

INSTALLATION OF 6189 COPPER ANTI-FOULING TAPE FOR YSI WATER QUALITY PROBES

INTRODUCTION

Protecting Your Data and Reducing Your Costs: YSI has improved upon its industry leading long-term monitoring systems with the development of the Anti-Fouling (AF) Kits for 6-Series Sondes. Use of the AF Kits will extend maintenance intervals by 3X or more in most environments through the use of copper-based alloys. Copper has been used as an anti-fouling agent in the marine industry for years but the use in and around *in situ* sensors has developed more recently. YSI has chosen several different copper alloys for various parts of the sonde to achieve a complete anti-fouling system that can be installed quickly and significantly reduce the maintenance and travel time to maintain a long-term monitoring program while improving data quality.

Copper tape is a component in the AF Kit that is used to protect probe bodies, ends of the sonde housing, and to cover other exposed areas, such as the foam edges on the top of the wipers. The copper tape will corrode in water and must be replaced on regular intervals. The rate of corrosion will depend on the environment, with increasing salinity and temperature accelerating the corrosion process. For challenging, warm, marine environments the copper tape should withstand deployments of 60 days or more.

This guide provides instruction on copper tape installation for YSI water quality probes used in long-term monitoring applications.

PREPARING THE SENSORS

! Before You Begin Remove All Sensors & Port Plugs from the Sonde!

CONDUCTIVITY/TEMPERATURE PROBE P/N 006560

The conductivity sensor on the 6560 Conductivity/Temperature Probe can be affected by biological fouling. When growth is allowed to form in the conductivity cells, a decrease in the instrument's conductivity and salinity reading can be expected. Since salinity data are used by the both the depth and oxygen sensors, fouling drift can have a significant impact on your data.

To maximize the protection to the conductivity sensor in marine and estuarine environments, it is recommended that you paint the inside of both conductivity cells and the probe's side vent with two thin coats of copper-based (ablative) anti-fouling paint prior to applying the copper tape. *(Please contact YSI Integrated Systems and Service for detailed instructions for applying anti-fouling paint to YSI probes at systems@ysi.com, 800-363-3269 in US, +1-508-748-0366.)*

STEP 1: Cut a 2-inch length of copper tape from the supplied roll. The probe must be clean and dry before you start the next step. **TIP:** If you are going to use anti-fouling paint it is recommended that you apply the paint prior to taping the probe.



FIGURE 1: Step 1

STEP 2: Ensure that the probe is clean and dry. Remove backing from tape and starting 180 degrees opposite of the side vent hole apply the tape as shown. Press tape firmly against the probe and avoid leaving air bubbles.



FIGURE 2: Step 2

STEP 3: Remove tape from vent hole with a #11 hobby knife blade.



FIGURE 3: Step 3

STEP 4: A taped probe is shown in Figure 4 with painted cells. In marine applications painting will be needed every 6 to 12 months, and tape replacement may be needed every 2 to 3 months during the peak fouling season. TIP: It is easier to remove the tape when it is still wet from the water and still intact, and not totally dissolved.



FIGURE 4: Step 4

pH and pH/ORP PROBES (all models)

All YSI pH sensors can be protected by applying copper tape to the sensor body. On probes that are wiped the tape must be kept a safe distance from the pH junction. This is the small 1/16 inch wide white-colored ribbon that can be seen between the probe's white endcap plug and the gray plastic probe body. The two examples below show typical applications. The probe must be clean and dry before applying the tape; cut tape to a length of 2 inches. On sensors with protective guards the tape must be removed from the 4 openings for proper operation. **WARNING:** Do NOT store the pH probe long term in pH buffer or in 2-molar storage solution with the probe taped. Remove all copper tape prior to any long-term storage.



FIGURE 5: Taping pH probe with guard



FIGURE 6: Taped hemisphere pH sensor

OPTICAL PROBES (all models)

All optical sensors are extremely sensitive to biological fouling on the measurement optics. All YSI optical sensors manufactured from December 2007 to present have been equipped with a number of features to improve their longevity and resistance to fouling. One important change is the addition of a magnetic switch to ensure that wiper parking on turbidity, chlorophyll and Rhodamine probes is not affected by growth on the wiper; this feature has always been present in the ROX optical dissolved oxygen and both blue-green algae sensors.

The following instructions show how to cover the probe body with copper tape for maximum anti-fouling protection and how to install the new copper-alloy wipers to eliminate growth on the wiper itself. Growth on the wiper body often results in data spikes and offsets. If you own a YSI turbidity or chlorophyll sensor manufactured before December 2007 the copper tape wrap to the probe body and the copper wipers can still be utilized. Remove the wiper and thoroughly clean the probe body and optical face first.

STEP 1: Cut two lengths of copper tape each four (4) inches long.



FIGURE 7: Step 1

STEP 2: Test the fit. Remove backing from tape and wrap around the top half of the probe body. Remember to first write down the probe type and the lot number! (This will be written on the tape when completed.) TIP: Allow the tape to cover the gray optical endcap. If the tape goes over or beyond, trim with a #11 hobby knife.



FIGURE 8: Step 2

STEP 3: Apply the second piece of tape starting at the bottom and allowing overlap to occur in the middle. Using a black indelible ink marker write down the type and lot number on the tape. Example: *YSI 6136 Turbidity Probe Lot # 08A1204*



FIGURE 9: Step 3

STEP 4: Figure 10 shows the new copper-alloy wiper installed on a turbidity sensor. The new wiper in this kit reaches out to the extreme edge of the probe face and, with the copper tape covering the gray endcap, no place has been left for fouling to get a foothold. Note that the wiper also has the foam pad trimmed flush and covered with copper tape. In addition the exposed titanium wiper shaft has also been covered with copper tape. In severe fouling environments even these small exposed areas can attract organisms that will create spikes and offsets in your data. This extra protection can mean the difference between perfect data or not. Note: The three flat backsides of this wiper were colored black with an indelible marker. This step is not required unless you work in zero NTU fresh water.



FIGURE 10: Step 4

For optimal anti-fouling protection it is important to use all of the AF Kit components simultaneously. Additional AF components include the AF Sonde Guard (Figure 11), AF Optical Probe Wipers and AF Wiper/Brush Assemblies for the 6600EDS or 6600V2-4 sondes, and AF Port Plugs for unused probe ports. Deploying a sonde with a partial AF kit will leave critical areas on the sonde unprotected and biofouling organisms may settle and grow quickly in these areas, jeopardizing data quality and shortening the deployment time.

YSI strongly encourages utilizing all AF components (see Figure 12) to offer the optimal protection from biofouling --- resulting in significantly longer deployment intervals, less maintenance time, and improved data quality.



FIGURE 11: AF Sonde Guard



FIGURE 12: A completely prepared 6600 V2-4 sonde ready for deployment. The patina coating on the sensor guard is from previous use while the sensor guard bottom plate is brand new. Copper tape was also applied near the depth sensor and the top endcap. The sonde body was wrapped in plastic wrap and held in place with black electrical tape. This has been a very effective way to keep the sonde clean and reduce servicing time.

CLEANING AND MAINTENANCE

On occasion it will be necessary to give the sonde and the copper-alloy parts a thorough cleaning. Soaking the sonde in white vinegar for one hour will remove excess oxidation and any hard growth that attached on unprotected areas. A simple soaking tube for a vinegar bath can be made from 4" internal diameter pvc pipe and pipe caps. Soaking the sonde for more than one hour is not recommended.

