The QUESTemp 48N heat stress meter has replaced the RSS-220 as the authorized Heat Stress Monitor for afloat units. The NSN 6685-01-584-0785 has been assigned to the QUESTemp 48N and the PMS is available under MIP 4361. Please review the safety advisory regarding WBGT monitor on the Naval Safety Center's Webpage (http://safetycenter.navy.mil/) for further information.

The Navy and Marine Corps Public Health Center has developed supplemental and simplified operating instructions using the Heat Stress Monitor User's Manual. This can also be used to assist with training personnel that are required to complete the NAVEDTRA 43704 318 Heat Stress Monitor Watch Station Qualification.

The QUESTemp 48N performs traditional heat stress monitoring without maintaining a wet bulb. Mathematical models were developed to create a Waterless Wet Bulb calculation through a combination of dry bulb temperature, globe temperature, relative humidity, and air flow. Empirical measures validated the accuracy of these calculations.

The QUESTemp 48N automatically calculates stay times in order to manage work/rest regimens. Guidance is based on the screening criteria for heat stress as defined in the ACGIH TLV Handbook, U.S. Navy PHEL charts, and Flag Conditions for U.S. Navy/Marine Corps Ashore.

Sensors

Globe Thermometer

The globe thermometer (left position) gives an indication of the radiant heat exposure on an individual due to either direct sunlight or hot objects in the environment. This is accomplished by placing a temperature sensor inside a blackened copper sphere and measuring the temperature rise. The WBGT index is based on the response of a 6 inch diameter globe. The QUESTemp

uses a 2 inch diameter globe for a faster response time. The temperature of the 2 inch globe is correlated to match that of a 6 inch globe.

Waterless Wetbulb & Relative Humidity Sensor

The relative humidity sensor (middle position) is used to calculate the Waterless Wetbulb from a combination of dry bulb temperature, humidity and wind speed measurements. The Waterless Wetbulb is used to calculate an estimated WBGT value.

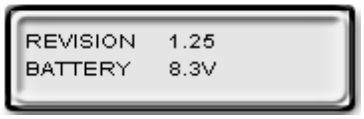
Dry Bulb Thermometer

The dry bulb thermometer (right position) measures the ambient air temperature. This measurement is used in the outdoor WBGT calculation when a high solar radiant heat load may be present. The series of white plates surrounding the sensor shield it from radiant heat.

A B C

A. Globe thermometer
B. Relative humidity sensor
C. Dry bulb thermometer

Operating the QUESTemp 48N



1. Hold the QUESTemp 48N chest high, 18 inches away from the body. Airflow should enter the left side of the unit.

2. Turn the unit **On**. Press the **I/O Enter** key to **turn on**. If the battery voltage displayed during the power-on sequence is less than or equal to 6.4 volts, replace or recharge the batteries.

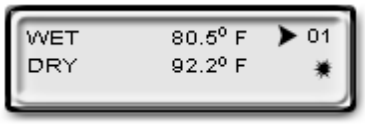
Start up Screen Indicates Revision and Battery Power

3. Sensors require 5 minutes to stabilize to a new environment.

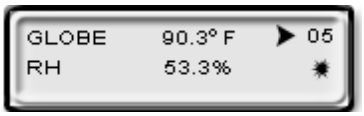
4. Press the **I/O Enter** key and the measurement screen will appear.

5. Press the **Run/Stop** key to begin datalogging. Use the **Arrow keys** to set the display to the desired items. When taking a measurement, the order in which the temperatures and WBGT index are taken are DB, WB, GT, and WBGT. Wait five minutes after turning the monitor on until taking the initial reading. Allow the temperature to stabilize before taking the subsequent readings. Following temperature readings, position the function switch to the PHEL curve (P position) from Appendix B2-A which corresponds to the routine limit, the non-routine limit, the heavy work limit, and the drills limit. The exposure limits should be checked against Table B2-B-2.

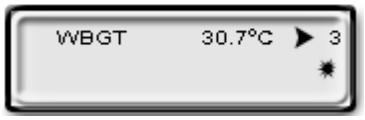
6. Toggle through the views pressing the **Up or Down Arrow**. The following measurements can be accessed on the display:



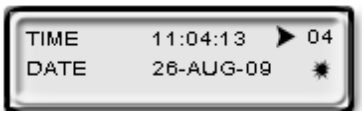
Wet and Dry Bulb



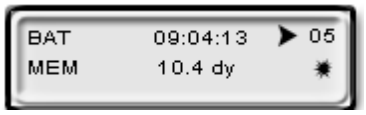
Globe and Relative Humidity



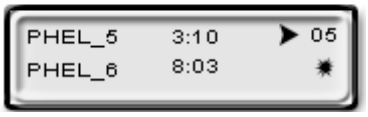
WBGT Index



Time and Date



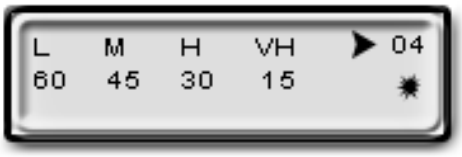
Battery & Available Memory



Navy PHEL Stay Times[1]

[1]Three screens are used to display the PHELs two at time.

If **ACGIH** is selected, the recommended working minutes per hour are shown for each of the workload categories Light (L), Moderate (M), Heavy (H), and Very Heavy (VH).



Index for ACGIH

If **Flag** is selected, the screen for Navy/Marine Corps ashore Flag Conditions will appear. There are five flag conditions including no flag, yellow, green, red, and black, which provide heat exposure training activity limitations for acclimated individuals.

Ashore Flag Conditions Navy/Marine Corps

Calibration

Heat stress meters are electronically calibrated by the manufacturer or the Metrology Calibration Lab every three years. Metrology Calibration labs charge $250.00/calibration.

The relative humidity (RH) sensor is periodically aligned by the ship/shore end user to ensure the RH sensor is within required range. If it is out of range then it can be interchanged/ replaced with another RH sensor. The dry bulb and globe thermometers are on the same sensor bar which is rugged but if broken they can be replaced as well.

Power options

There are 3 options for powering the QUESTemp 48N: a 9-volt alkaline battery; a NiMH (Nickel Metal Hydride) rechargeable 6-cell battery pack; and an AC adapter. A door on the back of the unit allows the user access to the 9-volt battery. The rechargeable battery pack is located inside of the unit. If the rechargeable battery pack ever needs to be replaced, it can be accessed by removing the screws from the bottom panel of the unit.