

# **WATER: THE MAGIC UNIQUE SUBSTANCE -A DETAILED DISCUSSION ON WHY WATER IS SO IMPORTANT TO US AND ALL LIFE.**

By Richard Sorokin

Water.....The magic, unique substance As mariners who operate on the water we should have an appreciation for this compound., water. We should understand what it does and how we are dependent on it. It should never be taken for granted whether it is in your drinking glass or raging our coast line.

Water is a unique compound in many ways. Without water life on Earth would not have happened. Though unique it is our most abundant compound. In fact 7/8 of this planet is covered by water. It should have been called water not earth.

Let me list some facts about water.

Water is a compound of two atoms of hydrogen and one atom of oxygen. It is a very strong bond. The atoms can be separated by electrolysis. They form two gases, not a liquid. If the two gases are mixed nothing happens until energy in the form of a flame or an electrical spark is introduced. Then we get a bang and water appears.

Water molecules have a unique~ strong attraction to themselves and other molecules. If you look at water in a glass you'll see it rising on the glass. If there is nothing to adhere to it will adhere to other water molecules with enough force that insects can walk on the surface of water. We call this surface tension. Water has a very high heat capacity. This means that it takes a lot of energy to change the temperature of water. Remember energy is measured in calories and heat is measured in degrees. Because of this ability to store large amounts of energy without much change in temperature we have milder summers and warmer winters since we live near the water. The oceans store vast amounts of energy during the summers and gradually give it up in the winter. Of course big storms like hurricanes also result when there is too much energy stored. When liquid water is changed to a gas, such as steam, a great deal of energy is stored in the steam. This energy is what makes steam engines work. High pressure steam can cut through steel. Water can dissolve almost anything given the time. Think of the Grand Canyon. When this planet was first formed it was mostly solidified matter; rocks. It took millions of years for the rains to dissolve the rocks forming soil before plants could root. Rain dissolved rocks and ice split them. Water is unique in that it is the only substance that when it first freezes it expands. Its greatest density is at 4°C. From 4°C to 100°C it expands about 9 percent. It takes up more space and can now float. This expansion ability alone broke up the rocks to make soil and plant life possible. Water is known as the universal solvent. We use water as a measuring standard. 1ml of water or cc at 4°C is one gram Heat (energy) needed to raise one gram of water one degree Celsius =1 calorie Heat needed to raise one pound of water one degree Fahrenheit =1 British Thermal. 1 BTU