

SPONSERED PROJECT

A Project Report on

“VARIABLE FLUSH TANK”

Submitted to KSCST IISc BANGALORE.

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VARIABLE FLUSH TANK

WATER:



Water in three states: liquid, solid (ice), and (invisible) vapor in air. Clouds are droplets of liquid, condensed from water vapor.

Water is a common chemical substance that is essential for the survival of all known forms of life. In typical usage, *water* refers only to its liquid form or state, but the substance also has a solid state, *ice*, and a gaseous state, *water vapor* or *steam*. Water covers 71% of the Earth's surface .

On Earth, it is found mostly in oceans and other large water bodies, with 1.6% of water below ground in aquifers and 0.001% in the air as vapor, clouds (formed of solid and liquid water particles suspended in air), and precipitation. Saltwater oceans hold 97% of surface water, glaciers and polar ice caps 2.4%, and other land surface water such as rivers, lakes and ponds 0.6%.

A very small amount of the Earth's water is contained within biological bodies and manufactured products. Other water is trapped in ice caps, glaciers, aquifers, or in lakes, sometimes providing fresh water for life on land.

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WATER CYCLE

Water moves continually through a cycle of evaporation or transpiration (evapotranspiration), precipitation, and runoff, usually reaching the sea. Winds carry water vapor over land at the same rate as runoff into the sea. Over land, evaporation and transpiration contribute to the precipitation over land.

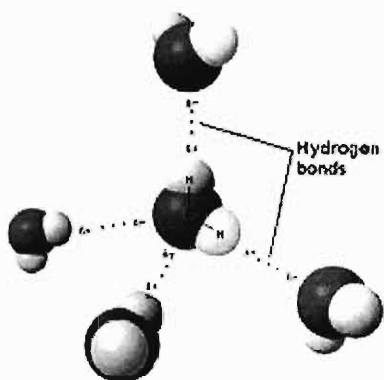
Clean, fresh drinking water is essential to human and other life. Access to safe drinking water has improved steadily and substantially over the last decades in almost every part of the world. There is a clear correlation between access to safe water and GDP per capita. However, some observers have estimated that by 2025 more than half of the world population will be facing water-based vulnerability.

Water plays an important role in the world economy, as it functions as a solvent for a wide variety of chemical substances and facilitates industrial cooling and transportation. Approximately 70 percent of freshwater is consumed by agriculture.

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Chemical and physical properties

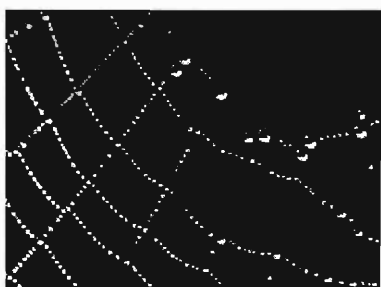
Main article: [Water \(molecule\)](#)



model of [hydrogen bonds](#) between molecules of water



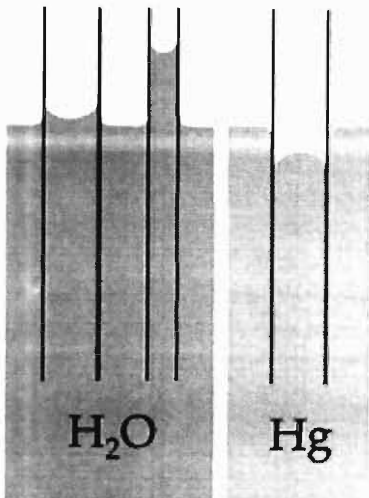
Impact from a water drop causes an upward "rebound" jet surrounded by circular [capillary waves](#).



[Dew](#) drops adhering to a [spider web](#)

<u>Water</u>	
<p>Water is a necessary solvent for all known life, and an abundant compound on the earth's surface.</p>	
Information and properties	
<u>Common name</u>	water
<u>IUPAC name</u>	oxidane
Alternative names	aqua, dihydrogen monoxide, hydrogen hydroxide, (more)
<u>Molecular formula</u>	H ₂ O
<u>CAS number</u>	7732-18-5
<u>InChI</u>	InChI=1/H2O/h1H2
<u>Molar mass</u>	18.0153 g/mol
<u>Density and phase</u>	0.998 g/cm ³ (liquid at 20 °C, 1 atm) 0.917 g/cm ³ (solid at 0 °C, 1 atm)
<u>Melting point</u>	0 °C (273.15 K) (32 °F)
<u>Boiling point</u>	99.974 °C (373.124 K) (211.95 °F)
<u>Specific heat capacity</u>	4.184 J/(g·K) (liquid at 20 °C) 74.539 J/ (mol·K) (liquid at 25 °C)

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capillary action of water compared to mercury

Water is the chemical substance with chemical formula H_2O : one molecule of water has two hydrogen atoms covalently bonded to a single oxygen atom.

The major chemical and physical properties of water are:

- Water is a tasteless, odorless liquid at standard temperature and pressure. The color of water and ice is, intrinsically, a very light blue hue, although water appears colorless in small quantities. Ice also appears colorless, and water vapor is essentially invisible as a gas.
- Water is transparent, and thus aquatic plants can live within the water because sunlight can reach them. Only strong UV light is slightly absorbed.
- Since oxygen has a higher electronegativity than hydrogen, water is a polar molecule. The oxygen has a slight negative charge while the hydrogens have a slight positive charge giving the molecule a strong effective dipole moment. The interactions between the different dipoles of each molecule cause a net attraction force associated with water's high amount of surface tension.
- Another very important force that causes the water molecules to stick to one another is the hydrogen bond.

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- The boiling point of water (and all other liquids) is directly related to the barometric pressure. For example, on the top of Mt. Everest water boils at about 68 °C (154 °F), compared to 100 °C (212 °F) at sea level. Conversely, water deep in the ocean near geothermal vents can reach temperatures of hundreds of degrees and remain liquid.
- Water has a high surface tension caused by the weak interactions, (Van Der Waals Force) between water molecules because it is polar. The apparent elasticity caused by surface tension drives the capillary waves.
- Water also has high adhesion properties because of its polar nature.
- Capillary action refers to the tendency of water to move up a narrow tube against the force of gravity. This property is relied upon by all vascular plants, such as trees.
- Water is a very strong solvent, referred to as *the universal solvent*, dissolving many types of substances. Substances that will mix well and dissolve in water, e.g. salts, sugars, acids, alkalis, and some gases: especially oxygen, carbon dioxide (carbonation), are known as "hydrophilic" (water-loving) substances, while those that do not mix well with water (e.g. fats and oils), are known as "hydrophobic" (water-fearing) substances.
- All the major components in cells (proteins, DNA and polysaccharides) are also dissolved in water.
- Pure water has a *low* electrical conductivity, but this increases significantly upon solvation of a small amount of ionic material such as sodium chloride.
- Water has the second highest specific heat capacity of any known chemical compound, after ammonia, as well as a high heat of vaporization (40.65 kJ mol⁻¹), both of which are a result of the extensive hydrogen bonding between its molecules. These two unusual properties allow water to moderate Earth's climate by buffering large fluctuations in temperature.

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- The maximum density of water is at 3.98 °C (39.16 °F). Water becomes even less dense upon freezing, expanding 9%. This causes an unusual phenomenon: ice floats upon water, and so water organisms can live inside a partly frozen pond because the water on the bottom has a temperature of around 4 °C (39 °F).



ADR label for transporting goods dangerously reactive with water

- Water is miscible with many liquids, for example ethanol, in all proportions, forming a single homogeneous liquid. On the other hand, water and most oils are *immiscible* usually forming layers according to increasing density from the top. As a gas, water vapor is completely miscible with air.
- Water forms an azeotrope with many other solvents.
- Water can be split by electrolysis into hydrogen and oxygen.
- As an oxide of hydrogen, water is formed when hydrogen or hydrogen-containing compounds burn or react with oxygen or oxygen-containing compounds. Water is not a fuel, it is an end-product of the combustion of hydrogen. The energy required to split water into hydrogen and oxygen by electrolysis or any other means is greater than the energy released when the hydrogen and oxygen recombine.
- Elements which are more electropositive than hydrogen such as lithium, sodium, calcium, potassium and caesium displace hydrogen from water, forming hydroxides. Being a flammable gas, the hydrogen given off is dangerous and the reaction of water with the more electropositive of these elements is violently explosive.