



HUERISTIC
D E V I C E S

FLIP

A smartphone based
water test kit

User Manual

Version 2.0

1 Before you begin

Before you start testing, you need to:

Clean the apparatus (measuring tubes and testing chambers) with distilled water.

Dispose any rinse off as well as excess / leftover solutions into the jar of activated charcoal that has been provided for safe disposal

Keep tissue paper at the ready so that you can wipe the testing chamber dry as well as clean up any excess spillage

Note: Turn on the switch of the light box to illuminate the box before starting any test

2 Before you begin

2.1 What your kit should contain

- Reagents
- Distilled water
- Jar of activated charcoal
- 15ml measuring tubes
- 50ml measuring tubes
- Funnel
- Filter Paper
- Sample bottle
- Testing chambers (Borosil and PVC)
- Titration solution
- Calibration solutions
- Light Box with rechargeable battery
- Colour Cards

2.2 Downloading and preparing the app

Download the HD Pro App from the Google Play Store:

<https://play.google.com/store/apps/details?id=dev.hueristic.pro>

Or scan the barcode below to download



After you have installed the app, you will be asked to scan a barcode. Scan this barcode.



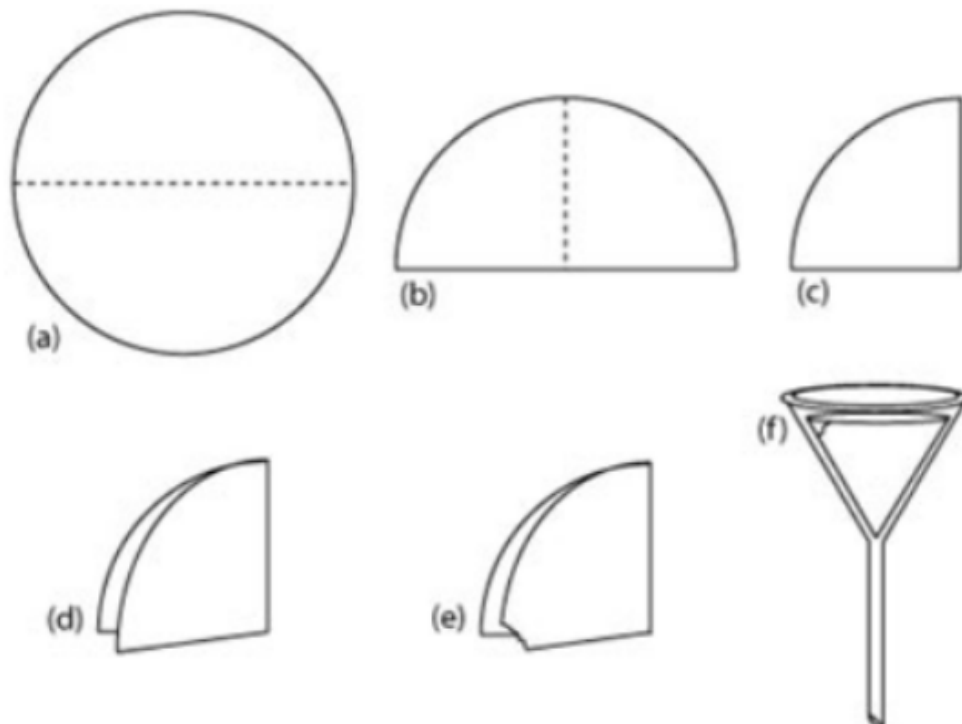
Now click on **Get Blank Form**. To begin testing, click on **Fill Blank Form**, and select the appropriate form downloaded. Navigate the form by clicking **Next** or **Back**.

3 Testing with the HD Pro Water app

3.1 Sample Filtration

This step is only necessary for colorimetric tests if the sample water is visibly turbid or has a noticeable colour. Do not filter samples for the turbidity or colour tests.

1. Take the sample bottle provided and fill it with the sample to be tested
2. Take the filter paper and fold it as illustrated



3. Insert the folded filter paper into the funnel (f)
4. Insert this Funnel with the filter paper inside into a 50 ml test tube
5. Slowly pour 25-30ml of sample water over the funnel into the test tube
6. Wait for 10-15 minutes for the sample water to be properly filtered
7. Your filtered sample is ready for testing

3.2 Standard Testing Procedure

The standard testing procedure for all tests is almost the same. The variables are marked with a * and specified in the tables

3.2.1 Titration Procedure

Refer to the Table of Variables below for variations in measurements

1. Measure out exactly the required amount* of your sample in a 50 ml
2. measuring tube.
Add the required amount of reagent(s)*
3. Shake well to ensure proper mixing of reagents
4. Add the titration solution/titrant for the parameter you are testing for drop by drop, counting the number of drops you have added till the sample solution undergoes the intended colour change*
7. Enter the number of drops of titration solution used
8. Approve the entry
9. Your result will be displayed on the screen

Table of variables

Parameter	Volume of Sample (ml)	Reagent	Mixing Procedure	Colour change to look for while adding titration solution
Total Hardness	25	Bottle of reagent A, bottle of reagent B, and bottle of titrant	<p>Add 20 drops of reagent A and 1 spoon of reagent B, and Mix contents well.</p> <p>Titrate with titrant bottle drop by drop Count the number of drops.</p>	Red to Blue
Total Alkalinity	10	Bottle of P - Alkalinity reagent, bottle of T Alkalinity reagent and bottle of titrant	<p>Add 3 drops of P - Alkalinity reagent and mix well.</p> <p>Pink colour indicates p-alkalinity reagent . Add titrant drop by drop till the pink colour disappears. Note the number of drops in titration 1 drops. If pink does not appear, note 0 in titration 1 drops.</p> <p>To this solution add 3 drops of T Alkalinity reagent and the solution will turn blue-green. Titrate drop by drop till it turns reddish violet. Note the number of drops in titration 2</p>	<p>Pink to Colourless</p> <p>Blue - green to reddish violet</p>

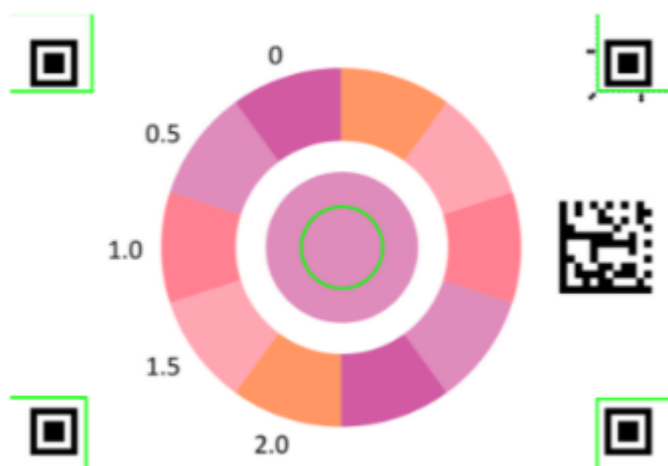
3.2.2 Colorimetric Test Procedure

Calibration

Calibration is the process of teaching your phone to relate colour intensity to find the quantity of the parameter being tested. Calibration influences the quality of test results that are based on it. There is a one point calibration that needs to be performed once with the calibration solution provided before starting any new parameter or when there is a renewal of reagents.

Refer to the Table of Variables for variations in measurement

1. Take 5ml of calibration solution (10 ml for for Turbidity and Hazen Units) in a 15ml measuring tube
2. Add the required* amount of reagent (Same amount as is required while
3. testing)
4. Mix well
5. Pour 5 ml of the solution into the testing chamber
6. Place the testing chamber into the holder in the box
7. On the next page click on "Calibrate"
8. Read the instructions on the screen and press "Start"
9. Click on "Start Timer" and wait the required amount of time for the reaction to take place
10. The camera immediately opens up once the specific time is up
11. Point your phone to align the green coloured grid on the screen with your colour card setup. *Tip: First get the card in focus, then move the phone so that you approach the grid from above.*



12. In case of an error message while calibrating, re-calibrate
13. On successful scanning, you will be hinted at the calibrated point and the colour shift
14. Press accept
15. Your phone is now calibrated. You can now begin testing samples

Note: Calibration needs to be done only once for every parameter. The "Calibrate" options changes to "Re-calibrate" when calibration is complete. There is no need for re-calibration before testing every sample.

Table of Variables

Parameter	Volume of sample (ml)	Reagent	Mixing Procedure	Range
Fluoride	5	Bottle of Fluoride Reagent	Add 5 drops of reagent to the sample. Shake gently 2-3 times	0 - 2 mg/l
Nitrate	5	Strips of Reagent A and Reagent B	Add 1 tablet each of Reagent A and Reagent B to the sample. Shake till dissolved.	0 - 75 mg/l
Free Chlorine	5	Bottle of Chlorine Reagent	Add 3 drops of the chlorine reagent to the sample. Shake will.	0 - 3 mg/l
Total Iron	5	Bottle of reagent A and bottle of reagent B	Add 1 drop of Iron reagent A and 5 drops of reagent B to the sample. Shake 2-3 times.	0 - 1.5 mg/l
pH	5	Bottle of universal pH indicator	Add 1 drop of pH indicator to the sample. Shake gently 2-3 times.	4 - 10

Testing

Refer to the Table of Variables for variations in measurements.

1. Measure out 5 ml (10 ml for Turbidity and Hazen Units) of your sample in a 15 ml measuring tube.
2. Add the required amount of reagent(s)*
3. Shake well to ensure proper mixing of reagents
4. Pour 5 ml of the solution into the testing chamber
5. Place the testing chamber into the holder in the box
6. Follow steps 6-12 as listed in the titration procedure

7. Click on "Start Test"
8. Read the instructions on the screen and press "Start"
9. On the next page click on "Start Timer"
10. The camera immediately opens up once the specific time is up
11. Point your phone to align green coloured grid on the screen with your colour card setup
12. Your result will be displayed on the screen

3.2.3 Turbidity and Hazen Units Test Procedure

Calibration

You are provided with 0, 10, 20, 40 NTU of turbidity and 0, 25, 50, 100 HU of Hazen Units solutions and distilled water. Using these solutions, you will need to calibrate the phone for all these points before you can begin the tests. (0 HU/NTU = Distilled water).

Note: Turbidity sample and calibration solutions need to be shaken vigorously and tested immediately after.

To Calibrate: (Example given with 20 NTU. Follow the same procedure and complete calibration for all points listed.)

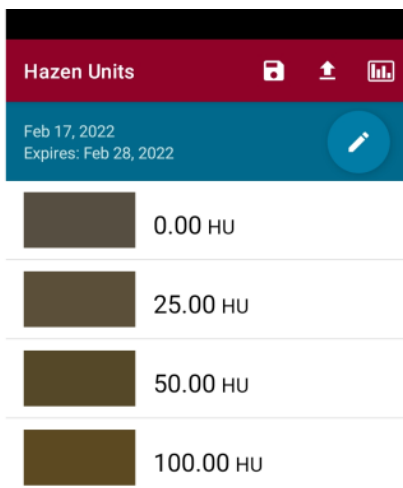
1. Take 10 ml of 20 NTU solution in the 50ml tube and shake vigorously for 1-2 minutes
2. Immediately pour 20ml of the solution into the borosil glass chamber provided
3. Place the testing chamber in the space provided in the light box (Use blue cuvette as a background in case of Turbidity)



4. You will be prompted that the calibration is not completed and will be taken to a page with the calibration points
5. You will see a number of standard concentrations (0, 10, 20, 40) on the screen where calibration is required
6. Click on 20 to calibrate for 20 HU/NTU and place the phone on top of the light box
7. Next enter the reagent expiration date (2/12/22)
8. Click on "Start Camera" and align the camera to the centre of the chamber in a clear no shadow region for Hazen Units (For turbidity align it to the centre)



9. Click on "Analyze"
10. You will hear a number of beeps accompanied by a long beep when the test is complete (Make sure to keep the phone absolutely still on top of the box during the beeping sound)
11. Click on "Accept"
12. Repeat for all points



13. Once each point has been calibrated, you will be able to start testing

Table of Variables (Turbidity and Colour)

Parameter	Sample Volume (ml)	Mixing Procedure	Range
Hazen Units	10	Take 10 ml of sample and fill the cuvette till it is full.	0 - 100 HU
Turbidity	10	Take 10 ml of sample and fill the cuvette till it is full.	0 - 40 NTU

Testing

Refer to the Table of Variables for variations in measurements

1. Take 10 ml of sample solution in the 50ml tube and shake vigorously for 1-2 minutes
2. Immediately pour 10 ml of the solution into the testing chamber (In case of turbidity, use the blue/black chamber provided)
3. Place the testing chamber in the space provided in the light box
4. Click on "Start Camera"
5. Align the camera to the centre of the chamber in a clear no shadow region for Hazen Units (For turbidity align it to the centre as illustrated above)
6. Click on "Analyse"
7. You will hear a number of beeps accompanied by a long beep when the test is complete (Make sure to keep the phone absolutely still on top of the box during the beeping sound)
8. Your result will be displayed on the screen

3.2.4 EC and TDS meter provided along with a manual inside the package