

# Turbidity/Transparency

## Purpose

This test measures the cloudiness or light-scattering effect of suspended materials in the water. Soil particles including clay and silt, algae, and microorganisms will affect the turbidity reading. Turbid water affects site feeding fish and may cause sedimentation downstream. It can also be a sign of more serious problems such as soil erosion or excessive algae growth. There will almost always be more turbidity in water after a rainfall and in field runoff than in base stream flow and pond readings. Transparency is another word that describes this test, and is the opposite of turbidity – how clear the water is, rather than how cloudy it is.

Turbidity measurements are closely related to another measurement used in laboratories, called “total suspended solids.” In this case, the water is simply filtered and the suspended material is weighed. KDHE guidelines state that “suspended solids added to surface waters by artificial sources shall not interfere with the behavior, reproduction, physical habitat, or other factors related to the survival and propagation of aquatic or semi-aquatic life or terrestrial wildlife.”

## Tools

In lakes, oceans, and deep rivers, a standard way to measure turbidity is by using a Secchi disk. This disk is painted with alternating black and white quarters and is lowered by rope until it is not visible. This depth is recorded and is a measure of the relative clarity of the water. Because many of the sampling locations are not deep enough to take a standard Secchi disk reading, we use a modified method. In this case a clear Plexiglass tube and a Secchi disk icon are used. These are available from several commercial sources, or a modified version can be created at home. Ordering information is included at the end of this fact sheet.

## Procedure

This test should be conducted in the field at your sampling site, because of the volume of water required. The other tests require less than a cup, so performing this test in the field eliminates the need to haul so much water back to the place you will perform the tests. In the field, stand in the shade or hold the tube in front of you with your back to the sun to avoid having sunlight creating reflections while you are taking a reading.

## Directions

1. Close the drain tube by squeezing the white plastic crimp. (*Figure 3.1*)
  2. Fill the Plexiglass tube with the water sample.
  3. While looking down through the opening of the tube, partially open the drain crimp and slowly drain off the sample. Control the flow by squeezing the crimp.
  4. When the black-and-white Secchi pattern at the base of the tube faintly begins to appear, immediately tighten the crimp and record the water level remaining via the centimeter scale on the side of the tube. You may refill the tube and repeat this step if you aren't sure when the icon appears, or if you miss it the first try, or to increase accuracy. (*Figure 3.2*)
- Note:* This is difficult at first, and you might want to work with a partner and compare readings. Work in an area with bright, but not glaring, light.
5. If the icon is visible when the tube is full (e.g. 60 cm), record the value on your data sheet at 60+ cm.



**W-3**  
**Turbidity/  
Transparency**



**W-3  
Turbidity/  
Transparency**

**Interpretation**

The interpretation of your turbidity reading is that the greater the water depth, the less turbidity. In general, water that clearer, or less turbid, is of higher quality. But the other tests you will run will determine if there are dissolved nutrients or other factors not related to turbidity. Turbid water is not good for aquatic life because it blocks sunlight and causes water to warm, and soil or other particles may have phosphorus attached to them. If your tube has 60 or more centimeters of water and you can see through it, it is not carrying much suspended silt or algae and is pretty clear.

Referring to the table below, record the centimeter measurement from the tube onto your data sheet and enter it on your scorecard. Now sample your stream from where it enters your farm to where it leaves and the points in between. Note if the turbidity goes up or down as it flows through your farm and if it rises at certain points where field runoff may be a contributing factor. This could indicate soil erosion and runoff or increased algae in the water due to nutrient runoff. Record the measurement on your data sheet and the score from the table below on your scorecard.

**Where to order the tube**

We use a model manufactured by Lawrence Enterprises Inc., P.O. Box 344, Seal Harbor, ME 004675. Telephone, 207-276-5746, fax 207-276-4058, [www.watermonitoringequip.com](http://www.watermonitoringequip.com). Approximate cost is \$34 per tube, with possible discounts for quantity purchase. This or similar tubes may be available from several suppliers including Ben Meadows and Forestry Supply. Longer tubes are available. We suggest the 60-inch tube because it is long enough to be accurate, and short enough to be easy to use.



Figure 3-1. Read the transparency tube while looking at the Secchi disk icon at the bottom.



Figure 3-2. When the Secchi disk icon becomes visible, stop the flow of water and take the reading from the side of the tube in centimeters.

*Brand names appearing in this publication are for product identification purposes only. No endorsement is intended, nor is criticism implied of similar products not mentioned.*

<b>Turbidity Rating</b>			
4 – Best	3 – Good	2 – Fair	1 – Poor
Turbidity reading is 60 cm or higher.	Turbidity reading is 30 to 60 cm.	Turbidity reading is 10 to 30 cm.	Turbidity reading is less than 10 cm.

Contents of this publication may be freely reproduced for educational purposes. All other rights reserved. In each case, credit Rhonda Janke, Rebecca Moscou, and Morgan Powell, *Citizen Science Water Quality Testing Series, PK-13 W-3 Turbidity/Transparency*, Kansas State University, June 2006.