bluelab®
soil pH meter

Care and use guide

Contents

www.getbluelab.com

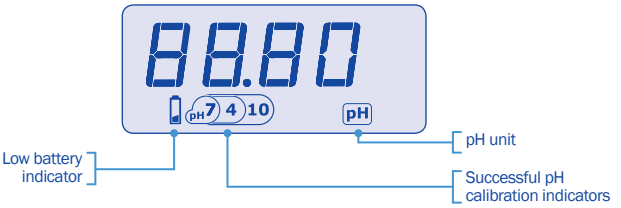
Features

Lightweight and portable	Successful pH calibration indicator
Large easy to read display	2 x AAA alkaline batteries included
Simple push button pH calibration	Auto off function
Replaceable soil pH probe included	Low battery indicator
Over range and under range indicators	

Bluelab Soil pH Meter

Soil pH probe storage cap

The soil pH probe tip must not be allowed to dry out. Always place the storage cap back onto the soil pH probe after each use. Ensure the cap contains enough Bluelab pH Probe KCl Storage Solution to cover the probe tip.



ATTENTION
If it dries, it dies!

Keep your soil pH probe tip wet
at all times to avoid permanent damage

1.0 Introduction

The Bluelab Soil pH Meter has two press buttons; 'calibrate' and power. The power button requires a short press; release in about one second. The 'calibrate' button requires a long press; hold for at least three seconds and release when the display starts flashing.

Turning the soil pH meter on and off

1. A short press of the power button will turn the soil pH meter on. The soil pH meter automatically turns off after approximately four minutes if no buttons are pressed. If the soil pH meter turns off before the reading is taken, short press the power button to turn the soil pH meter on again.

2.0 Preparing for use

The following tasks must be performed before the Bluelab pH Meter is used for the first time.

1. **Insert batteries.**
   See section 8.0.

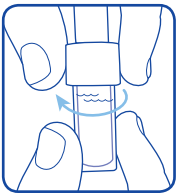
2. **Connect soil pH probe**
   Connect the soil pH probe to the soil pH meter by lining up the lugs of the BNC fittings. Fasten securely by pushing the pH probe connector on and twisting one quarter turn.

Attaching the Bluelab Soil pH Probe to the Meter

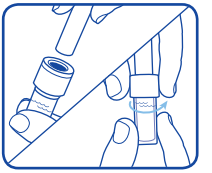
3. **Remove the storage cap**
   Remove the pH probe storage cap by gripping the top of the cap and gently twisting the base one rotation clockwise to loosen slightly. Next slowly slide the cap off the pH probe. DO NOT completely remove the base of the cap from the top of the cap.

   CAUTION: When the soil pH probe is not in use, add enough Bluelab pH Probe KCl Storage Solution to the storage cap so the probe tip is covered. Then replace the cap and store in a secure place.

   DO NOT use RO (Reverse Osmosis), Distilled or De-ionized water. Pure water changes the chemistry in the reference, causing the probe to die.



Removing soil pH probe storage cap



Ensure probe tip is covered by the KCl storage solution in cap

4. **Calibrate the pH**
   Calibrate the soil pH meter by following the instructions in section 3.0 of this manual.
   This must be done before the soil pH meter is used for the first time.

See section 3.0 for calibration steps

3.0 Calibration

pH calibration is required before first use and then monthly to ensure readings are accurate.

For accurate pH readings the soil pH probe is cleaned and recalibrated when:

- The reading is different to what you were expecting.
- The batteries have been removed or changed.
- The soil pH probe is replaced with a new one or is disconnected from the soil pH Meter.
- The pH calibration indicators have disappeared.

When calibrating the pH after first use the soil pH probe needs to be cleaned. See soil pH probe cleaning in section 8.0. The soil pH probe does not need to be cleaned for initial calibration.

For best pH calibration

pH reading accuracy is dependant on the accuracy and age of the calibration solutions used, and use and cleanliness of the soil pH probe tip.

- Ensure the soil pH probe has been cleaned and rinse the soil pH probe tip with clean water between calibration solutions to reduce contamination of the pH solutions.
- Only fresh uncontaminated solutions should be used.
- Calibrate the pH at the same temperature as the solution to be measured.
- ALWAYS calibrate the soil pH probe with pH 7.0 then pH 4.0 or pH 10.0.

The pH calibration involves cleaning the soil pH probe tip and then calibrating in TWO SOLUTIONS.

If a reading below pH 7.0 is expected, use pH 7.0 and pH 4.0 calibration solutions.
If a reading above pH 7.0 is expected, use pH 7.0 and pH 10.0 calibration solutions.
Follow the steps below for soil pH meter calibration.

Storage and use of calibration solutions

- Always place the lid back onto the bottle after use or evaporation will occur rendering the solution useless.
- Store in a cool place.
- DO NOT measure directly into the bottle. Tip a small amount into a clean container and discard after use.
- Never add water to solutions.

pH reading accuracy is dependant on the accuracy and age of the calibration solutions used, and use and cleanliness of the soil pH probe tip.

3.0 Calibration cont.

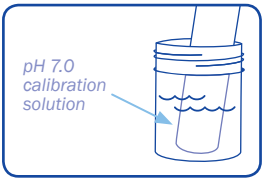
To calibrate the pH

1 Clean soil pH probe tip.

See section 8.0 (the soil pH probe does not require cleaning before the first use).

2 pH 7.0 calibration

a) Turn soil pH meter on. Rinse soil pH probe tip in fresh water, shake off excess water and place in a pH 7.0 calibration solution. Wait for at least one minute or longer if required for reading to stablize to a constant value.



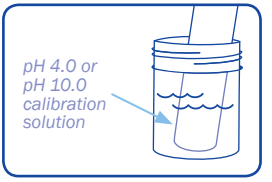
b) Long press the 'calibrate' button. When the display shows CAL release button.

pH 7 indicator is displayed indicating a successful pH 7 calibration.

The pH 4 indicator will now flash indicating pH 4.0 or pH 10.0 calibration is now required.

c) If Err appears during the calibration process see section 9.0.

d) The soil pH meter must be calibrated to two points. If after an hour the soil pH meter has not been calibrated with a second calibration point the calibration indicators disappear and the soil pH meter reverts to an uncalibrated state. Calibration is required.



3 pH 4.0 / 10.0 calibration

a) Rinse the pH probe tip in fresh water, shake off excess water and place the pH probe tip in either pH 4.0 or pH 10.0 calibration solution.

b) Wait for at least one minute for reading to stabilize to a constant value.

c) Long press the 'calibrate' button. When the display shows CAL release button.

pH 7 / pH 4 is displayed

or pH 7 / pH 10 is displayed

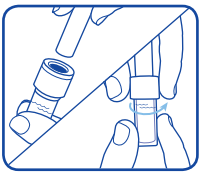
Successful pH 7 and pH 4 calibration

d) The pH meter is now calibrated and ready for use.

e) After 30 days, the calibration indicators disappear to let you know calibration is required.

4 Store the soil pH probe

Add enough Bluelab pH Probe KCl Storage Solution into the probe storage cap to fully submerge the soil pH probe tip. Place storage cap on probe.



Ensure probe tip is covered by the KCl storage solution in cap

4.0 Information about measuring the pH of soils/media

pH is the measurement of the hydrogen ion concentration (H+) - acidity and its opposite, alkalinity. Neutral pH is 7.0 pH. Acidity measures below seven pH (7.0 pH) with alkalinity measuring above it (7.0 pH). See chart below.

In soils or growing media, pH strongly influences the availability of nutrients and the presence of microorganisms in the soil.

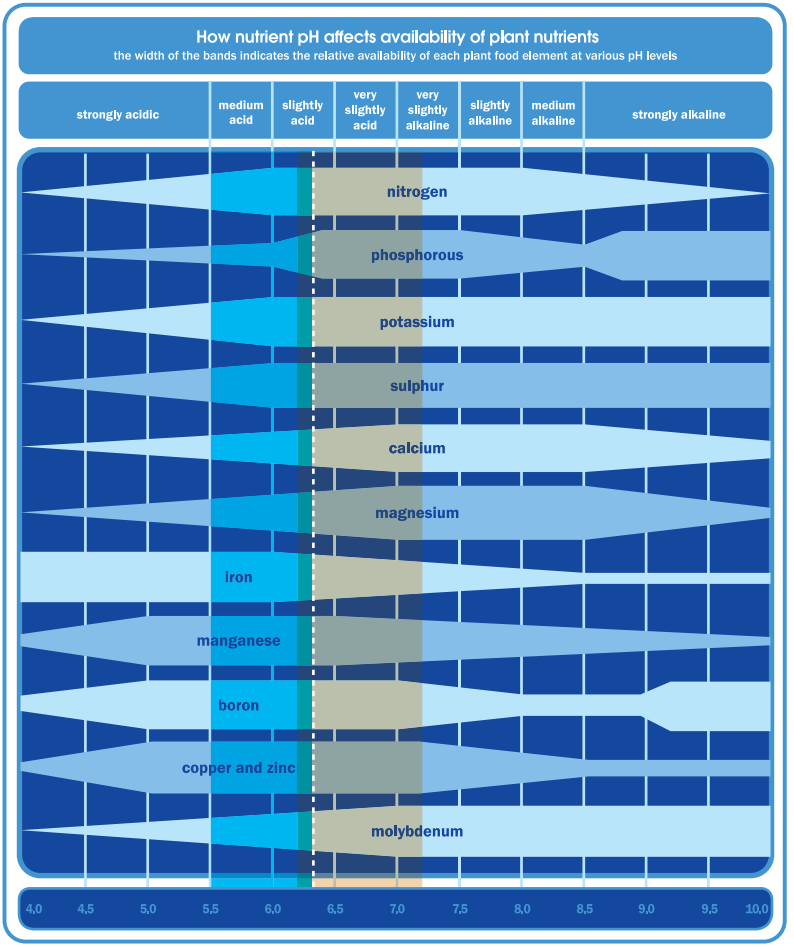
Certain plants require a particular pH range to enable the required nutrients to be consistently available to the plant. If the solution is too acidic or too alkaline it can cause "lock up" – a situation which restricts certain elements essential for growth from being absorbed by the root structure. This in turn reduces plant health and performance. Deficiencies in the required elements become apparent in plant growth and can lead to crop failure.

Low soil pH causes aluminium and manganese toxicity in plants and reduces the availability of soil phosphorus. High soil pH also reduces soil phosphorus availability and reduces micro nutrients such as zinc and boron to plants.

The chart below shows how nutrient pH levels influence the uptake of certain elements.

Recommended pH range for plants grown in: Solution 5.5 - 6.3 Soil 6.2 - 7.2

can be plant specific



4.0 Information about measuring the pH of soils/media cont.

Taking pH measurements of soils with an electronic meter is indicative rather than absolute.

The following factors are outside the control of any soil pH meter, so to minimise their effect on the accuracy of the pH measurement you should consider the following precautions:

Moisture level/raw water

If the sample you are wishing to measure is dry, add RO water or distilled water to moisten. Ideally wait 24 hours before you take a measurement.
NOTE: If you add tap water, you will influence the soil pH reading based on the pH of the tap water.

Calibration of the soil pH meter and cleanliness of the soil pH probe tip

Calibrating the soil pH meter at least monthly will ensure accurate readings. Cleaning the soil residue from the probe tip and storing the soil pH meter in a clean moist state will provide reliable readings as well as prolonging the probes life.

Sample selection

For field testing, remove the top 5 - 10 cm / 2 - 4" of the top of the soil. Samples are taken approximately 15 - 20 cm / 6 - 8" down into the substrate and from various areas, then an average of the readings is used.

For container grown plants, it is recommended to check the pH level of the substrate prior to planting.

Factors affecting pH in the soil or media:

Soil type
Soils formed under high rainfall conditions (e.g. Eastern USA) are more acidic than those formed under dry conditions (e.g. Western USA).

Growth stage of the plant
Uptake and requirements of particular elements change as the plant progresses through it's growing cycle. Recording pH level data to create a history is valuable.

Applications and types of fertilizers
Applications and types of fertilizers can alter the pH level significantly. The time at which you take the reading is important. Evaluate the brand of fertilizer to see if it is altering the pH in the wrong direction.

Applications of sprays
As sprays can soak into the soil/media, a change to the pH level could result.

Soil/media temperature
High temperature soils may have a high concentration of CO_2. The higher the concentration of carbon dioxide pressure results in more carbonic acid which lowers pH.

pH range for soil crops
The recommended pH range for soil crops is 6.2 - 7.2, but this is plant specific.

5.0 Measuring the pH value

Once the Bluelab Soil pH Meter has been set up and calibrated, using it to measure a pH value involves using the Bluelab Soil pH Probe, the green dibber/auger, a soil/media sample and button functions. NOTE: The soil pH probe tip must not have dried out. If it has dried, soak the soil pH probe in tap water for one hour prior to taking a measurement.

1. Remove the top 5 cm / 2 in. from the surface of the sample area.
2. Insert the dibber/auger into the sample to a depth of about 20 cm / 8 in. and remove.
3. If the soil/media is dry, moisten with a small amount of distilled water.
4. Remove the storage cap and insert the soil pH probe to the same depth ensuring the probe end makes proper contact with the soil.
5. Turn the soil pH meter on.
6. Wait for the reading displayed on the soil pH meter to stablize to a constant value. This can take up to four minutes. Record the reading.
7. Remove the soil pH probe from the soil/media and wash the soil pH probe tip under fresh running water (not distilled) to remove any remaining soil residue.
8. Repeat the procedure in different locations and take the average of the measured data as the pH level is representative of the sample area.
9. If the soil pH meter turns off while taking a measurement, simply press the power button to turn the soil pH meter back on and continue with your measurement.
10. Store the soil pH probe between measurements. See section 10.0.

6.0 Measuring soil solution pH value

The greatest source of error in soil analysis comes during sample collection. An effort should be made to ensure each sample properly represents the area being sampled.

- *The readings taken with this method could be higher than those taken by other methods*
- *Consistency of the method used is important to be able to compare sets of results*
- *The accuracy of this method cannot be guaranteed because of the variables involved*
- *The results should be viewed as 'indicative' rather than 'absolute'*

Collection of sample

1. Sample in a zig-zag pattern across the required area.
2. Remove 15 mm / 5/8 in. of top soil before sampling at a depth of 150 mm / 6 in.
3. Mix all collected samples together thoroughly.
4. Allow to dry in the air or in an oven at 40 °C / 104 °F.
5. Weigh out 20 g / 0.7 oz of the collected soil into a 150 ml / 5 fl oz plastic sample jar.

Sample preparation

1. Add 100 ml / 3 fl oz of distilled or deionised water, screw lid on tightly.
2. Shake continuously for 5 minutes. Leave overnight and shake again the next morning.
3. Allow to settle for 15 minutes after shaking and strain sample into clean measuring cup.

Take pH readings as follows:

1. Remove the storage cap and insert the soil pH probe tip into the soil solution sample.
2. Turn the soil pH meter on.
3. Wait for the reading displayed on the soil pH meter to stablize to a constant value. This can take up to four minutes. Record the reading.
4. Remove the soil pH probe from the soil solution and wash the soil pH probe tip under fresh running water (not distilled) to remove any possible soil residue.
5. If the soil pH meter turns off while taking a measurement, simply press the power button to turn the soil pH meter back on and continue with your measurement.

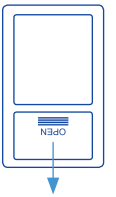
Store soil pH probe between measurements

1. See section 10.0.

7.0 Battery replacement

Batteries are replaced in the Bluelab Soil pH Meter when the low battery indicator appears on screen. The low battery indicator remains on and the Bluelab Soil pH Meter continues to operate until the batteries die or are replaced.

1. Open battery compartment by sliding the back cover down and insert 2 x AAA batteries as shown on the battery holder. Slide cover back on. NOTE: Alkaline batteries are recommended.
2. ***IMPORTANT: Check the batteries at least once every six months for signs of deterioration, rusting or swelling.***
   If signs of deterioration are found, clean battery holder contacts and replace batteries.

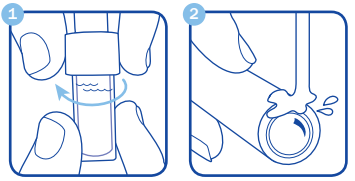


Battery cover

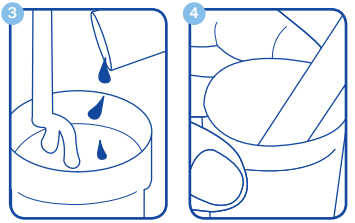
8.0 Cleaning the Bluelab Soil pH Probe

To ensure accurate readings the soil pH probe tip needs to be rinsed in water after each use and cleaned prior to calibration using the following instructions.
The storage cap must always be put back on after cleaning. Always ensure it contains enough Bluelab pH Probe KCl Storage Solution to cover the probe tip.

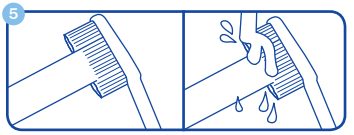
1. **Remove storage cap from soil pH probe.**
   Hold the top of the storage cap, twist the cap to loosen then remove.
2. **Rinse soil pH probe tip under fresh tap water.**
   Never use RO (Reverse Osmosis), Distilled or De-ionized water.



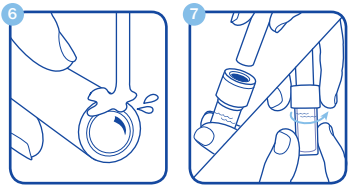
3. **Fill a small plastic container with clean tap water.**
   Add a small amount of Bluelab pH Probe Cleaner or mild detergent (dishwashing liquid).
4. **Gently stir the probe tip in the mixture.**
   Ensure that you do not 'knock' the soil pH probe on the side of the container as this may cause damage to the probe.
   Rinse well under fresh running water to remove all traces of the detergent mixture.



5. **If the probe tip requires removal of heavy contamination:** Gently brush around the glassware with a few drops of Bluelab pH Probe Cleaner or mild detergent (dishwashing liquid) and a soft toothbrush.



6. **Rinse well under fresh running tap water to remove all traces of the detergent mixture.**
7. **Calibrate soil pH probe after cleaning, see section 3.0** After calibration, store soil pH probe in the storage cap, ensuring there is enough KCl Storage Solution to cover the probe tip.



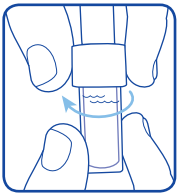
9.0 Hydrating the soil pH probe

Hydrate the soil pH probe in Bluelab pH Probe KCl Storage Solution when:

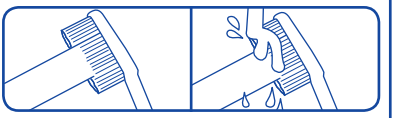
- *the probe tip has not always been stored in KCl storage solution, to improve the reading response speed.*
- *the probe tip has been accidentally allowed to dry out*

Never use RO (Reverse Osmosis), De-ionized or Distilled water.
Pure water changes the chemistry in the reference, causing the probe to die.

1. **Loosen, then remove the storage cap.**
   Place the soil pH probe upright in a plastic container.

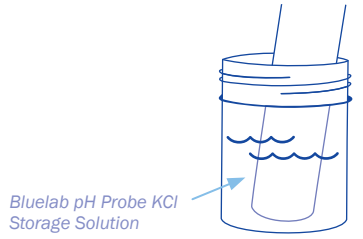


2. **Clean the soil pH probe tip.**
   Ensure the probe tip is cleaned before hydrating. See section 8.0 for instructions.



3. **Add enough Bluelab pH Probe KCl Storage Solution to a plastic container to submerge the soil pH probe tip.**

4. **Leave to soak for at least 24 hours.**
   After hydration, always calibrate the soil pH probe to ensure accuracy, see section 3.0.



10.0 Storing the Bluelab Soil pH Meter

1. **Store the soil pH meter in a cool, dry and clean place when not in use.**

2. **Keep out of direct sunlight.**
   Keep soil pH meter out of direct sunlight to prevent irreparable damage to the LCD reading display.

3. **The soil pH meter is not waterproof but will withstand occasional water splashes.**
   If the soil pH meter is splashed, wipe dry as soon as possible.

4. **Remove batteries if the pH Meter is to be stored for a prolonged period.**

5. **Remove pH probe if storing the pH Meter without use for longer than two to three weeks and check regularly that the pH probe tip has not dried out.**

   When storing the soil pH probe, the soil pH probe tip must be kept moist.

   To prepare the soil pH probe for storage, add enough Bluelab pH Probe KCl Storage Solution to the storage cap so the probe tip is covered. Then replace the cap and store in a secure place. DO NOT use RO (Reverse Osmosis), Distilled or De-ionized water. Pure water changes the chemistry in the reference, causing the probe to die.

11.0 Error messages

An error message will only appear following pH calibration failure.

'Err' will be displayed for a few seconds then the display will show the previous reading. Successful pH calibration indicators will disappear. The Bluelab Soil pH Meter is in an uncalibrated state, therefore recalibration is required. See causes of Error messages below.

Possible causes for an 'Err' message:

- Calibration solutions contaminated
- Wrong solutions used
- pH probe contaminated
- pH probe not properly attached
- pH probe worn out or damaged
- Calibrate to pH 7.0 FIRST then to pH 4.0/10.0

12.0 Technical specifications

	pH
Measurement range	0.0 - 14.0 pH
Resolution	0.1 pH
Accuracy at 25 °C/77 °F	±0.1 pH
Calibration	Two point pH 7.0 and pH 4.0 or pH 10.0
Temperature compensation	Not applicable
Operating environment	0 - 50 °C 32 - 122 °F
Power source	2 x AAA alkaline batteries

13.0 Troubleshooting guide

Trouble	Reason	Correction
pH reading inaccurate	Contaminated soil pH probe / glassware not clean.	Clean soil pH probe (see section 8.0); then calibrate.
	Wick contaminated, blocked or dry.	Hydrate probe in KCl storage solution for 24 hours, see section 9.0. Do not measure proteins or oils with this unit. Replace unit.
	Incorrect pH calibration.	Ensure calibration solutions are accurate. Replace if in doubt. Wait longer for readings to stabilize before calibrating to a constant value.
	pH calibration unreliable.	Calibrate soil pH probe (see section 3.0).
	soil pH probe damaged or old.	Replace soil pH probe.
pH reading does not change from solution to solution	Broken glass bulb, tube or connector.	Check soil pH probe for damage. Replace probe.
Displays low battery indicator	Insufficient power to take a reliable reading.	Replace the batteries. DO NOT use rechargeable batteries.
No display	Batteries dead or inserted incorrectly.	Check batteries are inserted correctly. Replace if necessary.
Display shows 'Err'	Problem with pH calibration.	See error message descriptions in section 11.0 of this document.
Or **Ur** **While in pH mode**	Over range pH. Under range pH.	Solution > 14.0 pH. Solution < 0.0 pH. Check pH probe connection. pH probe could be faulty. pH meter could be wet inside.

Bluelab Soil pH Probe replacement

The Bluelab pH Probe is the only part of the Bluelab Soil pH Meter that requires replacing.

Soil pH probes do not last forever. They age through normal use and will eventually fail.

To ensure you receive a long life from your soil pH probe, please read the instructions provided with it.

When the time comes to replace your Bluelab Soil pH Probe all you have to do is order a replacement from your supplier!

Bluelab Probe Care - pH

The instrument is only as accurate as the probe is clean!

Probe cleaning is one of the most important parts of owning and operating any Bluelab meter, monitor or controller.

If the probe is contaminated (dirty) it affects the accuracy of the reading displayed.

Bluelab Probe Care Kit - pH contents:

- Cleaning instructions inside box lid
- 500ml pH4.0 and pH7.0 calibration solutions
- Plastic cups
- Bluelab pH Probe Cleaner
- Toothbrush (probe cleaning instrument)

Bluelab pH Probe KCl Storage Solution

The perfect solution to store and hydrate your Bluelab pH products.

Bluelab pH Probe KCl Storage Solution is designed to increase response time and maximize the life of Bluelab pH pens and pH probes.

For best results, use the KCl solution to store the pH pen/ probe after use and hydrate monthly.

Instructions are on the label of the bottle.

Use Bluelab pH Probe KCl Storage Solution with:

- Bluelab pH Pen
- Bluelab Soil pH Pen
- Bluelab pH Probes
- Bluelab Soil pH Probes

Bluelab Soil pH Meter product guarantee

Bluelab Corporation Limited guarantees this product for a period of **5 years (60 months)** from the date of sale to the original purchaser. (This guarantee does not cover the Bluelab Soil pH Probe. The Bluelab Soil pH Probe is covered by a separate 6 month guarantee.)

The product will be repaired or replaced should it be found faulty due to component failure, or faulty workmanship. The faulty product should be returned to the point of purchase.

The guarantee is null and void should any internal parts or fixed external parts be tampered with or altered in any way, or should the unit have been incorrectly operated, or in any way be maltreated. This guarantee does not cover reported faults which are shown to be caused by any or all of the following: Contaminated measuring tip (see instruction manual for cleaning instructions), flat or damaged batteries or batteries that have been incorrectly inserted, or damaged battery contacts or connections caused by incorrect battery replacement, or ingress of moisture into the meter case.

NO RESPONSIBILITY will be accepted by Bluelab or any of its agents or resellers should any damage or unfavourable conditions result from the use of this product, should it be faulty or incorrectly operated.

Register your guarantee online at www.getbluelab.com

Limitation of Liability

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vimeopro.com/bluelab/videos

If you need assistance or advice - we're here to help you.
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