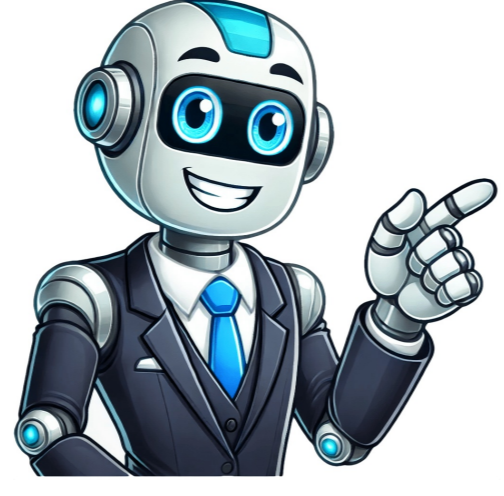


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Electronic water hardness tester

The multi-parameter water hardness tester is a comprehensive device for measuring various parameters of water quality. It offers up to 13 selectable parameters, including pH, alkalinity, chlorine, and cyanuric acid, allowing users to analyze the water's properties in detail. The tester comes with a Bluetooth interface, PC software, and cloud service, enabling seamless data transfer and analysis. To use the device, a sample of 10 ml is placed in a cuvette, where an LED generates a test light that triggers a photodiode to detect the value to be measured. Each measurement is automatically saved, and users can retrieve the data through the Bluetooth interface or mobile app. The device also supports cloud-based uploading and analysis, making it convenient for remote monitoring. In essence, water hardness refers to the presence of calcium and magnesium in water, which affects its quality and assessment. These elements are crucial for human health, as they contribute to bone strength, cell growth, and overall well-being. Understanding water hardness is vital for households, industries, and technical applications that rely on purified water. Water's mineral composition plays a vital role in human health, according to the International Health Organization's guidelines on calcium and magnesium levels in mg per liter. Exceeding these limits can lead to issues like stone formation or joint problems, especially for those with pre-existing conditions. To achieve optimal mineralization, water treatment plants continuously monitor quality and regulate hardness depending on application. Water sources, including surface and underground waters, lakes, rivers, and precipitation, contain varying amounts of natural rocks like limestone, gypsum, and dolomite, affecting calcium and magnesium levels and the hardness value, which fluctuates based on location, weather, season, and precipitation. Tap water used for household purposes should not be too hard, as it can cause issues with appliances and pipes. Initially, it's challenging to determine whether water is hard or soft, but after boiling or extended use, scale buildup on surfaces or a thin film on kettle surfaces indicates carbonate hardness (also known as temporary). The total hardness of water consists of both carbonate and non-carbonate hardness, measured in mol/m³ or mmol/l. Maintaining the optimal level of hardness is crucial not only for human health but also for appliances like dishwashers, kettles, washing machines, pipes, boilers, and heaters. While excessive calcium and magnesium are harmful, very soft water can also cause issues like corrosion to pipes, emphasizing the importance of balance. Knowing the level of hardness helps adjust device operation, select cleaning agents, and optimize filtration systems. A detailed water analysis is possible in a laboratory setting, although many people adjust by purchasing additional mediums that combat scale buildup. The German carbonate hardness degree °dH needs to be converted into other scales such as °Clark in Great Britain, °F in France, ppm in the USA, and °Ж in Russia. Due to non-equivalent values, a calculator is necessary for accurate readings. Germany 1, Britain 1.25, France 1.78, USA 17.84, Russia 0.357 °Clark 0.80, °F 0.56, ppm 0.056, °Ж 2.80 The Apure calcium and magnesium ion selective electrodes provide a stable reference solution that slowly releases the internal reference solution under a pressure of at least 100 KPa (1 Bar). A digital water hardness sensor measures water hardness using the potentiometric method. It mainly includes the measuring electrode, reference electrode, and temperature electrode. The measuring electrode is used to measure calcium and magnesium ions in the aqueous solution with an ion-selective response. The electrode surface undergoes an ion exchange reaction to form the electrode potential which is logarithmically related to the activity of calcium and magnesium ions. The reference electrode provides a stable reference potential, typically using silver/silver chloride or calumel electrodes. Temperature electrodes measure the temperature of an aqueous solution to ensure accurate measurements by compensating for the effects of temperature on the electrode potential. This digital water hardness meter is widely used in industrial applications, environmental monitoring, and domestic settings due to its accuracy, sensitivity, fast response time, ease of use, and maintenance. Given article text here The portable water hardness meter is a digital device that accurately detects water hardness, providing fast results for effective testing and treatment. With a large memory capacity of up to 500 sets of data, it stores information on various parameters, including temperature compensation, calibration points, and units of measurement. This handheld tool features an easy-to-read display screen, simple buttons, and intuitive navigation, making it simple to operate in different environments. The device is also equipped with a foam-filled case that protects the components and provides calibration solutions and instructions. The water hardness meter has multiple units available, including German degrees, English degrees, French degrees, gpg, mmol/L, and mg/L. It offers 2 to 5 points of calibration, allowing users to choose their preferred concentration calibration points. The device also features manual temperature compensation to eliminate measurement errors caused by temperature fluctuations. With a small size and lightweight design, the water hardness meter is easy to carry around for on-site measurements. Its large LCD screen ensures clear readings even in low-light conditions, making it an invaluable tool for monitoring and treating water quality in various settings, including industrial applications, environmental monitoring, and domestic use. The display's sleek design combines with its affordability, allowing users to calibrate the device using two to five precise points, including a choice of five concentration levels. The water hardness measurements can be displayed in various units such as German degrees (°dH), English degrees (°e), French degrees (°fH), gpg, mmol/L, or mg/L. To prevent temperature-related errors, the device features manual temperature compensation. Key details about this electronic water hardness meter include its large, clear screen for easy reading in low light conditions, simple and intuitive buttons for navigation, a compact design for convenient on-site measurements, and a foam-filled case that safeguards all components, including calibration solutions and instructions.