User Manual

FOS/TAC 2000

PRONOVA ANALYSENTECHNIK GmbH & Co.KG

Automatic titration of total anorganic carbon (TAC) and volatile organic acids (FOS)

Version: 812-04.2015-EN

Date revised last: April 2015

This manual contains information concerning installation, operation and maintenance/service of the measuring device.

Certain activities – such as replacing hardware components or changing internal settings – may only be carried out by qualified personnel.

The manufacturer reserves the right to implement modifications at any time in order to adapt the user manual to the latest state of the art. Any reproduction or distribution of the user manual or any parts thereof, including translated versions, are subject to written approval.

The manufacturer does not assume any liability for errors or omissions, if any, in this documentation. Any liability for direct or indirect losses or damage arising in conjunction with the delivery or use of this documentation is excluded to the extent permitted by law.

This device left the factory in an impeccable, safe condition. In order to maintain this condition and in order to ensure safe operation, users must proceed in accordance with the information and warnings in this manual.

Please read this manual carefully before setting the device into operation!

All brands and their respective owners referred to in this manual are recognized and accepted. The manufacturer does not claim any rights with regard to such brands.

Should you have any questions concerning the use or maintenance of the device, please contact the manufacturer or distributor:

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Contents

1 General safety information

The following safety information must always be observed during operation as well as during any maintenance and repair work on this device. Non-compliance with safety measures or any other information or warnings contained in this user manual constitutes a violation of safety standards underlying the design, manufacture and proper use of the device.

Non-compliance with such information can cause hazards for users and/or damage to the device! The manufacturer does not accept any liability for losses or damage caused by non-compliance with such safety measures on the part of the customer.

In order to avoid any additional hazards, unauthorized modification of the device is not permitted. In the event that repair work is necessary, the device should be returned to our service centre after prior notification.

Users are not permitted to open the device. Certain activities – such as replacing hardware components or internal settings – may only be carried out by qualified personnel.

Devices which are suspected to be at fault or defective must be switched off and protected against unauthorized access until the necessary repair/service work has been performed by qualified personnel.

When working in explosive or flammable environments, do not operate the device without additional protection measures!

Possibility of aggressive media. Please refer to the safety data sheet for the titration solution contained in the appendix to this document!
When working with the device – for example, during measuring, calibration or maintenance work – always wear protective glasses and suitable protective clothing.

When connecting the device, make sure that the correct mains voltage is available, and proceed in accordance with the information in the section titled "Requirements for the place of installation, power supply".

Before performing any fault-finding or repair work, or before replacing any parts, disconnect the device from any voltage sources! In the event that work must be performed on the live, opened device, this may only be carried out by an informed skilled technician who must be familiar with the related risks and hazards!

2 Introduction

The crucial parameter for assessing the fermentation process is the ratio of volatile organic acids (VOAs) and the capability of the fermentation substrate to neutralise acid formation, i.e. buffer capacity (TAC). TAC means "Total Anorganic Carbon" and corresponds to the equivalent of all the buffer substances contained in the substrate. A rising VOA/TAC ratio means the risk of acidification of the fermenter substrate. Controlling the pH alone is often not sufficient, so that it is important to be able to determine the VOA/TAC values. The relatively simple VOA/TAC analysis enables the early detection of the onset of acidification and its avoidance by suitable counter-measures.

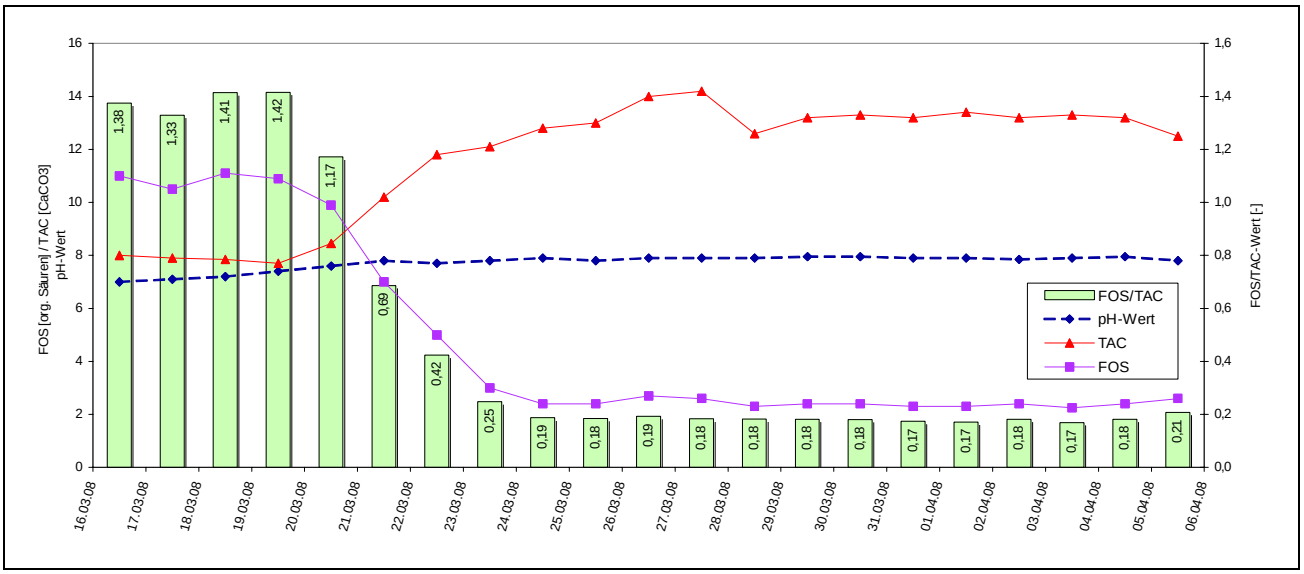


Illustration: FOS/TAC analysis diagram

FOS/TAC 2000 enables plant operators to perform FOS/TAC analyses without further external assistance. The fully automated system reduces operator errors to a minimum and enables a high repeatability rate. This is important because the most recent result must always be evaluated in light of the previous results. 5 g of fermenter substrate is necessary for the analysis and must be diluted to 20 g with distilled water. The subsequent titration process is fully automated. The results for total acids (VOA), the buffer capacity (TAC) and the VOA/TAC value are displayed after a few minutes. The benefits of using the small, compact lab at the biogas plant are obvious: Analyses can be performed more frequently than before. Furthermore, the results are immediately available.

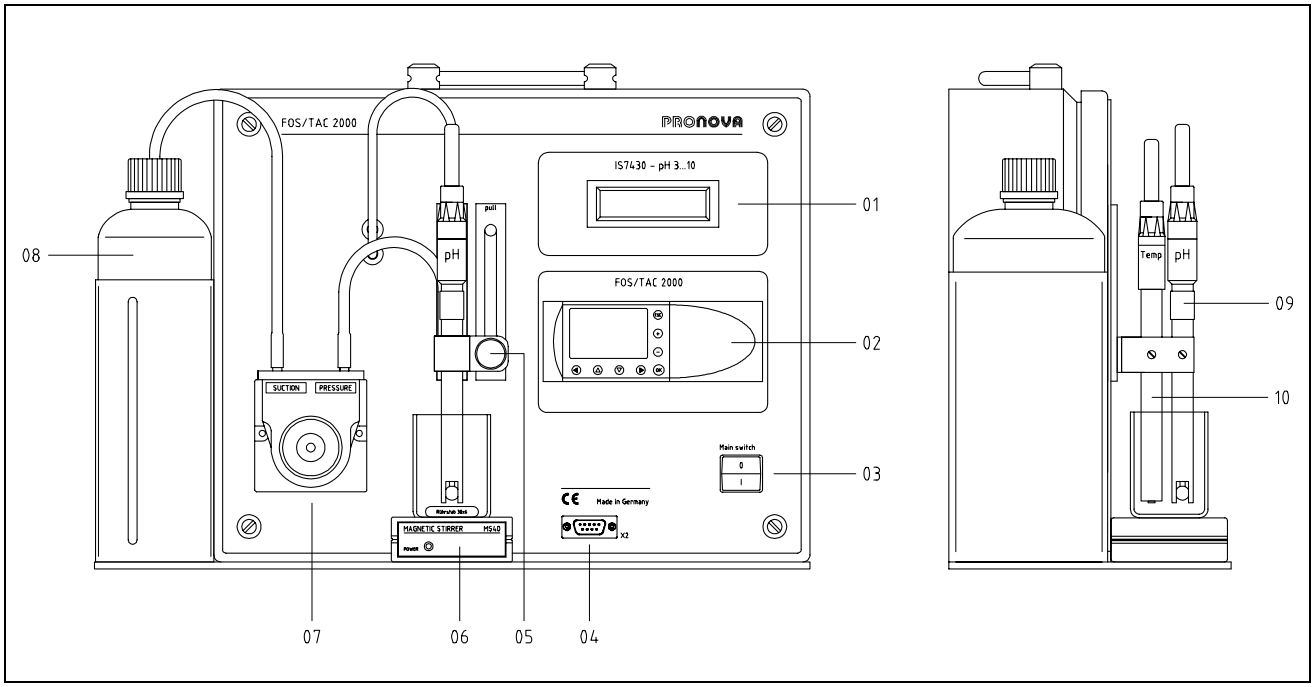
3 Hardware description

3.1 Measuring characteristics

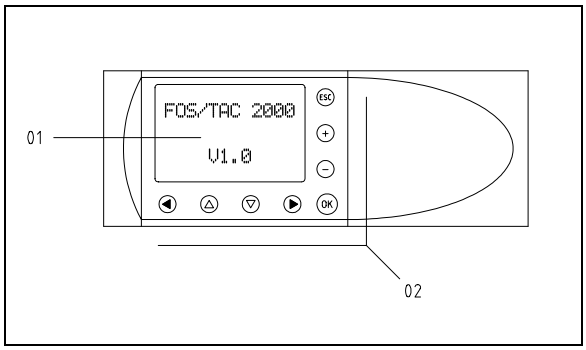
Gas type	Measuring range	Resolution	Measuring principle	Other
pH	0 ... 10 pH	0.001 pH	Combination electrode	
Temperature	0 ... 50 °C	0.01 °C	NTC	
FOS	1 ... 10 g/kg	0.01 g/kg	Titration	Unit: g $_{org.acids}$ / kg $_{substrate}$
TAC	5 ... 20 g/kg	0.01 g/kg	Titration	Unit: g $_{CaCO3}$ / kg $_{substrate}$
FOS/TAC	0.05 ... 2.00 -	0.01 -		Measured value calculated

The following sections deal with the installation, operation and calibration of the analyzer.

3.2 Elements of the analyzer



01	pH measurement IS 7430	05	Electrode support	09	pH electrode
02	FOS/TAC controller	06	Magnetic stirrer	10	Temperature sensor
03	Power switch	07	Peristaltic pump		
04	Service interface	08	Titration solution 1000ml		



View of the FOS/TAC controller

01 LC display / measured-value display
02 Function keys

The function keys of the controller are used to open the different user menus, for example, to start a measuring or cycle or a calibration process.

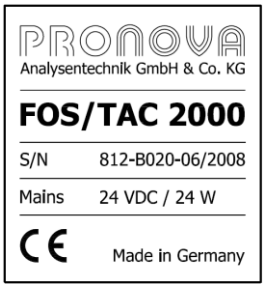
4 Scope of delivery, installation and setting into operation

4.1 Scope of delivery, rating plate and test certificates

Scope of delivery

Quantity	Description
1	FOS/TAC 2000 analyzer with 1000-ml titration solution bottle
1	Buffer solution pH 4, 100-ml bottle
1	Buffer solution pH 7, 100-ml bottle
1	Refill solution pH electrode 3 mol/l KCl, 100-ml bottle
1	Distilled water, 250-ml bottle
1	Spray attachment for 250-ml bottle (distilled water)
1	Refill syringe, 10ml (for refilling the pH electrode)
1	Protective glasses
1	Disposable gloves (PE), 50 pairs
1	Plug-in power supply unit (Euro) 24VDC/1A
2	Beaker 50ml, low design
1	Beaker 150ml, low design
2	Magnetic stirrer 30x6mm, PTFE
1	Sample sieve
1	Digital sample scales, measuring range 0-100 g / resolution 0.01g
1	User manual (German or English)
1	Test and calibration certificate of the analyzer

Rating plate



The rating place is located on the back of the device.

It contains the following information:

- Description of the device
- Manufacturing and serial number
- Voltage supply
- CE mark

Test and calibration certificate

The test and calibration certificate contains the following information:

- Manufacturing and serial number
- Calibration and result of test measurements
- Result of the function test
- Test result, including test date

4.2 Requirements for the place of installation

All major system components are installed in a housing with IP50 protection. The device is hence designed for installation in closed, air-conditioned rooms.

The device must be protected against adverse ambient conditions, such as:

- extreme cold,
- exposure to heat radiation, for example, sunlight, furnaces, boilers or gas motors,
- strong temperature fluctuations,
- dust accumulation and penetration,
- aggressive atmosphere and
- shock/vibration.

Climatic conditions	Air pressure (absolute)		850…1150 hPa
	Relative humidity		90% max.
	Ambient temperature	during storage and transport	+2…50 °C
		during operation	+10…+40 °C

4.3 Unpacking and setting into operation

Carefully remove the analyzer from the transport packaging and store it in a clean place. The analyzer was carefully packed for shipment. Before installing and setting into operation, check for possible transport damage. In the case of transport damage with signs of incorrect handling, have the damage recorded by the carrier (rail, post, mover) within seven days.

Make sure that the accessories enclosed (refer to the “Scope of delivery” section) are not lost.

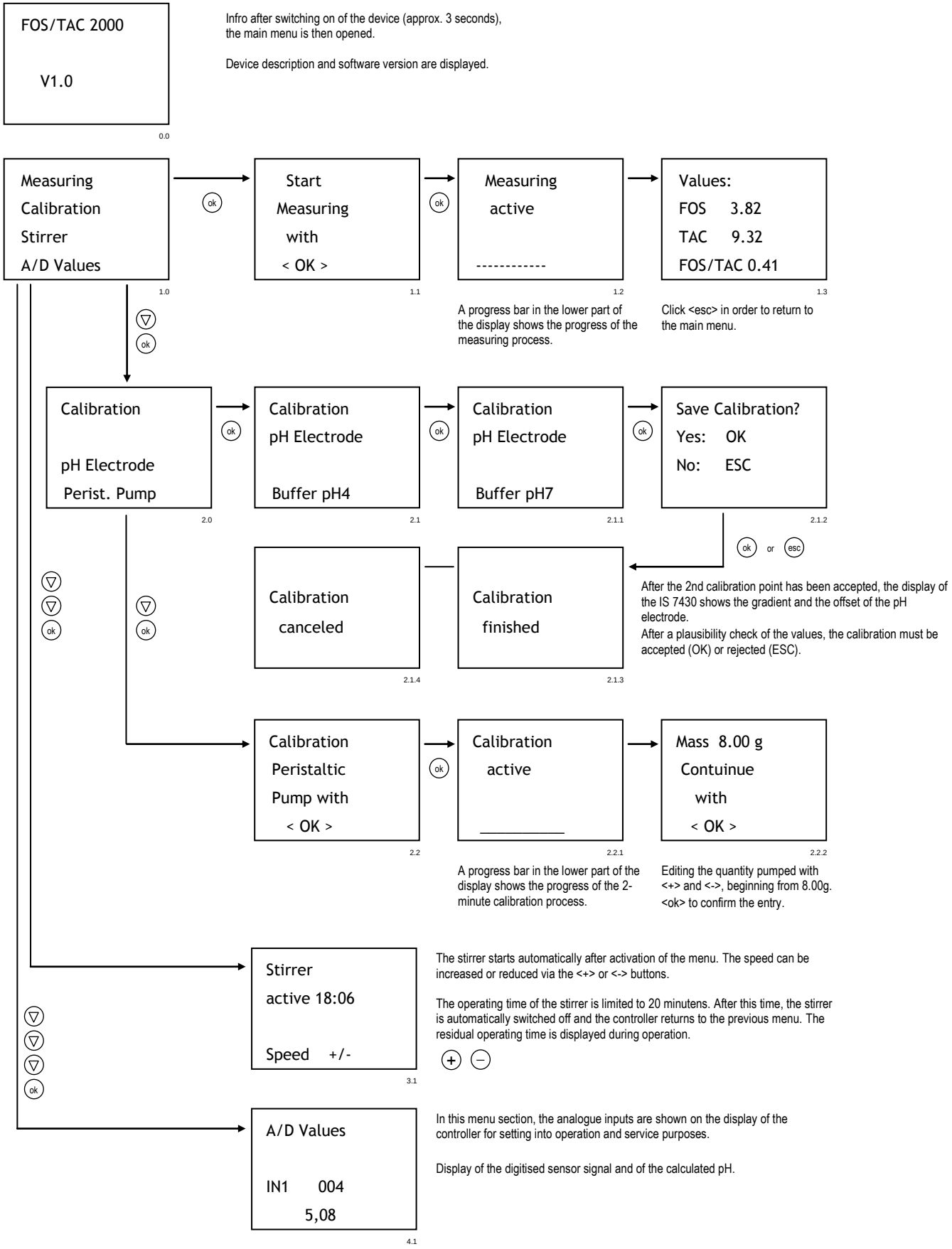
The device comes with a DC input socket on the back to which the plug-in power supply unit, which is included in the delivery, must be connected. The power supply unit has a EURO plug and is designed for an input voltage range of 100-240VAC / 47-63 Hz (1A @230V).

In order to set the FOS/TAC 2000 into operation, proceed as follows:

- Connect the plug-in power supply unit to the power supply.
- Switch the analyzer on using the power switch.

After power-on, the display of the analyzer shows the version number for around 5 seconds and subsequently changes to the main menu.

5 Menu and function overview



6 Performing a FOS/TAC measurement

6.1 Sample preparation

Variant 1: Centrifuging the sample

Whenever possible, the original sample should be centrifuged 20 minutes with a relative centrifugal acceleration rate of 15,000xg. The purpose of this is to eliminate the solid constituents from the sample which feature properties similar to those of the substances to be analyzed by way of FOS/TAC determination and which would hence distort the result. The sample must now be weighed and topped up with distilled water as described below.

Variant 2: Sieving the sample

If no centrifuge is available, it is also possible to use a close-meshed sieve in order to eliminate the solid constituents. In this case, a spoon should be used in order to strain the original sample through the sieve.

Sieving the fermenter substrate

Weighing and topping up the sample

In order to weigh the sample, place a 50-ml beaker with a stir stick on the scales. Switch on the scales or press the “TARE” key in order to reset scales to 0.00g.

Now fill 5.0g of the centrifuged or sieved sample into the beaker and top up with 15g of distilled water to 20.0g. Make sure to adhere precisely to the quantities stated because this dilution ratio is the basis of the calculation of the FOS and TAC values by the device!

Resetting the scales

Filling in the sample

Weighing in 5.0g of the sample

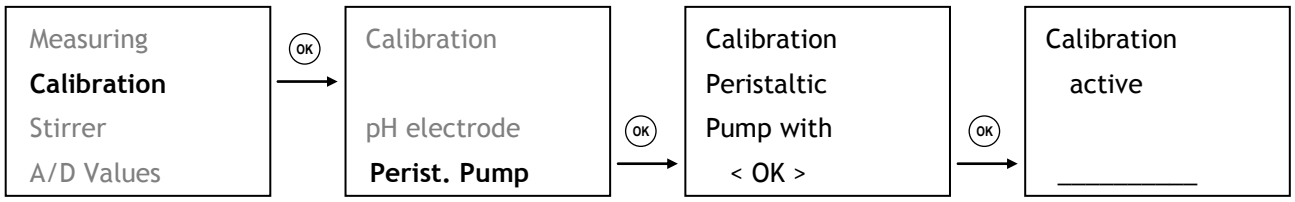
Topping up with distilled water

Finished final sample 20.0g

6.2 Preparing the device

6.2.1 Rinsing the hoses

If the device has not been used for a longer period of time, the hoses should be rinsed before measuring in order to make sure that the hose system does not contain any major air bubbles. For this purpose, select the “Calibration” option from the main menu and subsequently “Peristaltic pump”. Place an empty beaker (50ml) into the magnetic stirrer and press the OK button in order to start the process.



When major air bubbles are no longer visible in the hoses, you can click the ESC key in order to stop the process. The rinsing process stops automatically after two minutes. Press ESC to return to the main menu.

6.2.2 pH Electrode

First remove the protective cap filled with KCl solution from the pH electrode. Use distilled water in order to thoroughly rinse the electrode and subsequently use cellulose tissue in order to carefully dry the electrode. The cleaning water can be collected in a separate beaker.

Removing the protective cap

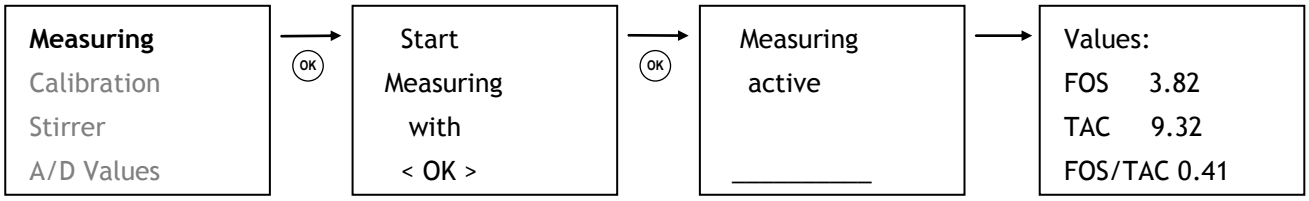
Rinsing the electrode

Drying with cellulose tissue

During transport or storage, KCl solution can leak from the protective cap and produce crystalline, white potassium chloride. This salt layer has no influence on measuring capability and can be easily rinsed off with water.

6.3 Start measurement

In order to perform the analysis, place the beaker containing the diluted sample and the stir stick onto the magnetic stirrer and dip the electrode system into the sample. In the main menu, use the △ and ▽ keys in order to select the “Measurement” menu option and click “OK” to confirm. When the display shows the “Click OK to start measurement” message, click <OK> in order to start the measuring process.



The measuring process then takes place fully automatically. The magnetic stirrer is switched on and the hose pump adds the titration solution. On completion of the measuring process, the result appears on the display. The values measured should be recorded and compared to previous measurements and/or plant-specific setpoints.

Finally press <ESC> to return to the main menu.

On completion of the measuring process, rinse the electrode, dry and dip in KCl solution. For this purpose, fill KCl solution into the protective sleeve to a level of approx. 10mm and push the sleeve over the electrode.

During transport or storage, KCl solution can leak from the protective cap and produce crystalline, white potassium chloride. This salt layer has no influence on measuring capability and can be easily rinsed off with water.

7 Calibrating the pH electrode

7.1 General information

In order to ensure correct measuring results within the specified tolerances, the analyzers and systems must be calibrated at regular intervals. The pH electrode is calibrated using the buffer solutions supplied.

Note that incorrect calibration leads to incorrect results during subsequent measurements!

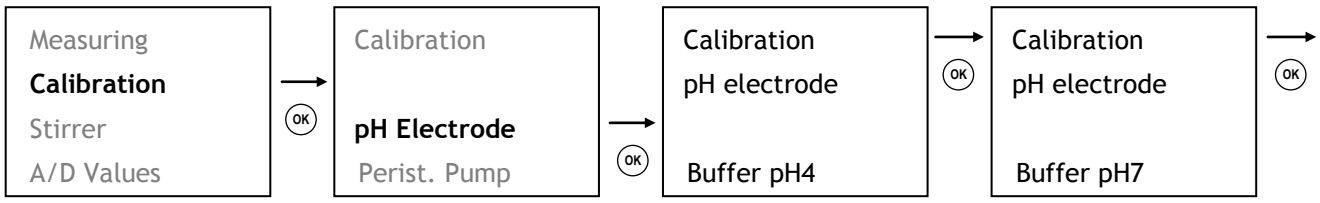
Whenever changing to the next buffer solution, always rinse the electrode with distilled water.
Please note that the temperature must be the same for the two calibration fluids for pH4 and pH7.
Dispose of buffer solutions after use!

7.2 Calibration procedure

Prior to calibration, rinse the pH electrode thoroughly with distilled water and use cellulose tissue to dry.

The following process of calibrating the pH electrode is split up to two points, where calibration point 1 is determined with the pH4 buffer solution and calibration point 2 with the pH7 buffer solution. For this purpose, first fill approx. 30ml of the pH4 buffer solution into a 50-ml beaker, put in a stir stick, and place onto the magnetic stirrer.

In the main menu, use the △ and ▽ keys in order to select the “Calibration and subsequently “pH electrode” menu options and click “OK” to confirm each selection.

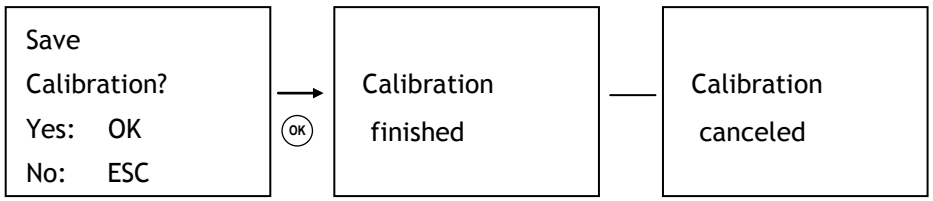


Dip the electrode system into the buffer solution pH=4.0 (calibration point 1) and watch the pH and temperature on the display of the IS7430. As soon as both measured values provide stable values, you can click <OK> in order to accept calibration point 1.

Then rise the electrode system with distilled water and use cellulose tissue to pat dry.

Then dip the electrode into the buffer solution pH = 7.0 for calibration point 2 and wait again until the pH and temperature have stabilized. Click <OK> once again in order to accept calibration point 2.

The IS7430 uses the two calibration points in order to calculate the new values for gradient and offset. These are compared to limits stored internally in the device. As soon as the values are within these limits, they are then shown on the display of the IS7430. Record these values and compare to earlier calibration results. You can then either click <OK> to accept the calibration result, or <ESC> to reject. The display of the IS7430 shows the “ERROR” message if the calibration process was not correct. The old calibration data is maintained if the calibration process is aborted.

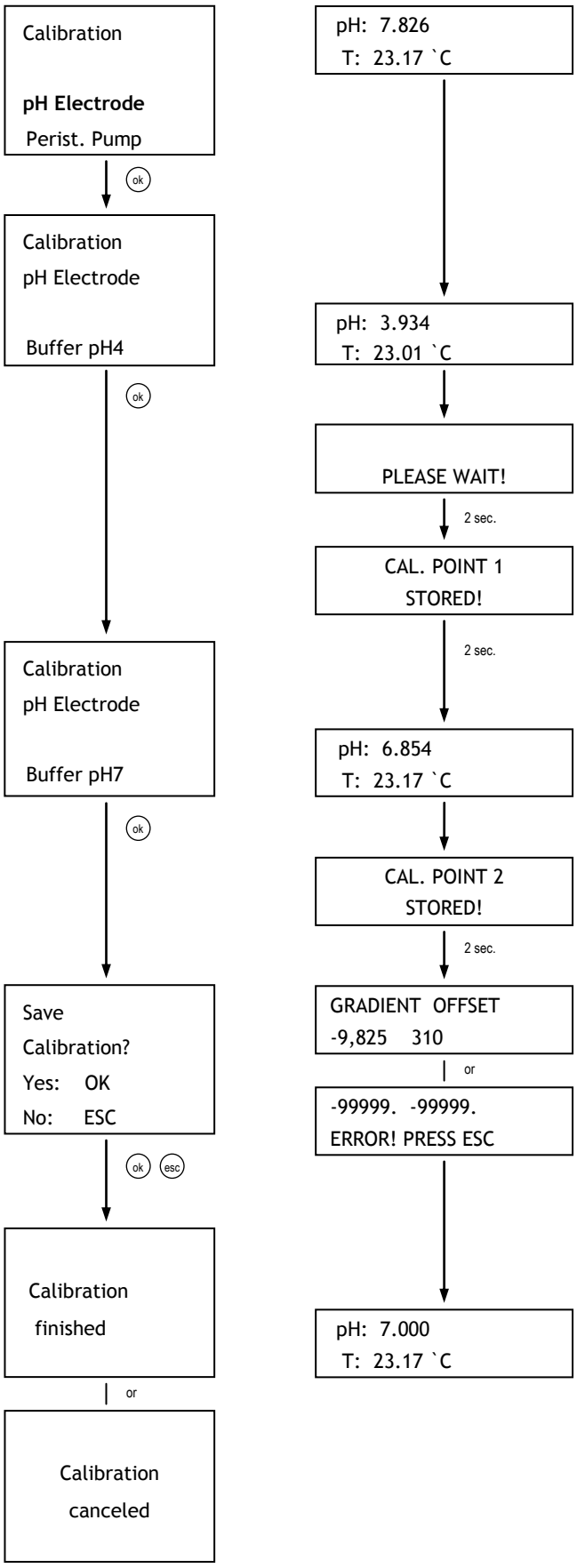


Reasons for strongly diverging calibration values can be imprecise or used-up calibration fluids, worn electrodes or manual calibration errors. In such a case, please repeat the calibration process, allow the electrodes more time to stabilize, service or replace the electrode system and/or the calibration fluids.

Dispose of buffer solutions after use!

Following this, rinse the electrode once again with distilled water and dry. In order to protect the membrane from drying out, we recommend always attaching the protective cap with KCl solution during measuring intervals.

The calibration process and the pertinent menus are once again summarized below.



Standard measured-value display of the IS 7430

Adjustment of calibration point 1 (pH 4)

- Rinse the electrode with distilled water and pat dry
- Dip electrode in buffer solution **pH 4**
- Allow values to stabilize

Following stabilization of the measured values, click <OK> in order to accept calibration point 1

Adjustment of calibration point 2 (pH 7)

- Rinse electrode with distilled water and pat dry
- Dip electrode in buffer solution **pH 7**
- Allow values to stabilize

Following stabilization of the measured values, click <OK> in order to accept calibration point 2

Display of the values determined for gradient (left) and offset (right) of the electrode.

The "ERROR" message on the display indicates that the values are out of the defined range.

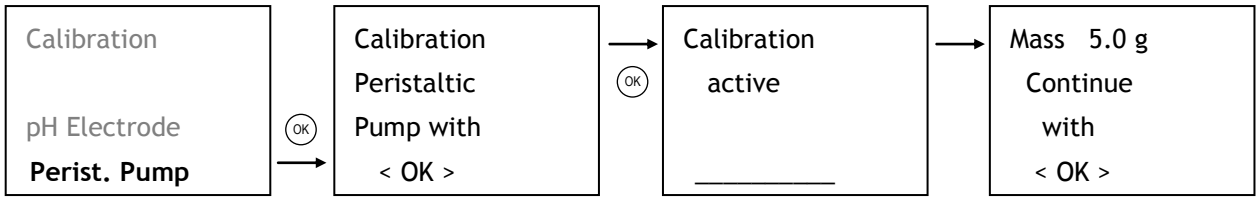
Click <OK> to confirm calibration and accept the new calibration data.

If the calibration process is aborted by clicking <ESC>, the old calibration data is maintained.

Calibration completed - automatic return to main menu

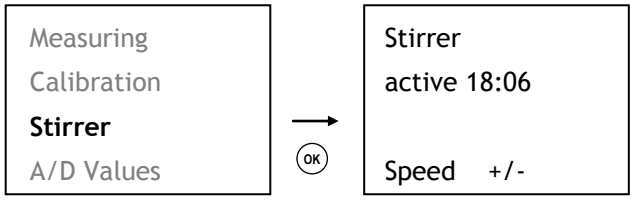
7.3 Calibrating the peristaltic pump

Every 6 months and/or after a hose change, the pumping rate of the peristaltic pump must be checked and, when necessary, adjusted. For this purpose, place the sample scales with a beaker into the magnetic stirrer and switch on. If necessary, press the "TARE" button in order to reset the value to 0.00g.
Then select the calibration menu for the peristaltic pump. The test period of two minutes is represented by a progress bar on the display. On completion of this process, the pumping rate of the pump is shown on the display of the scales and can be edited using the "+" and "-" buttons in the following menu and subsequently confirmed by clicking <OK>.



8 Manual stirring mode

The "Magnetic stirrer" menu option enables manual starting of the stirrer in order to measure the pH, for example. The speed can be increased and reduced using the +/- buttons of the controller. Press the <ESC> button in order to switch the stirrer off again. The operating time is limited to 20 minutes. The display shows the remaining operating time.



9 Maintenance, repair, customer service

The manufacturer is solely responsible for the original safety characteristics and features of the device. Any guarantee becomes void if the device is modified in any manner that is neither performed nor approved by the manufacturer.

Certain activities – such as replacing hardware components or internal settings – may only be carried out by qualified personnel.

The analyzer should be checked and calibrated by the manufacturer or qualified technical personnel every two years. Defective devices must be taken out of operation and returned to the manufacturer.

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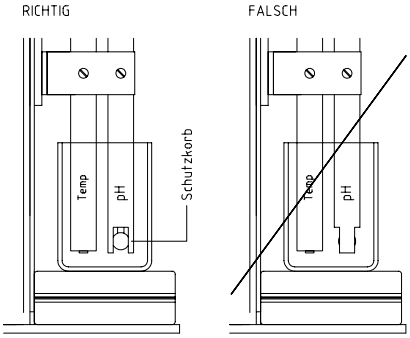
9.1 Maintenance of the pH electrode

On completion of the measuring process, always rinse the electrode, dry and dip in KCl solution. For this purpose, fill KCl solution into the protective sleeve to a level of approx. 10mm and push the sleeve over the electrode. In order to prevent drying out, check the filling level in the cap and, if necessary, top up if the electrode has not been in use for a longer period of time.

During transport or storage, KCl solution can leak from the protective cap and produce crystalline, white potassium chloride. This salt layer has no influence on measuring capability and can be easily rinsed off with water.

An extended response time, a reduced gradient or an offset shift can be caused either by electrode soiling or ageing. Every electrode ages as a consequence of the exchange processes at the glass membrane even if the electrode is not used. High temperatures, polarization, short circuit or exposure to chemicals can significantly reduce the life of the electrodes. In the case of electrodes with the possibility to top up electrolyte, the fluid level of the electrolyte solution must be checked at regular intervals. The level of the reference electrolyte must always be several centimetres above the fluid level of the measuring solution. When necessary, KCl solution (3mol/l) must be topped up with the syringe through the refill opening at the shaft after removal of the seal.

When changing the electrode, it is important to ensure that the protective basket is adjusted as shown in the illustration when the new electrode is fitted.



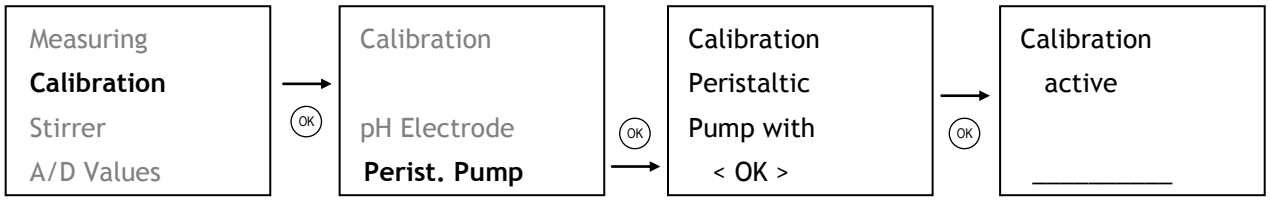
9.2 Changing the hose of the peristaltic pump

The hose of the peristaltic pump should be changed after approx. 250 measurements, but in no case later than after one year.

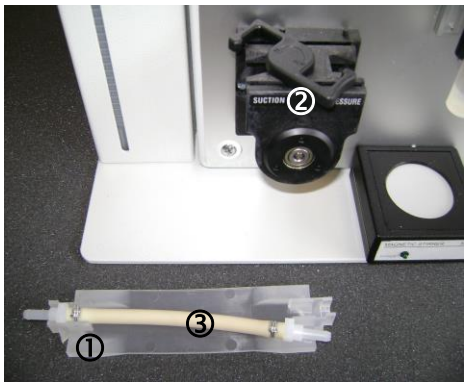
Possibility of aggressive media residues.
Wear protective glasses and suitable protective clothing when dismantling, repairing or cleaning the pump!

Before changing the pump hose, proceed as follows in order to drain the hoses:

Place an empty beaker onto the magnetic stirrer and pull the suction hose from the bottle containing the titration solution.
In the main menu, select the “Calibration” option and subsequently “Peristaltic pump” and press <OK> in order to start the pump.
The process ends automatically after two minutes or it can be stopped earlier by pressing <ESC>.



Then proceed as follows in order to change the hose:



- Carefully pull the hoses off the connecting nozzles of the pump.
- Press the conveyor ① together at the recesses and turn the S-bolt ② clockwise to end stop
- Remove the conveyor ① and hold the old hose ③ by the hose nozzles in order to remove the old hose from the guides
- Insert the new hose ③ with hose nozzles into the guides of the conveyor ①
- Insert the conveyor ① fully with the new hose ③ into the dovetail guide of the pump body
- Press the conveyor together at the recesses and at the same time turn the S-bolt ② counter-clockwise until it locks in place.

After the hose change, fill the hoses with titration solution again. For this purpose, screw the suction hose into the bottle containing the titration solution and place a beaker onto the magnetic stirrer. Then, similar to the process of draining the hoses, select the “Calibration/peristaltic pump” menu option and press <OK> to start the process.

On completion of the filling process, adjust the pumping rate of the peristaltic pump in the manner described in the “Calibrating the peristaltic pump” section.

10 Warranty conditions

The manufacturer assumes a 6-month guarantee corresponding to the statutory guarantee period for electric devices.

The guarantee is contingent upon compliance with the following conditions:

- The device must have been handled properly at all times and with the care required for an electronic device.
- All instructions and information contained in this manual must have been adhered to.
- The device must have been operated within the specified temperature range.

The warranty does not cover parts subject to wear and tear, such as various solutions, the pH electrode or the hose of the peristaltic pump.

Appendix

11.1 Technical specifications

FOS/TAC analyzer				
Parameter	Measuring range	Resolution	Measuring method	Other
pH	0 … 10 pH	0.001 pH	Combination electrode	
Temperature	0 … 50 °C	0.01 °C	NTC	
FOS	1 … 10 g/kg	0.01 g/kg	Titration	Unit: $g_{org.acids}$ / $kg_{substrate}$
TAC	5 … 20 g/kg	0.01 g/kg	Titration	Unit: g_{CaCO3} / $kg_{substrate}$
FOS/TAC	0.05 …2.00 -	0.01 -		Measured value calculated

Device / analyzer	
System casing	Steel sheet casing, powder-coated
Dimensions (w x h x d)	405 x 290 x 160 mm
Weight	Approx. 7.5 kg (including 1000ml of titration solution)
Protection	IP 50 according to DIN 40050
Display	LCD of the IS7430, two-line (pH and temperature)
	LCD of the FOS/TAC controller, four-line (FOS, TAC and FOS/TAC)
Operation / input	Keyboard of the FOS/TAC controller
Titration solution / standard	1 litre / measuring solution 0.1N H_2SO_4 / sufficient for approx. 30 FOS/TAC measurements

Requirements for the place of installation	
Operating temperature	10 to 40°C
Storage temperature	2 to 50°C
Rel. humidity	<=90% annual average, minor and seldom condensation when switched off

Electrical data	
Voltage supply, plug-in power supply unit	100-240VAC / 47-63 Hz / 1A @230V / Euro plug / (included in the scope of delivery)
Voltage output	24 VDC / 1 A / 24 W
Connector	Hollow connector 5.5x2.1x11 mm / centre positive

11.2 Parts subject to wear and tear

Article No.	Description
812 – 1998	Titration solution, 1000-ml bottle
812 – 3012	Buffer solution pH 4, 100-ml bottle
812 – 3013	Buffer solution pH 7, 100-ml bottle
812 – 3014	Buffer solution pH 4, 1000-ml bottle
812 – 3015	Buffer solution pH 7, 1000-ml bottle
812 – 3022	Refill solution pH electrode 3 mol/l KCl, 100-ml bottle + syringe
812 – 1995	Distilled water (Aqua Bidest) , 250-ml bottle with syringe attachment
812 – 1953	Disposable gloves (PE) (50 pairs)

11.3 Spare parts

Article No.	Description
812 – 1940	pH electrode with ceramic diaphragm, liquid electrolyte 3 mol/l KCl
812 – 1960	Hose set for peristaltic pump
812 – 1961	Roll support for peristaltic pump
812 – 1962	Conveyor for peristaltic pump
812 – 1963	Dosing hoses with dosing unit
812 – 1970	Beaker, 50ml, low design
812 – 1971	Beaker, 150 ml, low design
812 – 1955	Magnetic stir stick 30x6mm, PTFE
812 – 1958	Sample sieve, plastic 7cm
812 – 1994	Protective glasses, break-resistant / polycarbonate
812 – 1980	Digital sample scales, measuring range 0-100 g / resolution 0.01g
812 – 1981	Replacement battery for digital sample scales
812 – 1968	Plug-in power supply unit (Euro) 24VDC/1A
812 – 1930	User manual – German
812 – 1931	User manual – English

Other spare parts are available on request.

11.4 Declarations of conformity & Certificate

EG-Konformitätserklärung
Declaration of conformity

CE

Manufacturer	Pronova Analysentechnik GmbH & Co. KG Groninger Straße 25 13347 Berlin Germany
Product description	FOS/TAC 2000 Automatische Bestimmung des FOS/TAC-Wertes von Fermenterproben durch Titration
Manufacturer No.:	812-xxxx-xx/xxxx

The manufacturer herewith declares that the above-stated analysis systems is in conformity with the requirements in the following regulations, laws or other specifications:

EC-Directive 2004/108/EG	EMC
EC-Directive 2006/95/EG	Low voltage

The following harmonized standards have been used:

	EN 61010 Teil1/A2:1995 Overvoltage category III, pollution degree 2
Electromagnetic susceptibility:	EN 61000-6-3:2001
Electromagnetic disturbances:	EN61326:1997+A1:1998-A2:2001 Industry request

Berlin, 2008-06-06

This declaration confirms conformity with the above-stated directive, but does not constitute any warranty of properties in the legal sense.

The safety information of the product documentation supplied must be adhered to.

ZERTIFIKAT ◆ CERTIFICATE ◆ 認証証書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

TÜV SÜD Management Service

CERTIFICATE

The Certification Body
of TÜV SÜD Management Service GmbH

certifies that

PRONOVA Analysentechnik GmbH & Co.KG
Groninger Straße 25
D-13347 Berlin

has established and applies
a Quality Management System for

Sale, development, design, production, commissioning and maintenance of analysing equipment

An audit was performed, Report No. **70010504**

Proof has been furnished that the requirements according to

ISO 9001: 2000

are fulfilled. The certificate is valid until **2009-03-14**

Certificate Registration No. **12 100 11234 TMS**

Munich, 2006-03-29

QMS-TGA-ZM-07-92

TÜV SÜD Management Service GmbH • Zertifizierstelle • Ridlerstraße 65 • 80339 München • Germany

MS01/10.05

11.5 Safety Data Sheet H_2SO_4

Trade name: **SULPHURIC ACID 0.05 mol/l - 0.1 N volumetric standard solution**

according to Regulation (EC) No. 1907/2006

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1 Identification of the substance/mixture and of the company/undertaking

· Product details:
Trade name: SCHWEFELSÄURE 0,05 mol/l - 0,1N Maßlösung
Article number: 812-1998

· Registration number:
A registration number is not available for this substance as the substance or its use are exempted from registration according to Article 2 REACH Regulation (EC) No 1907/2006, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

· Application of the substance: Laboratory chemical

· Manufacteur / Supplier:
Pronova Analysentechnik GmbH & Co. KG
Groninger Str. 25
13347 Berlin
Telefon: +49/(0)30 455085-0 Telefax: +49/(0)30 455085-90 Email: info@pronova.de

· Information in case of emergency:
Giftinformation München
Telefon: +49/(0)89 19240 Telefax: +49/(0)089 41402467

2 Hazards identification

· Classification of the substance or mixture:
Classification according to Regulation (EC) No 1272/2008
Met. Corr.1 H290 May be corrosive to metals.
Classification according to Directive 67/548/EEC or Directive 1999/45/EC Void
Classification system: The classification is according to the latest editions of the EU-lists, and extended by company and literature data.

· Label elements:
Labelling according to Regulation (EC) No 1272/2008
The product is classified and labelled according to the CLP regulation.

Signal word Warning

Hazard pictograms

GHS05

Hazard statements
H290 May be corrosive to metals.

Precautionary statements
P234 Keep only in original container.
P390 Absorb spillage to prevent material damage.

· Other hazards:
All chemicals are potentially dangerous. They should only be handled by specially trained personnel.
Results of PBT and vPvB assessment
PBT and vPvB: Not applicable.

3 Composition/information on ingredients

Chemical characterization: Mixtures: Description: Aqueous solution.

Additional information: For the wording of the listed risk phrases refer to section 16.

Trade name: **SULPHURIC ACID 0.05 mol/l - 0.1 N volumetric standard solution**

according to Regulation (EC) No. 1907/2006

4 First aid measures

· General information: Remove any clothing soiled by the product.
· After inhalation: Supply fresh air.
· After skin contact: Rinse with water
If there is any trouble seek medical help.
· After eye contact: To be sure rinse opened eye under running water.
If there is any trouble seek medical help.
· After swallowing: Rinse out mouth and drink a glass of water. Do not induce vomiting.
If there is any trouble seek medical help.

5 Firefighting measures

· Extinguishing media: Use fire extinguishing methods suitable to surrounding conditions. CO2, powder or water spray.
Fight larger fires with water spray or alcohol resistant foam.
For this substance/mixture no limitations of extinguishing agents are given.

· Special hazards arising from the substance or mixture:
Ambient fire may liberate hazardous vapours.
In the event of fire development of hazardous combustion gases or vapours possible. In case of fire, the following can be released: Sulphur dioxide (SO_2), Carbon monoxide and carbon dioxide.

· Advice for firefighters:
Protective equipment: Wear self-contained respiratory protective device.
Wear fully protective suit.
Additional information: Not combustible.

6 Accidental release measures

· Personal precautions, protective equipment and emergency procedures:
Wear protective clothing.

· Environmental precautions: Do not allow to enter sewers/ground water or penetrate the soil.

· Methods and material for containment and cleaning up:
Absorb with liquid-binding material.
Dispose of the material collected according to regulations.

· Reference to other sections: See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

· Precautions for safe handling:
Information about safe handling: No special precautions are necessary if used correctly.
Information about fire - and explosion protection: No special measures required.

· Conditions for safe storage:
Requirements to be met by storerooms and receptacles: Provide acid-resistant floor.
Do not store in corrodible metal.
Information about storage in one common storage facility: Store away from foodstuffs.
Recommended storage temperature: 15-25 °C

8 Exposure controls/personal protection

· Additional information about design of technical facilities:
No further data; see item 7.

· Ingredients with limit values that require monitoring at the workplace:
The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.

· Personal protective equipment:

· General protective and hygienic measures:
Avoid close or long term contact with the skin.
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Avoid contact with the eyes and skin.

· Individual protection measures: Protective clothing needs to be selected specifically for the workplace, depending on concentrations and quantities of the hazardous substances handled. The chemical resistance of the protective equipment should be enquired at the respective supplier.

· Respiratory protection:  Required when vapours/aerosols are generated.

· Protection of hands:
Protective gloves:  The glove material has to be impermeable and resistant to the product/ the substance/ the preparation. Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

Material of gloves: Nitrile, thickness: ≥ 0.11 mm
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

Penetration time of glove material:
Value for the permeation: Level ≥ 6
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

· Eye protection:  Tightly sealed goggles

· Body protection: Protective work clothing

9 Physical and chemical properties

· General Information:
Form: Fluid
Colour: Colourless
Odour: Odourless

· Change in condition:
Melting point/Melting range: ~0°C
Boiling point/Boiling range: ~100°C

· Vapour pressure at 20°C: 23 hPa
· Density at 20°C: 1.002 g/cm³

· Self-igniting: Product is not self-igniting.
· Danger of explosion: Product does not present an explosion hazard.

· Solubility in / Miscibility: With water fully miscible.
· pH-value bei 20°C: 1,3

Solvent content:
Organic solvents: 0.0 %
Water: 99.5 %

10 Stability and reactivity

· Thermal decomposition / conditions to be avoided: No decomposition if used and stored according to specifications.
· Possibility of hazardous reactions: Reacts with alkali (lyes).
· Hazardous decomposition products: No dangerous decomposition products known.
In case of fire: see item 5.

11 Toxicological information

· Acute toxicity:
LD/LC50 values relevant for classification: Quantitative data on the toxicity of this product are not available.

· Primary irritant effect:
on the skin: Prolonged or repeated contact may cause skin irritations.
on the eye: Intense exposure may cause irritative symptoms.
after inhalation: No irritating effect.
Sensitization: No sensitizing effects known.

· Further information: The product should be handled with the care usual when dealing with chemicals.

12 Ecological information

· Aquatic toxicity: Quantitative data on the ecological effect of this product are not available.

· Ecotoxical effects: Harmful effect on aquatic organisms due to pH shift.
Do not allow to enter waters, waste water, or soil!

· Results of PBT and vPvB assessment: PBT: Not applicable.
vPvB: Not applicable.

13 Disposal considerations

· Product:
Recommendation: This material and its container must be disposed of as hazardous waste.
The disposal is regionally differently regulated, therefore the kind of disposal is to be inquired at the responsible authorities.

· Uncleaned packaging:
Recommendation: Disposal according to official regulations.
Recommended cleansing agents: Water, if necessary together with cleansing agents.

Trade name: **SULPHURIC ACID 0.05 mol/l - 0.1 N volumetric standard solution** according to Regulation (EC) No. 1907/2006

14 Transport information

· UN-Number: ADR, ADN, IMDG, IATA UN3264

· UN proper shipping name:
ADR: 3264 CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (SULPHURIC ACID)
IMDG, IATA: CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (SULPHURIC ACID)

· Transport hazard class(es): ADR, IMDG, IATA
Class: 8 Corrosive substances.
Label 8
ADN/R Class: 8

· Packing group: ADR, IMDG, IATA III
· Environmental hazards: Marine pollutant: No

· Special precautions for user:
Warning: Corrosive substances.
Danger code (Kemler): 80
EMS Number: F-A,S-B
Segregation groups: Acids

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code not applicable.

· Transport/Additional information: ADR
Limited quantities (LQ): 5L
Transport category: 3
Tunnel restriction code: E
UN "Model Regulation": UN3264, CORROSIVE LIQUID, ACIDIC, INORGANIC, N.O.S. (SULPHURIC ACID), 8, III

15 Regulatory information

· Information about limitation of use: Employment restrictions concerning juveniles must be observed.

· Waterhazard class: Generally not hazardous for water (German regulation).
· Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· Abbreviations and acronyms:
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organization
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
LC50: Letale Konzentration, 50 Prozent
LD50: Letale Dosis, 50 Prozent