



**National Weather Service  
Observing Handbook No. 1**

**Marine Surface Weather Observations**

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3.14 Sea Surface Group Indicator, Sea Surface Temperature, and Sign.

222D<sub>s</sub>V<sub>s</sub> 0s<sub>n</sub>T<sub>w</sub>T<sub>w</sub>T<sub>w</sub> 2P<sub>w</sub>P<sub>w</sub>H<sub>w</sub>H<sub>w</sub> 3d<sub>w1</sub>d<sub>w1</sub>d<sub>w2</sub>d<sub>w2</sub> 4P<sub>w1</sub>P<sub>w1</sub>H<sub>w1</sub>H<sub>w1</sub>  
 5P<sub>w2</sub>P<sub>w2</sub>H<sub>w2</sub>H<sub>w2</sub> 6I<sub>s</sub>E<sub>s</sub>E<sub>s</sub>R<sub>s</sub> ICE c<sub>i</sub>S<sub>i</sub>b<sub>i</sub>D<sub>i</sub>Z<sub>i</sub>

Definition

0s<sub>n</sub>T<sub>w</sub>T<sub>w</sub>T<sub>w</sub>

- 0 indicator for sea-surface water temperature group.
- s<sub>n</sub> Sign of sea-surface temperature (Coded, see below).
- T<sub>w</sub>T<sub>w</sub>T<sub>w</sub> Sea-surface water temperature in Celsius degrees and tenths.

Explanation

- s<sub>n</sub> Sign of temperature; enter 0 for zero or positive temperature; enter 1 for negative temperature.

This group shall always be included in ship reports when data are available. However, when the depth of intake manifold is more than 10 meters below the surface, the group 0s<sub>n</sub>T<sub>w</sub>T<sub>w</sub>T<sub>w</sub> is to be omitted from the coded radio weather message. In this case, the information is useful for other purposes -- record the depth of the measurement and enter on the record form. If the thermometer cannot be read to an accuracy of one-tenth degree, report T<sub>w</sub>T<sub>w</sub>/.

The most accurate method for measuring the sea-surface temperature is by means of a special sea-temperature dip (bucket) or a trailing thermistor lowered into the water over the side of the ship. The next most favorable method for obtaining the sea-surface temperature is by use of through-the-hull sensors, if they are properly calibrated. A hand-held infrared sensor is presently being tested.

If none of the above methods is practicable, the temperature of the sea water at the intake (induction) manifold may be useful if the thermometer is calibrated and the inlet for the water intake is not

below 10 meters. Large deep draft ships will provide valuable water temperature measurements for record, but the measurement could hardly be called "sea surface" if the depth was greater than 10 meters.

The box on the record form indicating "bucket" is to be checked if the sea-surface temperature is obtained by the "bucket" method, trailing thermistor, or from through-the-hull sensors. Check the box indicating "intake" if the intake/induction temperature is entered. Additionally, the depth of the intake manifold, to the nearest meter, is to be entered in the space provided. This will vary depending upon whether the ship is loaded or empty.

Sea-surface temperature is valuable information to ships at sea in determining the potential for fog and ice formation, for the weather forecaster, and for the fisherman. Sea-surface temperature, by definition, is the "skin" temperature of the ocean. It is only at this air-water interface that water evaporates. It is this skin temperature that affects fog formation, tropical storm development, freezing spray, and is the temperature that will be measured by satellite sensors. The temperature of the upper water layers varies on a daily or diurnal basis as shown in Figure 3.11.

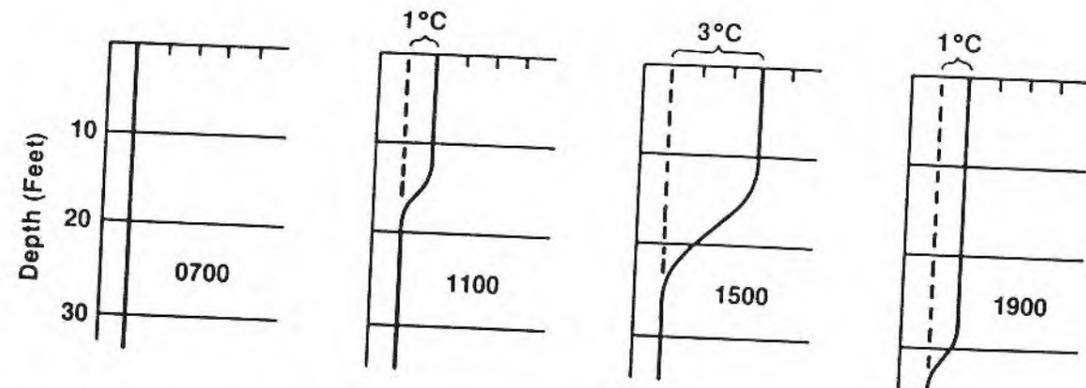


Figure 3.11 Typical Diurnal Warming Effects on Surface Layer Water Temperature.

Induction injection water temperatures, although they cost nothing, are not very accurate even if they could measure water temperature close to the surface rather than up to 30 meters (90 feet) in depth. Many studies are available that show a variation of up to ±4°C depending upon the status of the boilers and the cooling systems of the ship in addition to the effects of the depth of the intake.

3.15 Wind Waves Period, Height, and Indicator.