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Water quality - Determination of water temperature - Thermometer or reversing thermometer method

水质 水温的测定 温度计或颠倒温度计测定法

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1 Subject content and scope of application

1.1 Subject content

This Standard specifies methods for the determination of water temperature with a water thermometer, a deep-water thermometer or a reversing thermometer.

1.2 Scope of application

This Standard applies to the determination of well water, river water, lake and reservoir water, and sea water temperature.

2 Principle

At the water sampling site, use a special mercury thermometer to directly measure and read the water temperature.

3 Instruments

3.1 Water thermometer: suitable for the determination of water surface temperature. See Figure 1.

Install the mercury thermometer in a special metal casing. The casing is provided with a window for thermometer reading; the upper end of the casing has a lifting ring for tying the rope; the lower end of the casing is tightly screwed with a water-holding metal cylinder with holes; the bulb of the water thermometer shall be located in the center of the metal cylinder.

The measuring range is -6 ~ +40 °C; the division value is 0.2 °C.

3.2 Deep-water thermometer: suitable for the determination of water temperature within 40 m of water depth. See Figure 2.

Its structure is similar to that of a water thermometer. The water cylinder is larger, and there are upper and lower valves, which can be automatically opened and closed when it is put into the water and lifted, so that the cylinder is filled with water samples of the measured temperature.

4 Determination steps

The water temperature shall be determined at the sampling site.

4.1 Determination of surface water temperature

Put the water thermometer into the water to the to-be-measured depth. After 5 min of temperature sensing, lift it quickly and read it immediately. It shall not exceed 20 s from the time when the water thermometer leaves the water surface to the completion of the reading. After the reading is completed, pour out the water in the cylinder.

4.2 Determination of water temperature within 40 m of water depth

Put the deep-water thermometer into the water; perform the determination in the same step as the determination of surface water temperature (4.1).

4.3 Determination of water temperature above 40 m of water depth

Put the reversing hydrophore that is equipped with closed-end reversing thermometer into the water to the to-be-measured depth. After sensing the temperature for 10 minutes, use the "hammer" to hit the "impact switch" of the hydrophore, to make the hydrophore complete the reversion action.

When sensing the temperature, the bulb of the thermometer is downward; the height of the mercury column above the breakpoint depends on the site temperature. When the thermometer is reversed, the mercury breaks at the breakpoint and is divided into upper and lower parts. At this time, the mercury column at the acceptance bulb end shows the degree, which is the measured temperature.

Lift the hydrophore, and immediately read the temperature on the main thermometer.

According to the readings of the main and auxiliary thermometers, check the instrument difference table of the main and auxiliary thermometers, which is made by linear interpolation of the verification value in the thermometer verification certificate, to obtain the corresponding correction values.

The calculation formula for the reducing correction value K of the reversing thermometer is:

$$K=\frac{(T-t)(T+V_0)}{n}\left(1+\frac{T+V_0}{n}\right)$$

Where:

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