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Find the *Hach Surface Scatter 6* at our website: ***Click HERE***

Surface Scatter 6 High Range Turbidimeter



Monitoring high range turbidity with greater reliability and accuracy

The Hach Surface Scatter 6 Turbidimeter

- Optical components never touch the sample – virtually maintenance-free
- Wide measurement range – measures turbidity from 0 to 9999 NTU
- Reliable, accurate measurements – patented surface scatter design reduces interference
- Easy calibration – calibration cylinder and formazin included
- Durable – manufactured with corrosion-resistant materials
- Practical – sensitive electronics in the control unit can be placed up to 6.1 meters (20 feet) away from the sample unit

HACH®

THERE'S ONLY ONE WAY TO BE SURE

Hach's unique design keeps optics high and dry – for accuracy and trouble-free operation

You can count on Hach's Surface Scatter® 6 (SS6) Turbidimeter to deliver measurements that are consistently accurate – even in fluids with high loads of suspended solids – because the light source and photocell never come in contact with the sample. Where most conventional turbidimeters foul and "go blind" in samples with high turbidity, the SS6 features an automatic-ranging digital display and is capable of reliably measuring turbidity from 0 to 9999 NTU in samples that range from clear water to corrosive paper mill and oil field samples.

Designed for Accuracy and Low Maintenance

Hach's patented* surface scatter design virtually eliminates most of the measurement and maintenance problems associated with ordinary high-solids turbidimeters. Electrically and mechanically, the SS6 Turbidimeter is built to ensure reliability and accuracy in adverse environments.

The SS6 drastically reduces interference from stray light. And because the instrument's optical surfaces never contact the sample, the SS6 can monitor even highly turbid samples with virtually no maintenance. Sample cell cleaning and replacement, for example, are unnecessary. Hach recommends standardization checks monthly and re-calibration every four months or whenever the light source is replaced or adjusted. A calibration cylinder and a 500-mL bottle of formazin primary standard solution are included for convenient calibration of the SS6.

**Patent Number 3,309,956*





The Surface Scatter® 6 Turbidimeter

The Hach Surface Scatter® 6 Turbidimeter is the most versatile choice for continuous and accurate measurement of turbidity over an extensive range of sampling conditions – covering water treatment to industrial processing. Whatever the application, the SS6 makes it easier to establish and maintain optimum process control. It is the ideal choice for reliably monitoring:

- Raw water influent/drinking water
- Waste water effluent
- Flocculation and sedimentation
- Industrial process water
- Corrosive white and green liquor in paper mills
- Produced water in oil fields containing oil and hydrogen sulfide
- Food processing waste containing starch, fat or oil

The Surface Scatter® 6 High Sample Temperature Turbidimeter

A new model – the Surface Scatter® 6 High Sample Temperature (SS6/HST) Turbidimeter – is an SS6 built tough enough to monitor samples with temperatures of up to 70 °C. It is also well suited for applications where a significant difference between the sample temperature and the ambient temperature causes condensation and fogging. Constructed with highly durable, temperature-tolerant materials and an innovative moist air removal system, no other turbidimeter provides trouble-free performance in such a wide range of applications:

- The SS6/HST monitors turbidity in fluids ranging from raw water influent to corrosive white liquor
- High temperature samples – up to 70 °C
- Wherever temperature differences cause condensation and fogging

Built to last

All wetted parts of the SS6 are fabricated with corrosion-resistant materials for extended life. Plumbing fittings, tubing, hose clamps and even screws are selected for superior durability. Special attention is given to the design and construction of the photo-detector and light-source assemblies to safeguard them from the effects of corrosive vapors.

Backed by a 2-year warranty

Consistent with its long-standing reputation for quality and customer service, Hach Company warrants the SS6 turbidimeter against defects in materials or workmanship for two years from the date of shipment.

Principle of Operation

The Surface Scatter® 6 Turbidimeter is a sensitive and precise instrument designed to measure the light scattered by particles suspended in the sample fluid. The sample is introduced into the center of an inclined turbidimeter body at a flow rate of 1 to 2 liters per minute (1/4 to 1/2 gallon per minute). As the fluid spills over the top of the turbidimeter body, a stable, flat surface of liquid forms and becomes the measuring surface.

A high-intensity beam of light, powered by a regulated voltage source, is directed to strike the surface of the liquid at an acute angle (Fig. 1). Light is scattered by particles suspended in the sample and is detected by a photocell carefully positioned directly over the point where the light enters the liquid. Thanks to this optical geometry, the light is scattered at or near the surface and very little is absorbed by the liquid. The SS6 is able to measure extremely high levels of turbidity with excellent accuracy, because the amount of light scattered increases in direct proportion to the increase in turbidity. Readings are accurate across the entire range, from 0 to 9999 NTU.

The inclined turbidimeter body also serves as a trap for settling out solids that could interfere with measurement. A drain equipped with a ball-valve allows the operator to periodically purge accumulated solids. Large-diameter plumbing and flexible tubing (3/4" for sample inlet and drain, 1" for overflow) prevent plugging when monitoring highly turbid samples. Designed for fluids having high levels of suspended solids, the sample flow rate can be increased and the instrument can be operated with the bottom drain open to continuously purge solids when necessary.

Operating controls and indicators are located on the keyboard. Twelve numeric keys and nine function keys are used to program the instrument for recorder output minimums and maximums, turbidity level alarm set points, diagnostic self tests, and programming operations. Sample turbidity is displayed continually by a four-digit LED during normal operation. Separate system warning and system alarm features provide automatic self-testing diagnostics.

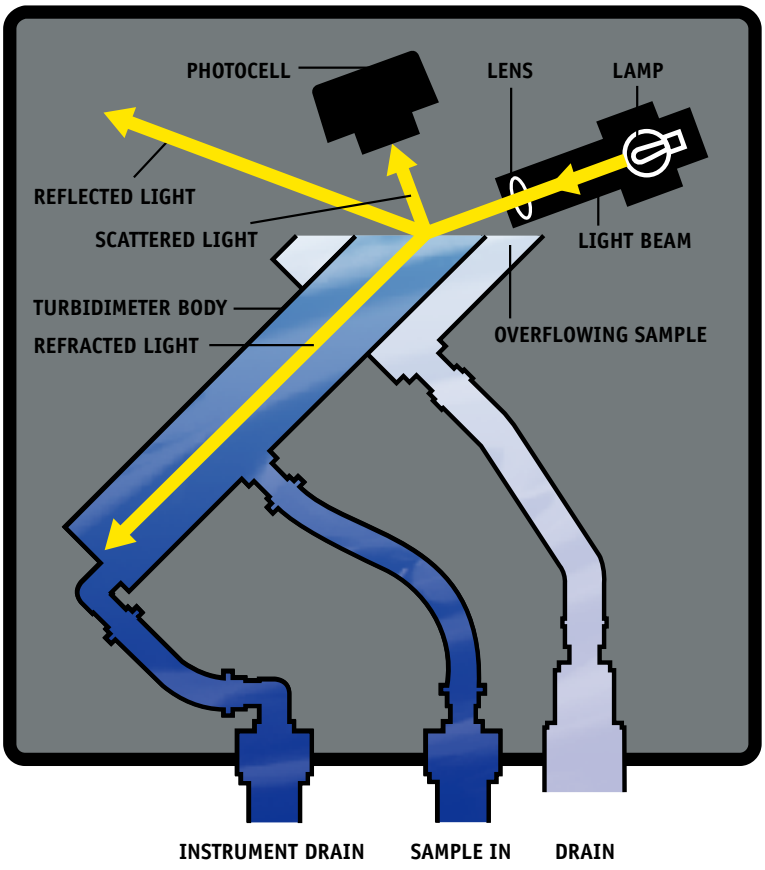


Figure 1: As the sample overflows the top of the turbidimeter body, a photocell measures the light scattered by suspended particles.

Method of analysis

Most of the light directed at the surface of the sample is reflected up into the instrument cabinet and absorbed, or refracted down into the turbidimeter body (Fig. 2). A small amount of the light is scattered by the particles suspended in the fluid. Light scattered at 90° from the incident beam is detected by the photocell assembly. The electronic signal generated by the photocell is directly related to the concentration of particles suspended in the sample.

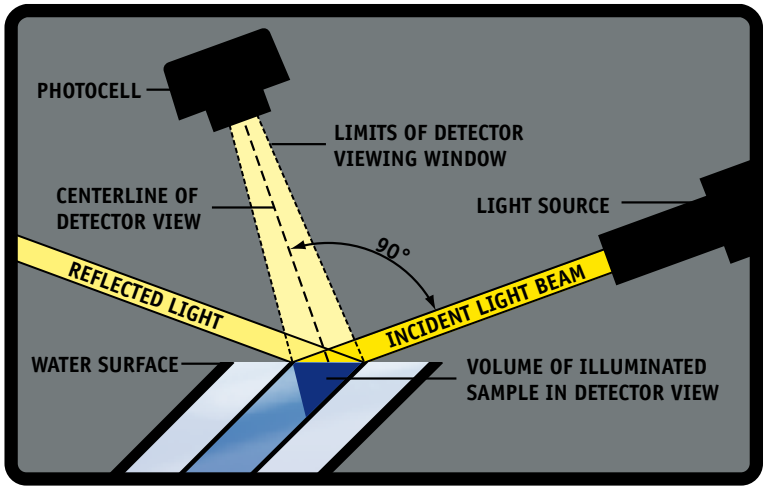


Figure 2: Scattered light is measured at exactly 90° from the incident light beam.

Surface Scatter 6 Specifications*

Range
0 to 9999 Nephelometric Turbidity Units (NTU)

Accuracy
± 5% from 0 to 2000 NTU; ± 10% from 2000 to 9999 NTU

Resolution
0.01 NTU below 100 NTU; 0.1 NTU between 100-999.9 NTU; 1.0 NTU over 1000 NTU

Repeatability
1.0% or ± 0.04 NTU, whichever is greater

Response time
Initial response in 30 seconds

Sample flow required
1.0 to 2.0 L/min (15 to 30 gal/hr)

Sample temperature range
0 to 50 °C; HST model: 0-70 °C, intermittent 70-80 °C; an optional heat exchanger is available to reduce sample temperature

Ambient temperature range
0 to 50 °C

Humidity specification
5 to 95% non-condensing

Recorder output
Selectable for 0-10 mV, 0-100 mV, 0-1 V, or 4-20 mA Output span programmable over any portion of the 0-9999 NTU range

Alarms
Two turbidity set-point alarms, instrument warning and system shutdown alarms are each equipped with an SPDT relay with unpowered contacts rated for 5A resistive load at 230 VAC; alarm 2 can be disabled and its contacts used to control flush valves

Power requirements
115/230 VAC, 50/60 Hz, switch selectable; 0.5/0.3 A

Installation category
Category II

Sample inlet fitting
3/4" NPT female

Overflow drain fitting
1" NPT female

Body drain fitting
3/4" NPT female

Air purge fitting
3/4" compression fitting; 0-50 SCFH air flow of clean, instrument air

Control unit case
NEMA-4X plastic instrument enclosure with clear polycarbonate cover suitable for indoor installation

Sample unit case
NEMA-12 plastic instrument enclosure suitable for indoor installation

Dimensions (width x height x depth)
Control unit: 13.5 x 9 x 7.5 in. (34.3 x 22.8 x 19.0 cm)
Sample unit: 25.3 x 26.6 x 7.5 in. (64.2 x 67.5 x 19.0 cm)

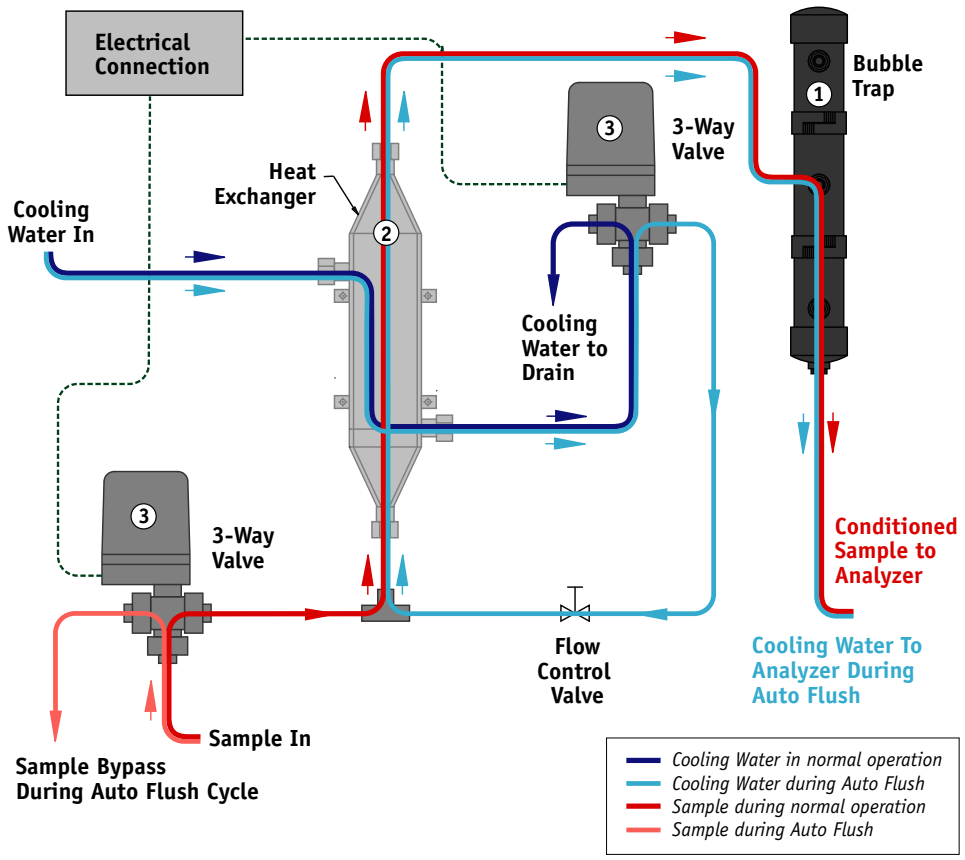
Mounting
Wall mount

Shipping Weight
SS6: 35 lbs. (15.8 kg)
SS6/HST: 40 lbs. (18 kg)

**Subject to change without notice.*

Sample Conditioning Accessories

One of many accessory configurations available for the Surface Scatter 6 Turbidimeter



Sample Conditioning Accessories

Extreme environments often require additional sample and pressure conditioning. Several optional accessories are available with the SS6 Turbidimeter.

1. Bubble Trap/Head Regulator

The bubble trap vents air bubbles from the sample and increases the instrument's response time to changes in turbidity or concentration. The head regulator dampens fluctuation in flow caused by variations in pump and sample pressure.

2. Heat Exchanger/Sample Cooler

The optional heat exchanger cools samples that exceed 50 °C (122° F) – the SS6 maximum temperature specification.

3. Auto Flush Kit

The programmable Auto Flush Kit initiates and controls automated flushing of sediment from the turbidimeter and the sample conditioning panel. It removes sediment that can be flushed out with clean water flowing at a rate equal to the sample flow rate. Sticky materials that cling to the wall of the sample cell will not be removed by the Auto Flush Kit.

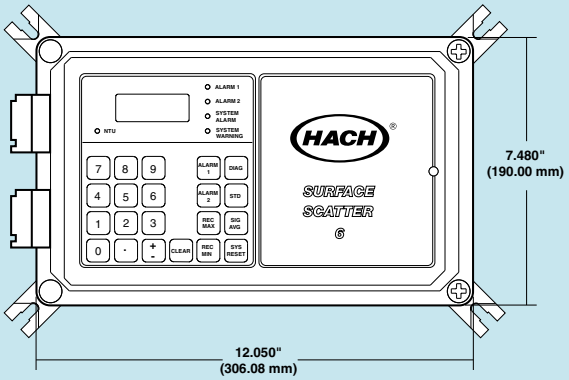
Outputs

Serial Interface Kit

The user-installed serial interface board equips the SS6 to output data directly to an external printer or computer and to receive control commands from the computer.

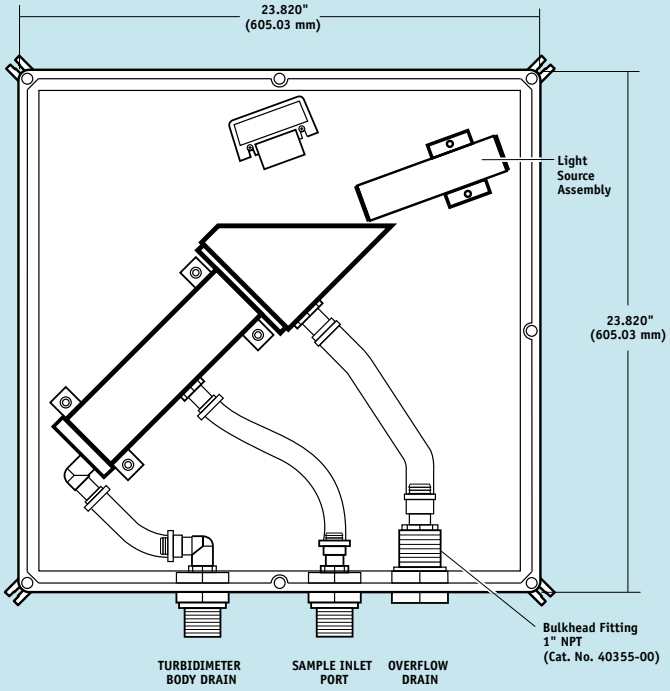
Installation and maintenance

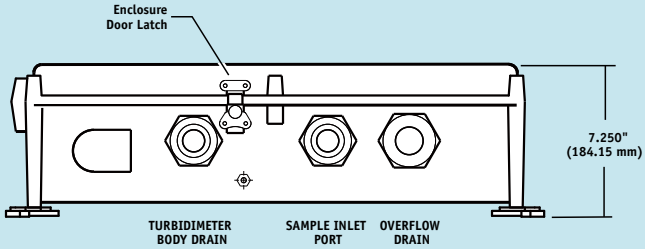
The SS6 Turbidimeter should be located as close to the sampling point as possible. The control unit and sample unit can be bench- or wall-mounted indoors and away from direct sunlight. Best performance will result if the ambient temperature does not change rapidly. Equipped with an 11-conductor control cable, the sample unit can be located up to 20 feet away from the control unit.



The control unit case houses the keyboard, microprocessor board and power supply components. The case meets NEMA 4X water-tight requirements and is constructed of corrosion-proof materials. Keyboard and display indicators are fully visible through a clear plastic front cover.

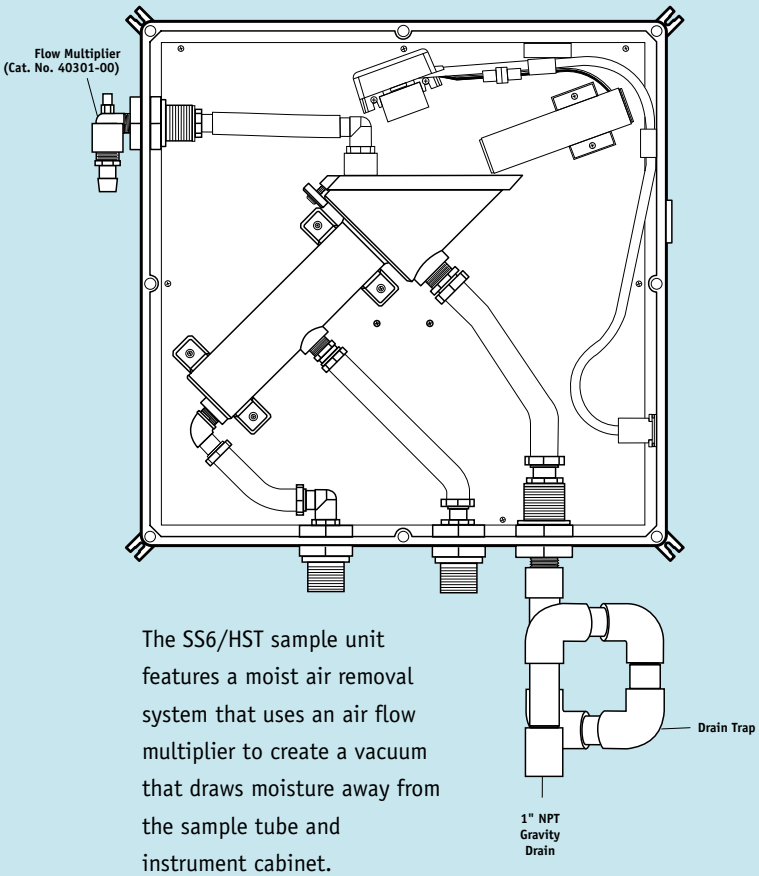
SS6 Turbidimeter





BOTTOM VIEW

SS6/HST Turbidimeter



The SS6/HST sample unit features a moist air removal system that uses an air flow multiplier to create a vacuum that draws moisture away from the sample tube and instrument cabinet.

How to Order

Call Hach today to order the Surface Scatter 6 High Range Turbidimeter that fits your application.

Catalog #	Surface Scatter 6 Turbidimeter
45000-10	Surface Scatter 6 Turbidimeter with calibration cup and 4000 NTU standard solution, installation accessories and instruction manual. (Note: Power cords must be ordered separately for both models)
45000-40	Surface Scatter 6/HST Turbidimeter for high temperature samples

Optional Accessories

Catalog #	Surface Scatter 6 Turbidimeter
45000-43	Upgrade Kit, converts standard Surface Scatter 6 to Surface Scatter 6 HST
44278-00	Serial Interface Kit
46692-12	Auto Flush Kit (120 VAC)
46692-22	Auto Flush Kit (220 VAC)
46680-00	Bubble Trap/Head Regulator
48551-00	Heat Exchanger (sample cooler)
40284-00	Flow Meter 100-1600 mL/minute
23513-00	Standardization Plates
46691-00	Tubing Replacement Kit
45000-19	Manual SS6 and SS6/HST
46306-00	Power Cord, 125 VAC, 10 A, 6' (1.83 m)
46308-00	Power Cord, 250 VAC, 10 A, 6' (1.83 m)

Sample Specification: Surface Scatter 6 Turbidimeter

The turbidimeter shall be a continuous-reading, on-line instrument using the nephelometric method of measurement. The turbidimeter shall consist of two main components: a sample unit and a control unit. It shall utilize a single silicon photodiode to detect 90 degree scattered light.

- Digital display with automatic decimal point placement reading from 0-9999 NTU
- Accuracy shall be better than ± 5% from 0-2000 NTU and 10% from 2000-9999 NTU
- Resolution shall be 0.01 NTU
- Calibration based on formazin
- Warranty against defects in materials and workmanship for two years from date of shipment
- Optics never touch the sample

Sampling Unit:

- All optical and hydraulic components shall be housed in the sample unit
- Light source shall be directed to the surface of the water source, eliminating the use of a glass window or flow cell.
- Shall be constructed of corrosion-resistant structural plastic
- Powered from the control unit, and requires no separate power source
- Housed in a NEMA-12 industrial plastic enclosures suitable for indoor installation

Control Unit:

- Linear output signal which can be programmed to span all, or any portion of the 0-9999 NTU range
- Digital LED Display with four digits and automatic decimal point placement
- 4-20 mA output and selectable outputs of 0-10 mV, 0-100 mV and 0-1 VDC
- Two turbidity alarm set points adjustable over the entire range of the instrument with a SPDT relay with unpowered contacts rated for 6 A
- A bubble rejection circuit shall be provided to eliminate spikes in measurement due to transient sample conditions.
- Housed in a NEMA-4X industrial plastic enclosure suitable for indoor installation

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