

EasyKristaTest – operating instructions

Conductometer for the determination of the potassium hydrogen tartrate saturation temperature, the calcium tartrate saturation temperature and for the performance of the minicontact process in wine

1. Preliminary examination

The EasyKristaTest leaves our house in good condition and carefully packed. On receipt of the kit, please check for completeness and examine the items carefully if any damage has occurred during shipment. For possible returns of defective items, please use the original packing material.

Each kit is supplied with:

- EasyKristaTest – conductivity meter with conductance cell and temperature sensor
- Kali-Contact
- Calci-Contact
- Calibration solution
- Cleaning solution
- Measuring spoons
- 60 mL beaker with lid

2. Description of the instrument

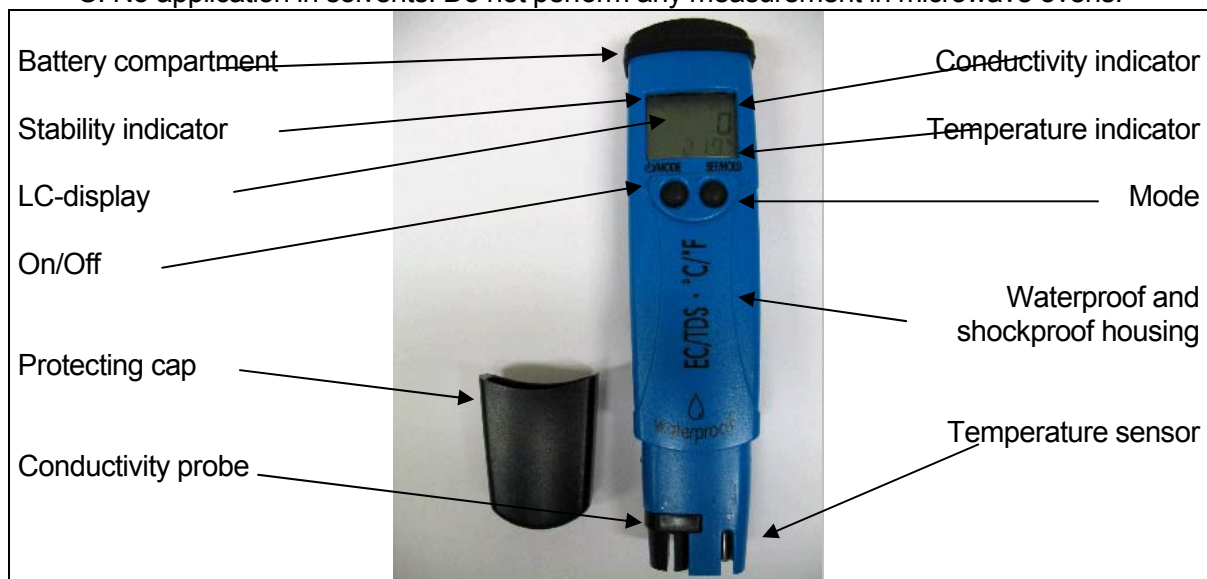
The EasyKristaTest is a very robust, waterproof, shockproof and floatable meter. Conductivity and temperature are measured and indicated at the same time. Electric conductivity (EC) and total dissolved solids (TDS) functions are interchangeable and temperature values can be displayed in °C or °F units. The selected adjustments are indicated on the display. All readings are automatically temperature compensated.

The EC/TDS conversion factor (CONV) and the temperature compensation coefficient (BETA) are selectable by the user.

Measurements are highly accurate with the stability indicator (symbol ☉) on the liquid crystal display (LCD).

During times when the meter is not in use, the measuring cells for conductivity and temperature are storable in dry condition and protected by a plastic cap.

Safety recommendation: the EasyKristaTest must be applied in accordance with the recommendations for use in beverages only and aqueous solutions up to a maximum of 50 °C. No application in solvents. Do not perform any measurement in microwave ovens.



ERBSLÖH Geisenheim AG ♦ Erbslöhstraße 1 ♦ D-65366 Geisenheim ♦ Tel: +49 6722/708-0 ♦

Fax: +49 6722/6098 ♦ info@erbsloeh.com ♦ www.erbsloeh.com

3. Energy supply

The energy supply for about 100 hours, is provided by 4 x 1.5 V batteries, which are located in the compartment (black) on top of the meter. The meter displays the remaining battery percentage every time it is switched on. When the battery level is < 5 %, the battery symbol on the LCD lights up to indicate a low battery condition. To change batteries, the 4 screws located on the top of the meter have to be removed. After the batteries have been replaced (pay attention to polarity!) the top is replaced, making sure that the gasket is properly seated in place and that the screws are tightened to ensure a watertight seal. To save energy, the instrument is automatically turned off after 8 minutes of operation. Measured values are not stored.

4. Technical Data

Measuring range:

Temperature	0.0 – 60.0 °C	in 0.1 °C steps
EC	0 – 3999 µS/cm	in 1 µS/cm steps
TDS	0 – 2000 ppm (NaCl)	in 1 ppm steps
Temperature compensation		Beta 0.0 – 2.4 % per °C
Environment		0 – 50 °C; RH 100%
Calibration		automatic, at 1 point
Calibration solution		1413 µS/cm
Auto-off		after 8 minutes
Weight		85 g

5. Operation

To turn the EasyKristaTest conductometer on:

Press the left button. All the used segments on the LCD will be visible for a few seconds, followed by a percent indication of the remaining battery life. Then the meter is ready for use.

Taking measurements:

Submerge the probe of the EasyKristaTest conductometer into the solution to be measured. During measurement, do neither agitate nor stir the sample to be tested. As soon as the symbol ☉ on the top left of the LCD disappears, the measurement is stable and should be taken. Conductivity is shown in the middle of the display in bigger letters; the temperature below on the right side in smaller letters.

To turn the EasyKristaTest conductometer off:

Press the left button until „OFF“ appears on the display.

Please observe the notes and indications on calibration and cleaning.

6. Calibration

For calibration, use the calibration solution included in the kit. The meter should be calibrated whenever:

- the instrument has not been in use for some time
- the instrument is regularly and frequently used, then calibrate at least once per month
- the conductivity probe is replaced

Performance: from normal measurement mode, press and hold the left button for 3 – 4 seconds and release the button when „CAL“ appears on the display. Immerse the probe into the calibration solution. Do not move/stir the calibration solution. Calibration is performed automatically. When completed, the LCD will display „OK“ briefly and the meter will return to normal measurement mode.

7. Cleaning

After each measurement, the probe of the EasyKristaTest must be rinsed with clear water, the residual water is shaken off. In case of repeated use, daily careful rinsing with warm water or demineralized water is recommended. Dependent on the frequency of use, every 4 – 6 weeks a thorough cleaning with the cleaning solution included in the kit should be conducted.

8. Probe replacement

The probe for temperature measurement is made from refined steel and practically indestructible. Thus replacement is not necessary.

Due to suspended matter and other deposits, the sensitivity and accuracy of measurement of the conductivity probe can turn ineffective. As soon as calibration is no longer possible, the probe must be replaced. For this purpose, the supplied tool is inserted into the probe cavity. With half a rotation counterclockwise the probe can be pulled out by using the other side of the tool. The new probe can be inserted following the above instructions in reverse order. The sealing ring must be properly seated in place. After replacement of the probe, calibration is necessary.

9. Further adjustments

To change the temperature unit:

The EasyKristaTest conductivity meter is adjusted to °Celsius. To change to °Fahrenheit, from measurement mode, press the left button, until „TEMP“ is displayed on the LCD. By pressing the right button, the temperature unit can be changed to °F. To return to the normal measuring mode, press the left button 3 times.

To change the temperature compensation coefficient:

From measurement mode, press and hold the left button until „TEMP“ is displayed on the LCD; press the same button again twice and „BETA“ is shown on the display. By pressing the right button a value between 0 and 2.4 can be selected. For the evaluation of the crystal stability, a „Beta-value“ of 2.4 is required and the meter is set to this value. By pressing the left button, the selected value is stored. The measuring mode is shown on the display.

In the same way, the EC/TDS conversion factor „CONV“ can be changed. The meter is adjusted to a value of 0.5; the available range is 0.45 – 1.00.

10. Disposal information

Valid only for deliveries within the Federal Republic of Germany.

Registration number: WEEE-Reg.-No. DE 70432862

The Erbslöh Geisenheim AG provides for a regular disposal of all electrical devices, which have been put into circulation by us after 13th August 2005. You may return unserviceable instruments to us for disposal.

11. Accessories available for subsequent delivery

Art. no. 62804	replaceable conductivity probe with probe removal tool
Art. no. 62802	calibration solution 1413 µS/cm
Art. no. 62803	cleaning solution
Art. no. 62502	Kali-Contact
Art. no. 62503	Calci-Contact
Art. no. 62806	measuring spoon
Art. no. 62805	60 mL beaker with lid

Determination of the potassium hydrogen tartrate saturation temperature in wine with the EasyKristaTest

Principle of measurement

Every wine contains an individual amount of dissolved potassium hydrogen tartrate. Increased potassium hydrogen tartrate amounts can lead to crystal precipitations later on. To the wine to be tested, an excess quantity of finely ground potassium hydrogen tartrate is added at room temperature. The amount of potassium hydrogen tartrate which is then dissolved, leads to an increase in conductivity. From this conductivity increase, the original potassium hydrogen tartrate saturation temperature can be calculated.

Instrument and laboratory equipment

EasyKristaTest – conductivity and temperature meter
60 mL beaker with lid
measuring spoon

Reagents

Kali-Contact – finely ground potassium hydrogen tartrate	art. no. 62502
calibration solution	art. no. 62802
cleaning solution	art. no. 62803

Performance

About 40 mL of the – to the greatest extent clear – wine to test (with excess CO₂ shaken out!) are filled into a 60 mL beaker and closed with the lid. The sample is allowed a rest period of approx. 30 minutes to adapt to a room temperature of > 18 °C.

The initial conductivity is measured and taken down as LF1 value (Leitfähigkeit 1 = conductivity 1).



Add Kali-Contact – a measuring spoon-tipfull. Shake the sample well to evenly distribute the crystals. Wait for approx. 5 minutes and shake again.

After a short settling time – without stirring up the crystals – conductivity is measured again and taken down as LF2 value.

Read off the wine temperature and take down as T.

Calculation

$T - (LF2 - LF1) : 33 = Tsät$ (Sättigungstemp. = K-hydrogen tartrate saturation temp.) in °C.

The parenthesis is calculated first, i.e., LF1 is subtracted from LF2. This difference is then divided by factor 33 and the resulting value deducted from the wine temperature. The result is the potassium hydrogen tartrate saturation temperature of the wine in °C.

Practical example

The conductivity of the wine is 1820 $\mu\text{S}/\text{cm}$. After the Kali-Contact addition the measured conductivity amounts to 1970 $\mu\text{S}/\text{cm}$. The calculated conductivity difference is 150 $\mu\text{S}/\text{cm}$. This difference divided by 33 makes a value of 4.5. Wine temperature is 21 °C. The value of 4.5 subtracted from 21 results in a potassium hydrogen tartrate saturation temperature of 16.5 °C.

Evaluation of measured results

Wine type	Saturation temperature	Evaluation/recommendation
Base wines for sparkling wine	below 10 °C, if possible	after sparkling wine-making, the sample is stable
White wines and rosé wines	below 12 °C	the wine is stable
	between 12 and 16 °C	the wine is instable, treatment with Metavin [®] Opti or MetaGum [®]
	between 16 and 20 °C	the wine is very instable; cold storage or Metavin [®] Opti / MetaGum [®]
	above 20 °C	the wine is extremely instable; longer cold storage and new analysis
White wines, rich in extract	below 15 °C	the wine is stable
	between 18 and 21 °C	the wine is very instable; cold storage or Metavin [®] Opti / MetaGum [®]
	above 21 °C	the wine is very instable; cold storage or Metavin [®] Opti / MetaGum [®]
Light red wines	below 14 °C	the wine is stable
	between 17 and 20 °C	the wine is very instable; cold storage or Metavin [®] Opti / MetaGum [®]
	above 20 °C	the wine is very instable; cold storage or Metavin [®] Opti / MetaGum [®]
Heavy red wines	below 15 °C	the wine is stable
	between 18 and 21 °C	the wine is very instable; cold storage or Metavin [®] Opti / MetaGum [®]
	above 21 °C	the wine is very instable; cold storage or Metavin [®] Opti / MetaGum [®]

Wines with increased saturation temperature can be tested by means of the minicontact process to determine their tendency to crystallize.

The indications are based on the experience of several years. The risk of potassium hydrogen tartrate precipitations or the formation of other crystal deposits can however not be fully excluded.

Determination of the calcium tartrate saturation temperature in wine with the EasyKristaTest

Principle of measurement

Every wine contains an individual amount of dissolved calcium tartrate. Increased calcium tartrate amounts can lead to crystal precipitations later on.

To the wine to be tested, an excess quantity of finely ground calcium tartrate is added at room temperature. The amount of calcium tartrate which is then dissolved, leads to an increase in conductivity. From this conductivity increase, the original saturation temperature can be calculated.

Instrument and laboratory equipment

EasyKristaTest – conductivity and temperature meter
water bath
60 mL beaker with lid
measuring spoon

Reagents

Calci-Contact – finely ground calcium tartrate	art. no. 62503
calibration solution	art. no. 62802
cleaning solution	art. no. 62803

Performance

About 40 mL of the – to the greatest extent clear – wine to test (with excess CO₂ shaken out!) are filled into a 60 mL beaker and closed with the lid. The sample is warmed in a water bath to a temperature of 25 – 30 °C.

The initial conductivity is measured and taken down as LF1 value (Leitfähigkeit 1 = conductivity 1).



Add Calci-Contact – a measuring spoon-tipfull. Shake the sample well to evenly distribute the crystals.
Allow a rest period in the water bath of approx. 15 minutes and shake from time to time.

After a short settling time – without stirring up the crystals – conductivity is measured again and taken down as LF2 value. Read off the wine temperature and take down as T.

Calculation

$T - (LF2 - LF1) : 4 = Tsät$ (Sättigungstemp. = Ca-tartrate saturation temperature) in °C.

The parenthesis is calculated first, i.e., LF1 is subtracted from LF2. This difference is then divided by factor 4 and the resulting value deducted from the wine temperature. The result is the calcium tartrate saturation temperature of the wine in °C.

Evaluation

The calcium tartrate saturation temperature should be below 20 °C.

The indications are based on the experience of several years. The risk of calcium tartrate precipitations or the formation of other crystal deposits can however not be fully excluded.

ERBSLÖH Geisenheim AG ♦ Erbslöhstraße 1 ♦ D-65366 Geisenheim ♦ Tel: +49 6722/708-0 ♦

Fax: +49 6722/6098 ♦ info@erbsloeh.com ♦ www.erbsloeh.com

Our technical product leaflets and the treatment recommendations they contain, are based on our current knowledge and experience and we make all reasonable efforts to ensure the accuracy of the information it provides. But since pre-treatment is mostly unknown to us and moreover imponderabilities with regard to the natural products to treat have to be taken into consideration, the advice given provides general information and serves for your consultation. Without a separate, written statement from our side on a defined matter or problem, the information provided should not be relied upon as legal advice or regarded as a substitute for legal advice and is without liability. The information provided is in accordance with the law in force of the Federal Republic of Germany and the EU. In addition, our general terms of business apply. Edition 02/07 – EasyKristaTest_Bedienungsanleitung_englisch.doc - printed on 19.06.2007

Performance of the minicontact process in wine with the EasyKristaTest

Principle of measurement

Every wine contains an individual amount of dissolved potassium hydrogen tartrate. Increased potassium hydrogen tartrate amounts mean that the saturation temperature of the wine is increased, a fact which can lead to crystal precipitations later on.

The minicontact process can be used to test the tendency of a wine to crystallize. To do so, the wine is cooled to $< + 5\text{ °C}$, contact potassium hydrogen tartrate is added and conductivity is measured to determine whether by a decrease in conductivity, crystallization in the wine has occurred.

Instrument and laboratory equipment

EasyKristaTest – conductivity and temperature meter
cooling bath/refrigerator
60 mL beaker with lid
measuring spoon

Reagents

Kali-Contact – finely ground potassium hydrogen tartrate	art. no. 62502
calibration solution	art. no. 62802
cleaning solution	art. no. 62803

Performance

About 40 mL of the – to the greatest extent clear – wine to test (with excess CO_2 shaken out!) are filled into a 60 mL beaker and closed with the lid. The sample is cooled in a cooling bath or refrigerator for approx. 1 hour to a temperature of $< + 6\text{ °C}$.

The initial conductivity is measured and taken down as LF1 value (Leitfähigkeit 1 = conductivity 1).



Add Kali-Contact – a measuring spoon-tipfull. Close the lid and shake the sample well. Then place in the cooling bath / refrigerator and shake several times in the first 2 hours.

Cool for a further full 2 hours and more, then measure conductivity again in the clear supernatant – without stirring up the crystals and without warming – and take the measured value down as LF2.

Calculation

$\text{LF1} - \text{LF2} = \text{conductivity difference in } \mu\text{S/cm}$

Evaluation

Conductivity difference $< 50\ \mu\text{S/cm}$ – the wine is stable as to potassium hydrogen tartrate

Conductivity difference $> 50\ \mu\text{S/cm}$ – the wine is instable as to potassium hydrogen tartrate and tends to crystallize.

Evaluation of the potassium hydrogen tartrate stability of a wine

Different factors have an impact on the **potassium hydrogen tartrate stability** of a wine. Analytical parameters, for instance potassium content, tartaric acid content, pH-value and alcohol content have an impact; equally storage conditions – temperature, time, movement. Furthermore, extract and colloid content derived from the grape, from the yeast, or through the addition of high-molecular substances must be taken into account.

The potassium hydrogen tartrate stability can be actively controlled and affected by the way of storage (time, temperature), the treatment (deacidification, crystal stabilization), the removal of high-molecular substances (enzymatic treatment, fining, filtration), the addition of high-molecular substances (metatartaric acid, gum arabic, mannoprotein) and by blending or by the addition of Süßreserve (unfermented grape juice or partly fermented grape must for sweetening).

The easiest method to control the potassium hydrogen tartrate stability, is the determination of the **potassium hydrogen tartrate saturation temperature**. It is an indicator of the potassium hydrogen tartrate amount dissolved in a wine. If it is accordingly low, the wine is potassium hydrogen tartrate stable and further tests are not necessary. If the potassium hydrogen tartrate saturation temperature is increased, crystal precipitations are to be expected, yet, an increased wine saturation temperature does not automatically lead to crystal precipitations.

The tendency of a wine to crystallize can be determined by means of the **minicontact process**. For this purpose, seed crystals in the form of finely ground potassium hydrogen tartrate are added to the cooled wine. It is then checked if the, now in the wine dissolved potassium hydrogen tartrate amount, actually leads to crystallization or, if crystallization is prevented by other wine constituents.

By a **combination of both methods**, the potassium hydrogen tartrate stability of a wine can be evaluated relatively reliably, even if the saturation temperature is increased. It is therefore advisable with wines having increased saturation temperatures, to additionally check the tendency to crystallize with the minicontact process. If the test shows no conductivity change worth mentioning, the wine is stable in spite of oversaturation. If however a clear change in conductivity is determined, appropriate stabilization measures must be taken.

Please observe the operating instructions given in the test methods attached.



EasyKristaTest
according to Gernot Friedrich

Erbslöh Geisenheim AG
Erbslöhstrasse 1
65366 Geisenheim
GERMANY

To all users of the **Erbslöh EasyKristaTest**

Dear customer

We are glad that you have bought an **EasyKristaTest**. We would like to inform you in the future on further ways of application and on the market experience made with this instrument.

To be in a position to register you as a user, would you please fill in the form and return it to us.

Our Fax no. +49 6722 6098

We say thank you and you will receive some beakers, measuring spoons and an info-CD from us within the next days.

With best regards

Your Erbslöh-Team

I am a user of the **EasyKristaTest**

Name

Company

Street

Postal number/City

Country

Telephone

Fax

Email

ERBSLÖH Geisenheim AG ♦ Erbslöhstraße 1 ♦ D-65366 Geisenheim ♦ Tel: +49 6722/708-0 ♦

Fax: +49 6722/6098 ♦ info@erbsloeh.com ♦ www.erbsloeh.com

Our technical product leaflets and the treatment recommendations they contain, are based on our current knowledge and experience and we make all reasonable efforts to ensure the accuracy of the information it provides. But since pre-treatment is mostly unknown to us and moreover imponderabilities with regard to the natural products to treat have to be taken into consideration, the advice given provides general information and serves for your consultation. Without a separate, written statement from our side on a defined matter or problem, the information provided should not be relied upon as legal advice or regarded as a substitute for legal advice and is without liability. The information provided is in accordance with the law in force of the Federal Republic of Germany and the EU. In addition, our general terms of business apply. Edition 02/07 – EasyKristaTest_Bedienungsanleitung_englisch.doc - printed on 19.06.2007