

HYDRATION TEST

URINE SPECIFIC
GRAVITY TEST

Instruction
Manual

Diagnox

SUMMARY

The hydration test by Diagnox® checks the body's hydration level by measuring the urine's specific gravity. Urine Specific Gravity (USG) is a measure of the concentration of electrolytes and other substances in your urine, relative to the amount of water. USG also indicates how effectively our kidneys concentrate urine and maintain optimal nutrient, electrolyte, and fluid balance.

All physiological systems in the human body are influenced by our hydration level. Optimal hydration is essential for maintaining body temperature, lubricating joints, and enabling the transportation of nutrients and oxygen to cells. It supports metabolic functions, aids in digestion, and facilitates the removal of waste and toxins. Moreover, staying well-hydrated is critical for cognitive functions, affecting mood, concentration, and memory; it is also fundamental for muscular endurance and overall physical performance. Scientific studies show that dehydration can impair aerobic capacity, muscle endurance, and mental performance. It also elevates the likelihood of suffering from heat exhaustion and heat stroke. Chronically atypical USG is linked to several serious medical conditions, including diabetes insipidus, hypertension, and renal stenosis, among others.

Diagnox hydration test strips are designed for regular and repeated testing, making it both convenient and affordable. This allows you to take preemptive actions to maintain an optimal hydration state. Since hydration levels are dynamic, changing throughout the day, and unique to each individual, not solely dependent on the number of glasses of water you drink, a USG test can help determine your true hydration level.

Individual packaging of each test helps to keep each strip fresh and protected from humidity and moisture, ensuring reliable testing for every use. Unlike conventional strips in spin-top bottles that expire within a few days after opening, individually packaged dipsticks offer an extended shelf life, convenient handling, and easy storage.

INTENDED USE

Diagnox urine hydration test strips are intended for semiquantitative measurement (estimate of the quantity) of urine's specific gravity to estimate the body's hydration status.

WHO CAN BENEFIT FROM THIS TEST?

Testing hydration levels for wellness monitoring is beneficial for various groups of people, each with specific needs or circumstances that make monitoring their hydration status particularly important:

- Athletes and physically active individuals.
- People with certain health conditions, such as UTIs, diabetes, heart, and kidney diseases.
- Older adults.
- People working in hot climates.
- Individuals trying to manage weight.
- Patients in clinical settings, especially those with fluid restrictions or receiving diuretic therapy.
- Pregnant and breastfeeding women.
- People with a history of hyponatremia.
- Individuals engaged in high-altitude activities.

In general, while everyone should be mindful of their hydration, these specific groups may need to pay extra attention due to their increased risk of either dehydration or overhydration.

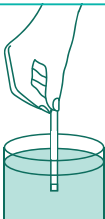
DIRECTIONS FOR USE

This test can be used by directly urinating on the strip or immersing it in a urine sample container. The latter method, immersing in a urine sample container, is preferred as it yields average results for the entire sample.

Start with a freshly collected urine sample in a clean, dry container. Tear open the sealed bag and remove the strip. Hold the strip without touching the test pad.

Follow the following simple steps.

1



IMMERSE

Immerse the strip into the urine sample for 1 – 2 seconds and remove it immediately. Run the edge of the strip against the rim of the urine container to remove excess urine. Alternatively, hold the strip in the urine stream just long enough to wet the test pad.

2

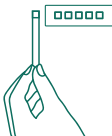


WAIT

Start timing. Blot the side of the strip on a paper towel to remove excess urine. Lay the strip with the test pad facing upwards on a paper towel.

Results are ready to read 45 seconds after the pad is wet.

3



COMPARE

Compare the color of the test pad to the provided color key to find the closest color match. Read the results carefully in a good light.

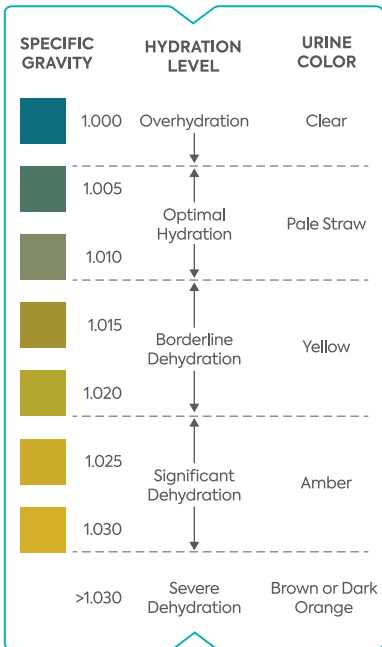
Note: A color change that appears after 2 minutes is of no diagnostic significance.

Say goodbye to guesswork and hello to smart, informed decisions about your well-being.

With the free Urinox app, simplify tracking your test results and unveil insightful health trends.

COLOR CHART

The correlation between the color changes on the test pad, USG values, and the corresponding hydration levels is shown below.



SCAN THIS QR CODE
AND START USING
THE FREE URINOX
MOBILE APP.



WHAT DO THE RESULTS IMPLY?

Typically, a urine specific gravity (USG) within the range of 1.002 to 1.030 is considered clinically normal. It's not uncommon for results to fall slightly outside this range. The higher the USG value, the more concentrated the urine is. For reference, the specific gravity of plain water is 1.000.

From a clinical perspective, this wide 'normal' range for USG may not align with the optimum range for a healthy individual, especially athletes or people who regularly engage in physical activity or exercise. Given the rapid loss of water and electrolytes during physical exertion, even slight variations in USG can quickly lead to abnormal levels. This can significantly impact physical performance and may increase the risk of injury.

HYDRATION LEVELS

Different levels of hydration can be inferred depending on your USG reading:

1. OVERHYDRATION

USG: Less than 1.005

- Very low values suggest overhydration, characterized by an excess of water relative to solutes. This imbalance can dilute essential electrolytes, increasing the risk of hyponatremia, which is an abnormal decrease in blood sodium levels.
- In cases of diabetes insipidus, the kidneys lose their ability to concentrate urine, resulting in low USG. Additionally, the consumption of diuretics, coffee, or alcohol may also contribute to low USG.

2. OPTIMAL HYDRATION (EUHYDRATION)

USG: 1.005 – 1.010

- Euhydration refers to the state of optimal total body water content, regulated by the brain, where the kidneys efficiently dilute urine to eliminate waste products while minimizing excessive water loss.

- Urine within this range is typically light in color, resembling pale straw or light yellow. This is commonly used as a visual indicator of good hydration.

3. BORDERLINE/MILD DEHYDRATION

USG: 1.011 – 1.020

- Values in this range indicate minimal dehydration. This may be a sign that body is beginning to conserve water, likely due to insufficient intake or increased fluid loss, such as through sweating.
- Urine becomes more concentrated and may appear yellow. Early signs of dehydration, like dry mouth or thirst, may occur, and it is advisable to increase fluid intake accordingly.

4. SIGNIFICANT DEHYDRATION

USG: 1.021 – 1.030

- Indicates a significant deficit in fluid levels (3% to 5% dehydration), often due to intense exercise, illness, or reduced fluid intake. This could be accompanied by physical signs such as decreased skin turgor, lethargy, and reduced urine output.
- The urine may appear amber in color. Active rehydration strategies are usually necessary.

5. SEVERE DEHYDRATION

USG: Greater than 1.030

- Signifies severe dehydration, where the kidneys concentrate urine to the maximum extent possible to preserve the body's remaining fluid. The urine may be a shade of brown or dark orange.
- Severe dehydration is a medical emergency as it can result in hypovolemia, electrolyte imbalances, and kidney damage if not promptly treated. Immediate medical attention and intervention with oral or intravenous fluids are critical to restore hydration balance.

CARE TO KNOW

Hydration refers to the state of maintaining adequate fluid levels in the body. It represents a balance between water, electrolytes, nutrients, and other compounds essential for various bodily functions. Both insufficient fluid replacement (hypohydration) and excessive fluid intake (hyperhydration) can significantly impact your health and well-being.

WHY MEASURING HYDRATION IS IMPORTANT?

Testing hydration levels is helpful for several reasons, particularly in ensuring overall health, optimizing physical performance, and preventing dehydration-related health issues. The importance of measuring and maintaining optimum hydration includes:

Supports Cellular Function: Every cell in the body needs water to function correctly. Water is vital for cellular homeostasis and biochemical reactions. Both poor hydration and over-hydration can adversely impact cellular functions, organ health, and the entire body.

Enhances Physical Performance: For athletes and those engaged in physical activities, optimal hydration is crucial for peak performance. Both dehydration and overhydration can compromise athletic performance during exercise and competitive sports. Dehydration can reduce strength, focus, and increase the risk of injury, as well as escalate cardiovascular stress during intense exercise. Conversely, over-hydration due to excessive intake of fluids can increase the risk of bloating, gastrointestinal discomfort, and body mass gain – all undesirable traits during sports or any physical activity.

Promotes Mental Clarity and Cognitive Function: Hydration status significantly impacts cognitive function, concentration, and mood. Even mild dehydration can affect cognitive abilities, impair attention, judgment, and memory. Scientific

evidence suggests that both under and over-hydration can dull the ability to perceive and interpret sensory information.

Assists in Metabolism, Weight Management, and Digestive Health: Adequate hydration is vital for digestion, promoting satiety, nutrient absorption, supporting gut health, and preventing digestive issues like constipation, gastritis, ulcers, and GERD.

Supports Kidney Function: Staying well-hydrated helps in maintaining a healthy glomerular filtration rate (GFR), a measure of how well the kidneys are filtering blood. Optimal hydration helps prevent kidney stones by increasing urine flow and diluting substances in the urine. Adequate fluid intake also helps prevent UTIs by flushing bacteria from the urinary tract.

Helps Toxin Elimination: Optimal hydration supports the body's natural detoxification systems, including the kidneys, liver, digestive system, lymphatic system, and skin.

Ensures Nutrient Transport: Adequate hydration maintains proper blood volume for efficient circulation, ensuring effective nutrient transportation and absorption, and supporting the health of vital organs and tissues.

Provides Thermoregulation: Optimal hydration enables adequate sweat production, maintains blood volume for heat dissipation, prevents heat stress conditions, supports cardiovascular function, and contributes to overall body temperature stabilization.

Prevents Overhydration: Excessive water intake can put you at risk of water intoxication or hyponatremia, where sodium levels diminish, causing swelling in organs and tissues.

Testing hydration levels can involve simple methods like observing the color of urine, monitoring the frequency of urination, and being aware of thirst cues. Hydration test strips from Diagnox offer a more precise method using urine specific gravity measurements. Understanding and maintaining optimal hydration is key to health and well-being.

RECOMMENDED HYDRATION LEVEL FOR ATHLETES

For athletes, pregame hydration status is crucial for optimizing performance. Studies indicate that about 50% of individual and team-sport athletes are dehydrated at the start of competition. Even a 1% to 2% dehydration of body weight can start to impact performance. Dehydration exceeding 3% of body weight significantly disturbs physiological functions and increases the risk of exertional heat illnesses, such as heat cramps, heat exhaustion, or heat stroke. It's recommended that physically active individuals maintain euhydration, which is within +1% to -1% of body weight. This corresponds to a USG of 1.005 to 1.010. Given the substantial sweat loss that can occur in competitive sports within a short period, maintaining euhydration with minimal variation is vital. This allows the body to efficiently regulate temperature and maintain cardiovascular function during intense activity.

HOW OFTEN SHOULD I MEASURE MY HYDRATION LEVELS?

Body hydration levels are dynamic, meaning they fluctuate throughout the day. For instance, first-morning urine is generally more concentrated, typically resulting in a higher USG value. Factors like fluid intake, diet, climate, hormonal (circadian) rhythms, and activity levels significantly influence your body's hydration status. A spot urine test provides a snapshot of your hydration status at a specific moment. For a comprehensive hydration profile, it's advisable to monitor USG multiple times throughout the day. Relying on a single data point for a conclusive assessment can be misleading. For clinical evaluation using USG measurements, it is recommended to check USG on a 24-hour urine sample for a comprehensive analysis.

McDermott BP, et al., "National Athletic Trainers' Association Position Statement: Fluid Replacement for the Physically Active," *J Athl Train.* 2017;52(9):877-895.

James LJ, et al., "Does Hypohydration Really Impair Endurance Performance? Methodological Considerations for Interpreting Hydration Research," *Sports Med.* 2019;49(Suppl 2):103-114.

LIMITATIONS AND INTERACTIONS

While urine tests are generally reliable, there are instances where they can yield incorrect results. Understanding the potential causes of inaccuracies is important:

- **Old Urine Samples:** Always use a fresh urine sample for testing to avoid inaccuracies.
- **Non-Sterile Urine Containers:** Containers cleaned with detergents, antiseptics, or quaternary ammonium compounds can cause false positives. Use clean, sterile containers for collecting urine samples.
- **Highly Buffered Alkaline Urine:** Alkaline urine (pH greater than 6.5), possibly due to medications, supplements, or a vegetarian diet, can result in false negatives.
- **High Protein Concentration:** Elevated protein levels in urine can falsely increase USG readings, suggesting dehydration when it may not be the case.
- **Prolonged Dipstick Immersion:** Leaving the dipstick in the urine too long can wash out the chemicals on the reagent pads. Immerse the pad for only 1 – 2 seconds.
- **Contaminants in Urine:** Vaginal discharge, semen, heavy mucus, pus, and blood in the urine sample can lead to false positives.

Understanding these limitations helps ensure more accurate results and informed interpretations of urine tests.

WARNING AND PRECAUTIONS

- Store in a dry place at 2–30°C (36–86°F). Do not freeze. Keep out of direct sunlight.
- The strip should remain in the sealed pouch until use.
- Long-term exposure to air may cause inaccurate readings.
- Do not use if the pouch is torn or damaged.
- Do not touch the test pad of the strip.
- Discard any discolored strips that may have deteriorated.

STORAGE AND HANDLING

Please read all the information in this package insert before performing the test.

- For urine testing only.
- Do not use for blood testing.
- The used strip should be discarded according to local regulations after testing.
- Keep out of the reach of children.
- Do not use after the expiration date.
- For *in vitro* diagnostic use. Not to be taken internally.



We believe that promoting and sharing knowledge is a form of care. With this mission, we make it easy for people to take charge of their own health.

Listen to your body and get to know yourself to own yourself.

Being the protagonist of your well-being is having information at the palm of your hand. With that in mind, we provide innovative health tests that provide accurate results along with simple-to-understand information and all the support needed for you to connect the dots and be aware of your health. After all, good decisions come from good information.

It is knowledge from the inside out that guides us to look after ourselves and others around us, raising awareness for better health for all.

Diagnox

Care to Know. Know to Care.

QUESTIONS?

For questions, please contact us at:

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