, with TriClamp or Inline-installation (depending on Model)

3.2 Installation

A. Contractor will install the analyzer in strict accordance with the manufacturer’s instructions and recommendation.

B. Manufacturer’s representative will include a half-day of start-up service by a factory-trained technician, if requested.

1. Contractor will schedule a date and time for start-up.

2. Contractor will require the following people to be present during the start-up procedure. a. General contractor

b. Electrical contractor

c. Hach Company factory trained representative d. Owner’s personnel

e. Engineer

3.2 Manufacturer’s Service and Start-Up

* + 1. Contractor will include the manufacturer’s services to perform start-up on instrument to include basic operational training and certification of performance of the instrument.
    2. Contractor will include a manufacturer’s Service Agreement that covers all the manufacturer’s recommended preventative maintenance, regularly scheduled calibration and any necessary repairs beginning from the time of equipment startup through to end user acceptance / plant turnover and the first 12 months of end-user operation post turnover.
    3. Items A and B are to be performed by manufacturer’s factory-trained service personnel. Field service and factory repair by personnel not employed by the manufacturer is not allowed.
    4. Use of manufacturer’s service parts and reagents is required. Third-party parts and reagents are not approved for use.

END OF SECTION