Instrument Construction: Surface Ozone

Instructions for Making an Ozone Measurement Station and Wind Direction Instrument

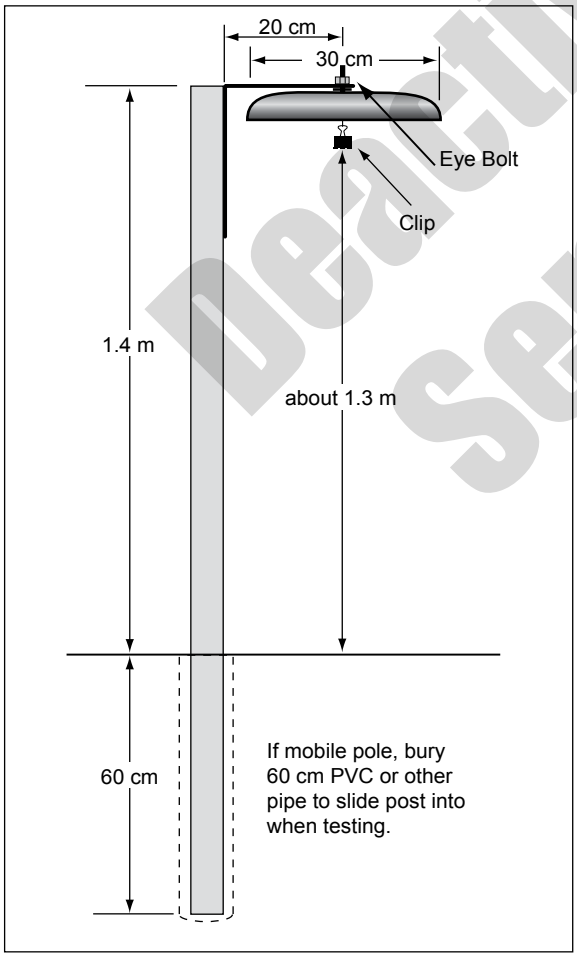
Constructing the Ozone Measurement Station

Materials

The materials needed to construct the Ozone Measurement Station can be purchased at a local hardware store.

- 1 Plastic Disk for a roof guard – 30 cm diameter (e.g., frisbee, plastic bucket lid)
- 1 Corner Bracket – 20 cm (8”)
- 1 Eye Bolt – 1 cm x 5 cm (3/8” x 2”)
- 2 Rubber Washers – 1 cm (3/8”)
- 1 4 Links of 1 cm (3/8”) stainless steel chain
- 1 Binder Clip – 3 cm (1 1/4”)

Figure AT-ICO-1



- 1 Can light colored rust-protective enamel paint
- 1 2 m (6’8”) sturdy pole or treated wooden post

Directions for Construction

1. Spray-paint all metal pieces with light-colored, rust-resistant paint.
2. Place one washer on the eye bolt.
3. Place the 30-cm plastic disk on top of the eye bolt with the convex side facing up (so rain water will run off).
4. Place the eye bolt through the drilled hole of the bracket. Put on the second washer and secure it with a nut.
5. Attach the other side of the bracket to a 2 meter post or pole and place 60 cm securely into the ground or attach it to a mobile pole that fits into a 60 cm-long section of PVC or other pipe buried in the ground. See Figure AT-ICO-1.

Making the Chain Clip

1. Use needle nose pliers to open one link on the end of the chain to slide over the eye bolt and use the pliers to close the open link.
2. Open the link on the opposite end of the chain and attach it to one handle of the
   3 cm (1 1/4”) binder clip. Close the link securely.
3. When you are ready to expose the ozone strip, place it in the binder clip.

The ozone measurement station is designed to provide some protection from rain and snow for the ozone test strip. The chain with the chemical strip should be long enough that the ozone test strip hangs in the open air below the plastic disk and short enough that the wind cannot make the strip swing out from under the plastic disk which is serving as a roof.

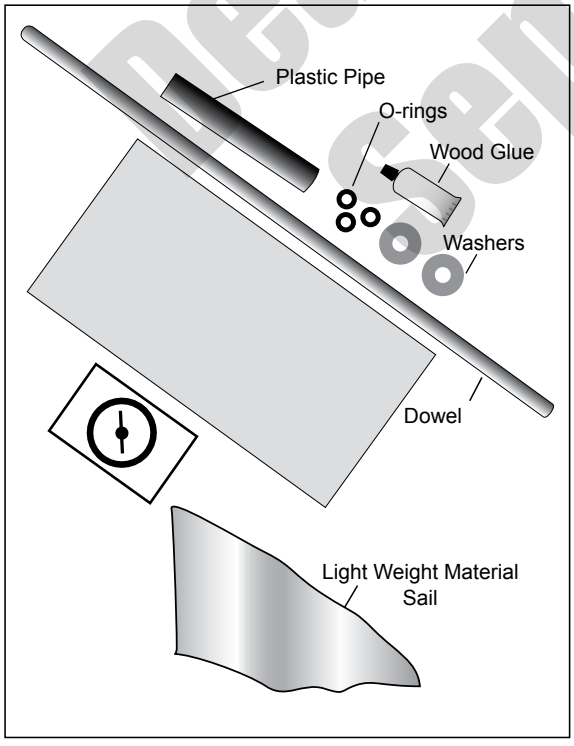
Constructing a Wind Direction Instrument

Materials

(see Figure AT-ICO-2)

- 1 Scrap piece of pine – approximately 5 cm x 15 cm x 60 cm for base
- 1 Dowel
- 3 O-rings – to fit snugly on dowel
- 2 Wide flat washers – with the inner diameter of the dowel
- 1 15 cm piece of plastic pipe
- 1 Package of letters and numbers or paint
- 1 Compass
- 1 Scrap piece of very light weight material (nylon, plastic, etc.) to cut right triangle wind sail (roughly 15 cm x 25 cm)
- 2 Pieces of waxed dental floss or nylon thread to tie sail
- 1 Drill with spade bit – for drilling hole for dowel
- 1 15 cm piece of self-adhesive velcro
- 1 Container of wood glue

Figure AT-ICO-2



Directions for Construction

(see Figure AT-ICO-3)

1. Draw lines through the center of the wood (one going end to end and one going from side to side) and place letters on the grid N, S, E and W.
2. Drill hole the same diameter as your dowel, almost all the way through the center of block of wood.
3. Cut dowel to 60 cm in length and lightly sand both ends.
4. Glue one end of the dowel in the hole.
5. Roll one O-ring down approximately 25 cm from the top of the dowel.
6. Place steel flat washer on top of the O-ring.
7. Place 15 cm long piece of plastic pipe on top of the flat washer.
8. Place a second O-ring 0.5 cm above the pipe.
9. Place a washer on top of the O-ring and the third O-ring on top of the washer.
10. Cut out right angle sail and attach it to the pipe with nylon thread or waxed dental floss.
11. Attach Velcro to wood and back of compass and line N on the compass up with N on the line of the wooden block. (N on the wood should be true North and not magnetic North, so be sure to adjust for your magnetic declination.) If you are not familiar with the difference between North and magnetic north, see the *GPS Investigation* for help.

Figure AT-ICO-3