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The viscosity of a fluid is a measure of its resistance to gradual deformation by shear stress or tensile stress . For further definitions, go to Absolute (dynamic) and kinematic viscosity . Absolute or dynamic viscosity is used to calculate Reynold's Number to determine if a fluid flow is laminar, transient or turbulent. Online Water Viscosity Calculator The calculator below can be used to calculate the liquid water dynamic or kinematic viscosity at given temperatures. The output dynamic viscosity is given as cP, mPa*s, Pa*s, N*s/m2,lbf *s/ft2and lbm/(ft*h), while the kinematic viscosity is given as cSt, m2/s and ft2/s. Note! Temperature must be within the ranges 0-370 °C, 32-700 °F, 273-645 K and 492-1160 °R to get valid values. See Water and Heavy Water - thermodynamic properties. See also other properties of Water at varying temperature and pressure : Boiling points at high pressure, Boiling points at vacuum pressure, Density and specific weight, Enthalpy and entropy, Heat of vaporization, Ionization Constant, pKw , of normal and heavy water, Melting points at high pressure, Prandtl number, Properties at Gas-Liquid Equilibrium Conditions, Saturation pressure, Specific gravity, Specific heat (heat capacity), Specific volume, Thermal conductivity, Thermal diffusivity and Vapour pressure at gas-liquid equilibrium. See also dynamic and kinematic viscosity of air, ammonia, benzene, butane, carbon dioxide, ethane, ethanol, ethylene, methane, methanol, nitrogen, oxygen and propane The figures and tables below shows how water viscosity changes with temperature (°C and °F) at water saturation pressure (which for practicle use, gives the same result as atmospheric pressure at temperatures < 100 °C (212°F). One figure showing relative viscosity with variations in pressure and temperature is also included. Water - Dynamic (Absolute) and Kinematic Viscosity vs. Temperature and Pressure Temperature Dynamic viscosity (°C) (MPa) (Pa s), (N s/m2) (cP), (mPa s) (lbf s/ft2 ×10-5) (lbm/(ft h)) (cP), (mPa s) (ft2/s ×10-5) 32.02 0.9506 3.7414 4.3336 1.7914 1.9287 34 0.0962 3.6047 4.1752 1.7259 1.8579 39.2 0.1180 3.2801 3.7992 1.5705 1.6906 40 0.1217 3.2340 3.7458 1.5484 1.6668 50 0.1781 2.7276 3.1593 1.3060 1.4063 60 0.2563 2.3405 2.7109 1.1206 1.2075 70 0.3634 2.0337 2.3556 0.9737 1.0503 80 0.5076 1.7888 2.0719 0.8565 0.9250 90 0.6992 1.5896 1.8411 0.7611 0.8234 100 0.9506 1.4243 1.6497 0.6820 0.7392 110 1.277 1.2847 1.4880 0.6151 0.6682 120 1.695 1.1652 1.3496 0.5579 0.6075 130 2.226 1.0620 1.2300 0.5085 0.5551 140 2.893 0.9733 1.1273 0.4660 0.5102 150 3.723 0.8950 1.0366 0.4285 0.4706 160 4.747 0.8279 0.9589 0.3964 0.4367 170 6.000 0.7698 0.8916 0.3686 0.4074 180 7.520 0.7192 0.8330 0.3444 0.3820 190 9.349 0.6745 0.7813 0.3230 0.3596 200 11.537 0.6300 0.7297 0.3016 0.3371 212 14.710 0.5881 0.6812 0.2816 0.3163 220 17.203 0.5619 0.6508 0.2690 0.3032 240 25.001 0.5050 0.5850 0.2418 0.2750 260 35.263 0.4575 0.5299 0.2191 0.2515 280 49.286 0.4176 0.4837 0.2000 0.2320 300 67.264 0.3840 0.4448 0.1839 0.2157 350 134.73 0.3202 0.3708 0.1533 0.1853 400 247.01 0.2750 0.3185 0.1317 0.1648 450 422.32 0.2404 0.2785 0.1151 0.1504 500 680.56 0.2126 0.2463 0.1018 0.1398 550 1045.0 0.1888 0.2187 0.0904 0.1322 600 1542.1 0.1673 0.1937 0.0801 0.1270 625 1851.2 0.1562 0.1809 0.0748 0.1252 650 2207.8 0.1438 0.1666 0.0689 0.1239 675 2618.7 0.1292 0.1496 0.0619 0.1230 Unit conversion Viscosity Dynamic, Absolute centipoise (cP), gram/(centimetre second) (g/(cm s)) = poise (P), kilogram/metre second (kg/m s)=newton second/square metre (N s/m2)= pascal second (Pa s), pound/(foot hour) (lb/(ft h)), pound/(foot second) (lb/(ft s)), reyn (reyn) 1 cP = 0.001 Pa s = 0.01 P = 0.01 g/(cm sec) = 6.72197×10-4 lb/(ft s) = 2.4191 lb/(ft h) 1 lb/(ft h) = 0.00027778 lb/(ft s) = 0.00041338 Pa s = 0.041338 P = 0.41338 cP 1 lb/(ft s) = 3600 lb/(ft h) = 1.48816 Pa s = 14.8816 P = 1488.16 cP 1 kg/(m s) = 1 (N s)/m2= 1 Pa s = 10 P = 1000 cP = 0.672197 lb/(ft s) = 2419.09 lb/(ft h) 1 (N s)/m2= 1 kg/(m s) = 1 Pa s = 10 P = 1000 cP = 0.672197 lb/(ft s) = 2419.09 lb/(ft h) 1 P = 1 g/(cm s) = 0.1 Pa s = 100 cP = 0.067197 lb/(ft s) = 241.909 lb/(ft h) 1 Pa s = 1 kg/(m s) = 1 (N s)/m2= 10 P = 1000 cP = 0.672197 lb/(ft s) = 2419.08 lb/(ft h) = 0.00014504 reyn 1 reyn = 6894.76 Pa s See also Absolute or Dynamic Viscosity Unit Converter Viscosity Kinematic centistoke (cSt) = square millimetre/second (mm2/s), square foot/hour (ft2/h), square foot/second (ft2/s), square inch/second (in2/s), square metre/hour (m2/h), square metre/second (m2/s), stoke (St) = square centimetre/second (cm2/s) 1 cm2/s = 1 St = 100 mm2/s= 100 cSt = 1×10-4 m2/s = 0.36 m2/h = 1.07639×10-3 ft2/s = 3.875008 ft2/h = 0.1550003 in2/s 1 m2/s = 1×10-6 m2/s = 0.0036 m2/h = 1.07639×10-5ft2/s = 0.03875008 ft2/h = 0.001550003 in2/s 1 ft2/h = 2.7778×10-4 ft2/s = 0.258064 St 1 ft2/s = 3600 ft2/h = 144 in2/s = 0.09290304 m2/s = 25.8064 cS = 0.258064 St 1 ft2/h = 0.00027778 ft2/s = 0.0026416 St 1 in2/s = 6.9444×10-3ft2/s = 0.00694444 ft2/s = 25 ft2/h = 0.006451616 m2/s = 2.32258064 ft2/h = 645.16 cS = 6.4516 St 1 m2/h = 13600 m2/s = 2.7778×10-4 m2/s = 2.7778 cm2/s = 277.78 mm2/s = 277.78 cSt = 2.7778 St = 0.00298998 ft2/s = 10.7639 ft2/h = 0.430556 in2/s 1 m2/s = 3600 m2/h = 1×104 cm2/s = 1×104 St = 1×106 mm2/s = 1×106 cSt = 10.7639 ft2/s = 38750.08 ft2/h = 1550003 in2/s 1 mm2/s = 1 cSt = 1×10-6 m2/s = 0.0036 m2/h = 0.01 cm2/s = 0.01 St = 1.07639×10-5ft2/s = 0.03875008 ft2/h = 0.001550003 in2/s 1 St = 1 cm2/s = 100 cSt = 100 mm2/s = 1×10-4 m2/s = 0.36 m2/h = 1.0764×10-3 ft2/s = 3.875008 ft2/h = 0.1550003 in2/s 1 ft2/s = 1 ft2/h = 0.00027778 ft2/s = 0.0026416 St 1 in2/s = 0.09290304 m2/s = 25.8064 cS = 0.258064 St 1 ft2/h = 3600 ft2/s = 144 in2/s = 0.09290304 m2/s = 334.451 m2/h = 92903.04 cSt = 929.0304 St 1 in2/s = 0.0069444 ft2/s = 25 ft2/h = 0.006451616 m2/s = 2.32258064 ft2/h = 645.16 cS = 6.4516 St 1 m2/h = 13600 m2/s = 2.7778×10-4 m2/s = 2.7778 cm2/s = 277.78 mm2/s = 277.78 cSt = 2.7778 St = 0.00298998 ft2/s = 10.7639 ft2/h = 0.430556 in2/s 1 m2/s = 3600 m2/h = 1×104 cm2/s = 1×104 St = 1×106 mm2/s = 1×106 cSt = 10.7639 ft2/s = 38750.08 ft2/h = 1550003 in2/s 1 mm2/s = 1 cSt = 1×10-6 m2/s = 0.0036 m2/h = 0.01 cm2/s = 0.01 St = 1.07639×10-5ft2/s = 0.03875008 ft2/h = 0.001550003 in2/s 1 St = 1 cm2/s = 100 cSt = 100 mm2/s = 1×10-4 m2/s = 0.36 m2/h = 1.0764×10-3 ft2/s = 3.875008 ft2/h = 0.1550003 in2/s See also Kinematic Viscosity Unit Converter Related Mobile Apps from The Engineering ToolBox Kinematic Viscosity Converter App - free apps for offline use on mobile devices. The differences between dynamic, absolute, and kinematic viscosity - a fluids resistance to flow - with definitions, unit conversions, and practical applications for engineers and scientists. Convert between dynamic or absolute viscosity units - Poiseuille, Poise, centPoise and more. Online calculator, figures and table showing dynamic and kinematic viscosity of benzene, C6H6, at varying temperature and pressure - Imperial and SI Units. Online calculators, figures and tables with dynamic and kinematic viscosity of liquid and gaseous butane, C4H10, at varying temperarure and pressure, SI and Imperial units. Convert dynamic viscosity values between units like Poiseuille - Poise - centiPoise and more. Online calculator, figures and tables showing dynamic and kinematic viscosity of ethanol, C2H5OH, at varying temperature and pressure - Imperial and SI Units. Online calculator, figures and tables showing dynamic and kinematic viscosity of ethylene, C2H4, also called ethene or acetene, at varying temperature and pressure - Imperial and SI Units. Diffusion flux [kg/m2s] tells how fast a substance solved in another substance flows due to concentration gradients. Diffusion constants [m2/s] for several gases in water. Thermodynamic properties of heavy water (D2O) like density, melting temperature, boiling temperature, latent heat of fusion, latent heat of evaporation, critical temperature and more. Online calculator, figures and tables with melting points of ice to water at pressures ranging from 0 to 29000 psia (0 to 2000 bara). Temperature given as °C, °F, K and °R. Convert between kinematic viscosity units like centistokes, poise, lentor and more. Convert between Centistokes, Saybolt and Redwood seconds. Online calculator, figures and tables showing dynamic and kinematic viscosity of methane, CH4, at varying temperature and pressure - Imperial and SI Units. Online calculator, figures and tables showing dynamic and kinematic viscosity of liquid methanol,CH3OH, at varying temperature - Imperial and SI Units. Online calculator, figures and tables showing dynamic and kinematic viscosity of oxygen, O2, at varying temperature and pressure - Imperial and SI Units. Online calculators, figures and tables showing dynamic and kinematic viscosity of liquid and gaseous propane at varying temperature and pressure, SI and Imperial units. Viscosity of sewage sludge vs. content of solids. Online calculator, figures and tables showing specific heat of liquid water at constant volume or constant pressure at temperatures from 0 to 360 °C (32-700 °F) - SI and Imperial units. Friction loss in schedule 40 steel pipe with viscous liquids - viscosities ranging from water to oil. Dynamic viscosities of sucrose water solutions vs. temperature. Figures and tables showing thermal conductivity of water (liquid and gas phase) with varying temperature and pressure, SI and Imperial units. Convert between viscosity units like Centiposes, milliPascal, CentiStokes and SSU. Friction loss in steel pipes for fluids with viscosities ranging 32 - 80000 SSU. Absolute viscosity for water in centiposes for temperatures between 32 - 200oF. Online calculator, figures and tables giving the boiling temperatures of water in varying vacuum, SI and Imperial units. Figures and tables showing the enthalpy and entropy of liquid water as function of temperature - SI and Imperial Units. Ionization constant (= dissociation constant = ion product = autoprotolysis constant) of water and heavy water, given as function of temperature (°C and °F) in figures and tables. Figures and tables showing how the properties of water changes along the boiling/condensation curve (vapor pressure, density, viscosity, thermal conductivity, specific heat, Prandtl number, thermal diffusivity, entropy and enthalpy). Online calculator, figures and tables showing Specific Volume of water at temperatures ranging from 0-370 °C and 32 - 700 °F - Imperial and IS Units. Figures and tables with thermal diffusivity of liquids and gaseous water at varying temperarures and pressures - SI and Imperial units. Data on the density and specific weight of water across various temperatures and pressures. Useful for engineering, fluid dynamics, and HVAC calculations. Online calculator, figures and tables showing heat of vaporization of water, at temperatures from 0 - 370 °C (32 - 700 °F) - SI and Imperial units. Online calculator, figures and tables with water saturation (vapor) pressure at temperatures ranging 0 to 370 °C (32 to 700°F) - in Imperial and SI Units. Critical point is where vapor and liquid are indistinguishable and triple point is where ice, water and vapor coexist in thermodynamic equilibrium. The Engineering ToolBox provides a wide range of free tools, calculators, and information resources aimed at engineers and designers. It offers detailed technical data and calculations for various fields such as fluid mechanics, material properties, HVAC systems, electrical engineering, and more.The site includes resources for common engineering tasks, such as calculating physical properties (e.g., density, viscosity, thermal conductivity), converting units, and designing systems like heating and water distribution. With sections on everything from acoustics to hydraulics, it serves as a comprehensive tool for both students and professionals in technical and engineering disciplines. Density Of Water: Lb/Ft3 Calculator & Facts The density of water is a fundamental physical property that plays a crucial role in various fields, including engineering, chemistry, and environmental science. Understanding the density of water is essential for calculating the weight of water in different units, such as pounds per cubic foot (lb/ft³). In this article, we will delve into the world of water density, explore its significance, and provide a comprehensive guide on how to calculate the weight of water using a density calculator. What Is Density? Density is defined as the mass of a substance per unit volume. It is typically expressed in units of mass per unit volume. It is typically expressed in units of mass per unit volume, such as grams per cubic centimeter (g/cm³) or pounds per cubic foot (lb/ft³). The density of a substance is a measure of how tightly its molecules are packed together. Substances with high densities have tightly packed molecules, while those with low densities have more loosely packed molecules. Density of Water The density of water is approximately 1 gram per cubic centimeter (g/cm³) or 62.4 pounds per cubic foot (lb/ft³) at room temperature (20°C or 68°F). This means that one cubic foot of water weighs around 62.4 pounds. The density of water is slightly less than that of most metals, but it is higher than that of many gases. Importance of Water Density The density of water has significant implications in various fields, including: Engineering: Understanding the density of water is crucial for designing water treatment plants, pipelines, and other infrastructure that handles water. Environmental Science: Density plays a critical role in understanding ocean currents, water pollution, and the behavior of aquatic ecosystems. Chemistry: The density of water is essential in calculating the concentration of solutions and understanding chemical reactions that involve water. Transportation: The density of water affects the buoyancy of ships and boats, which is critical for navigation and safety. Density of Water Calculator To calculate the weight of water in pounds per cubic foot, you can use the following formula: Weight (lb) = Volume (ft³) x Density (lb/ft³) Where: Weight is the weight of water in pounds (lb) Volume is the volume of water in cubic feet (ft³) Density is the density of water in pounds per cubic foot (lb/ft³) Using this formula, you can calculate the weight of water for different volumes. For example, if you want to calculate the weight of 10 cubic feet of water, you can plug in the values as follows: Weight (lb) = 10 ft³ x 62.4 lb/ft³ Weight (lb) = 624 lb Facts About the Density of Water Density Here are some interesting facts about the density of water: Temperature dependence: The density of water changes with temperature. It increases as the temperature decreases and decreases as the temperature increases. Pressure dependence: Density of seawater is higher than that of freshwater due to the presence of dissolved salts. Ice density: The density of ice is lower than that of water, which is why it floats on top of liquid water. What is the density of water at room temperature? + The density of water at room temperature (20°C or 68°F) is approximately 62.4 pounds per cubic foot (lb/ft³) or 1 gram per cubic centimeter (g/cm³). How does temperature affect the density of water? + The density of water increases as the temperature decreases and decreases as the temperature increases. What is the difference between the density of seawater and freshwater? + The density of seawater is higher than that of freshwater due to the presence of dissolved salts. In conclusion, the density of water is a fundamental property that has significant implications in various fields. Understanding the density of water is essential for calculating the weight of water in different units and for designing infrastructure that handles water. By using a density calculator and understanding the factors that affect the density of water, you can make informed decisions and calculations in your work or studies. How can financial brands set themselves apart through visual storytelling? Our experts explain how.Learn MoreThe Motorsport Images Collections captures events from 1895 to today's most recent coverage.Discover The CollectionCurated, compelling, and worth your time. Explore our latest gallery of Editors' Picks.Browse Editors' FavoritesHow can financial brands set themselves apart through visual storytelling? Our experts explain how.Learn MoreThe Motorsport Images Collections captures events from 1895 to today's most recent coverage.Discover The CollectionCurated, compelling, and worth your time. Explore our latest gallery of Editors' Picks.Browse Editors' FavoritesWojciech Sas, PhDPhD, Institute of Physics in ZagrebWojciech, PhD, is a physicist at the Institute of Physics in Zagreb, investigating materials under extreme conditions such as low temperatures and high pressures. He specializes in experimental work, including participation in Large-scale User Facilities such as synchrotrons. Wojciech uses his experience and knowledge to create calculators in physics, math, and statistics categories. In his free time, he likes swimming, playing board games, and looking for meteors while stargazing. See full profileCheck our editorial policyBogna Szyk and Jack Bowater116 people find this calculator helpfulWith this water density calculator, you can quickly estimate the density of salt water. In this text, you will find the answer to the question "What is the density of water?" and how it changes depending on temperature, salinity, or pressure. Have you ever wondered what the relationship is between the density of water in kg/m³, the density of water in g/ml, and the density of water in lb/ft³? Should eggs float or sink in salt water? Read on to find answers to these questions too!The density of water (or any other substance) is the ratio of its mass, m, to its volume, V. We usually denote density using the symbol ρ, so the formula for density is: ρ = m / V. It turns out that density isn't constant for most substances but, in fact, changes when external parameters change, such as temperature or pressure.There are various units of water density. Any combination of the units of mass and the units of volume is acceptable, but some are more prevalent than others. The most commonly used units are: [kg/m³] – kilogram per cubic meter; [lb/ft³] – pound per cubic foot; [g/ml] or [g/cm³] – gram per milliliter or gram per cubic centimeter, which are equivalent to each other. The density of water in kg/m³ is 1000 times greater than the density of water in g/cm³ and circa 16.018 times smaller than the density of water in lb/ft³. If you are interested in the different density units and want to know their relation, try our density converter.You probably know of the phenomenon of the density of water changing at different temperatures, even if you've never thought about it in scientific terms: ever wondered why ice floats? This change is mainly caused by thermal expansion – where the same amount of substance occupies more and more space as the temperature increase. As a result, the mass stays constant, but the volume increases, causing the density to decrease. Qualitatively, it's fairly simple, but from a mathematical point of view, estimating the outcome is a different story. Water has an intriguing property – it reaches its maximum density at about 4 °C or 40 °F. While there are tables of pure water density between water's freezing point (0 °C or 32 °F) and its boiling point (100 °C or 212 °F), there isn't a straightforward formula which yields the exact value for a given temperature. To get around this, our water density calculator uses an approximate equation based on the 5th order polynomial: ρ(T) = ρ₀ + (a₁ × T) · (a₂ × T²) + (a₃ × T³) · (a₄ × T⁴) + (a₅ × T⁵), where the temperature T is in °C, and the values of coefficients are the following: ρ₀ = 999.83311 kg/m³; a₁ = 0.0752 kg/(m³·°C²); a₂ = 0.0089 kg/(m³·°C³); a₃ = 7.36413 × 10⁻⁵ kg/(m³·°C⁴); a₄ = 4.74639 × 10⁻⁷ kg/(m³·°C⁵); and a₅ = 1.34888 × 10⁻⁹ kg/(m³·°C⁶). We use scientific notation to express all of the small values more clearly. Although the outcome is an approximation, it's provided with sufficient precision. Did you know the boiling point also depends on the pressure? Check our boiling point calculator to learn more about it!The mixture of water and salt heralder referred to as salt water has a different density than pure water. The basic parameter that tells us about the amount of salt in salt water is salinity, S, given as: S = m₁ / (m₁ + m₀), where m₀ is the mass of pure water and m₁ is the mass of salt. In other words, mixing a mass of pure water, m₀, with a mass of salt, m₁, gives you the salinity S of salt water. This quantity is usually given in per mille ‰, parts per thousand (ppt), or practical salinity units (psu), which are basically equivalent. In our density of water calculator, we use a method proposed by Millero and his coworkers. The overall formula is complicated, so we won't show it here explicitly. Still, generally, it uses the same concept as the equation for the temperature dependence of density: – a polynomial of mixed terms of temperature, salinity, and pressure: ρ(T,S,p) = ρ(T) + f(T,S,p). Here ρ(T) is the density of pure water derived from the previous chapter. However, we can spot some common properties – the density of salt water increases for higher salinity and external pressure.What is the density of water at 20 °C of salinity S = 35‰ and under the pressure of 1 atm? Let's give our water density calculator a try and find out! Set the temperature to 20 °C. Set salinity to 35‰. Set pressure to 1 atm. And that's it! The density of salt water is 1,024.9 kg/m³. The same density of water is 1.0249 g/ml or 63.982 lb/ft³. But this is not the end! Perform your own experiment at home – take a few objects with an unknown density (but more or less equal to the value for the density of water, i.e., 1000 kg/m³). Although changing the external pressure is difficult, you can create a liquid with known salinity and control its temperature. Check out the Additional parameters section to see how much pure water and salt you need to obtain salt water with a specific density. You can start by heating your mixture (e.g., in a microwave) and then submerging your objects in it. You can quickly evaluate the temperature of water while it is cooling down. In the beginning, the density of hot water is quite high, so everything should sink, but at some point, the density will decrease to the point where the object begins to float! Insert the value of salinity and temperature at which the object began to float in the water density calculator, and you should be able to estimate those densities with relatively good precision! You can also choose one of the objects from the list to see if it floats or sinks. We consider some average values, so the results may not be accurate in every case (especially for fruit).Well, the most accurate answer is: it depends! Firstly, there is a difference between fresh and rotten eggs. When boiling an egg, you can put it in pure lukewarm water before testing it by opening it. If it sinks, it should be fresh, but if it floats, it's most probably stale. As an egg ages, some gases (e.g., hydrogen sulfide) are produced inside, and they escape the object through pores in the shell. As a result, the mass decreases, but the volume of the egg remains constant, so the density decreases. The second factor is the salinity of the water. When cooking, we most often use pure or slightly salty water, so the explanation above holds true. But if we put an egg into a really salty environment (like the Dead Sea, which has a salinity of around 342‰), both the fresh and rotten variety will float. It would therefore be impossible to decide whether the egg is fresh or not using this method. Check what is the critical value of salinity that makes it possible for a fresh egg to float with our density of water calculator.You can use a simple speed of sound formula to find the value of c. We can rewrite the formula as follows: c = √(γ × p / ρ), where γ is the adiabatic index, p is pressure, and ρ is air density. For most liquids, the relationship is usually not that simple. Still, in general, the speed of sound in the water rises when the density decreases over a wide range of temperatures. The knowledge of the speed of sound dependence in salt water is crucial for all sonar measurement research.SelectEggBananaAppleLemonPotatoWooden ball (pine)Wooden ball (oak)Plastic ball (solid, not hollowed)Check out 46 similar fluid mechanics calculators Density is the ratio of the mass to the volume of a substance: ρ = m / V (1) where ρ = density, units typically (g/cm3) or (lb/ft3) m = mass, units typically (g) or (lb) V = volume, units typically (cm3) or (ft3) Pure water has its highest density 1000 kg/m3 or 1.940 slug/ft3 at temperature 4 °C (=39.2 °F). Specific weight is the ratio of the weight to the volume of a substance: γ = (m g) / V = ρ g (2) where γ = specific weight, units typically (N/m3) or (lbf/ft3) m = mass, units typically (g) or (lb) g = acceleration due to gravity, units typically (m/s2) and value on Earth usually given as 9.80665 m/s2 or 32.1740 ft/s2 V = volume, units typically (cm3) or (ft3) ρ = density, units typically (g/cm3) or (lb/ft3) Example 1: Specific weight of water In the SI system, specific weight of water at 4°C will be: γ = 1000 (kg/m3) 9.807 (m/s2) = 9807 (kg/m2 s2) = 9807 (N/m3) = 9.807 (kN/m3) In the Imperial system the mass unit is the slug (sl) , and is derived from the pound-force by defining it as the mass that will accelerate at 1 foot per square second when a 1 pound-force acts upon it : 1 (lbf) = 1 (sl) 1 (ft/s2) and 1 (sl) = 1 (lbf)/1 (ft/s2) The density of water is 1.940 sl/ft3at 39 °F (4 °C), and the specific weight in Imperial units is γ = 1.940 (sl/ft3) 32.174 (ft/s2) = 1.940 (lbf)/((ft/s2) (ft3)) * 32.174 (ft/s2) = 62.4 (lbf/ft3) See more about the difference between mass and weight Online Water density Calculator The calculator below can be used to calculate the liquid water density at given temperatures. The output density is given as g/cm3, kg/m3, lb/ft3, lb/gal(US liq) and sl/ft3. Note! Temperature must be within the ranges 0-370 °C, 32-700 °F, 273-645 K and 492-1160 °R to get valid values. The density of water depends on temperature and pressure as shown below: See Water and Heavy Water for thermodynamic properties at standard conditions. See also other properties of Water at varying temperature and pressure : Boiling points at high pressure, Boiling points at vacuum pressure, Dynamic and kinematic viscosity, Enthalpy and entropy, Heat of vaporization, Ionization Constant, pKw, of normal and heavy water, Melting points at high pressure, Prandtl number, Properties at Gas-Liquid Equilibrium Conditions, Saturation pressure, Specific gravity, Specific heat (heat capacity), Specific volume, Thermal conductivity, Thermal diffusivity and Vapour pressure at gas-liquid equilibrium . For other substances, see density and specific weight of acetone, air, ammonia, argon, benzene, butane, carbon dioxide, carbon monoxide, ethane, ethanol, ethylene, helium, hydrogen, methane, methanol, nitrogen, oxygen, propane, propane and toluene . Density of crude oil . Density of fuel oils . Density of lubricating oil and Density of jet fuel as function of temperature in Celcius: For fuel table with Specific Weight and Thermal Expansion Coefficient - rotate the screen! Water - Density, Specific Weight and Thermal Expansion Coefficients Temperature Density (0-100°C at 1 atm, >100 °C at saturation pressure) Specific weight Thermal expansion coefficient (°F) (lbm/ft3) (sl/ft3) (lbm/gal(US liq)) (g/cm3) (kg/m3) (lbf/ft3) (kN/m3) (°C) (°F) (kg/m³) (lb/ft³) (kN/m³