

Sapromat® E

BOD Measuring Unit



SAPROMAT®

●●● BOD MEASURING UNIT

THE NEW SAPROMAT® E BOD MEASURING UNIT

We have always been committed to ensuring a long life for our devices.

The Sapromat E BOD Measuring Unit stands for high quality in determining the Biochemical Oxygen Demand (BOD).

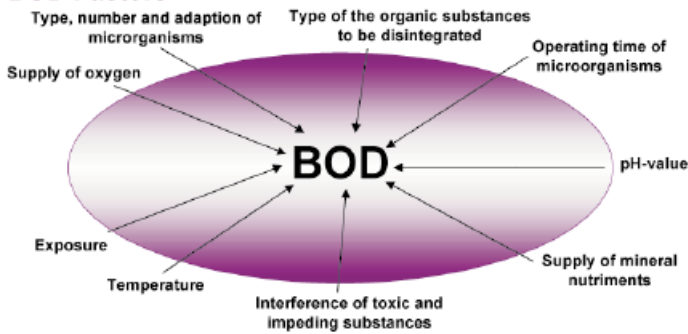
Consistent use of new materials and technologies has brought its rewards.

Operation is easier, measurements are more exact, maintenance is minimal..

OUR IMPROVEMENTS

- Water bath, control unit and measuring units have been completely redesigned.
- Temperature stability is now < 0.1 K both in and above the water bath – an excellent result.
- Stirring and circulation now uses the patented and wear-free VARIOMAG drive technology.
- The use of stirring bars suspended in the vessels facilitates non-abrasive testing of partially solid samples.
- More exact testing and easier maintenance thanks to modified measuring units.

BOD Factors



- With its control unit and software, the unit can be operated independent of your PC for several days while preserving the graphical illustration and evaluation capability.
- By connecting your device to your PC you can obtain detailed information about the entire measuring process.



THE NEW SAPROMAT® E BOD MEASURING UNIT

The Sapromat E has been designed for direct automatic determination of the biochemical oxygen demand.

Well-proven respirometric analysis in combination with a precisely tempered water bath is unsurpassed in its precision. The method used is the oxygen determination method by Coulomb.

The system complies with the requirements of the German standard method for testing water, effluents and mud, DIN 38409-H52.

Day in and day out, more than 1000 units in use prove their reliability for BOD measurings.

The Sapromat E consists of four basic components – control unit, heated water bath, measuring unit and evaluation software.

Each measuring unit consists of a reaction vessel, an oxygen generator and a pressure gauge.

The user provides the PC.

WHEN TO USE SAPROMAT E

The unit registers aerobic decomposition of organic material over time. The BOD decomposition curve allows conclusions to be drawn regarding the existence of inert materials, inhibitors or toxic substances. These influence the metabolism of aerobic microorganisms in different ways. Furthermore, the BOD curve may show e.g. whether the reduction of oxygen in the sample had already set on before testing, what speed oxidation takes place at or whether a nitrification process has set on.

- Potential complete aerobic and biological decomposition of organic material
- Decomposition reactions of chlorohydrocarbons (CHC) in water and soil
- Biological activity of compost, wrapping and refuse
- Activity and growth of microorganisms

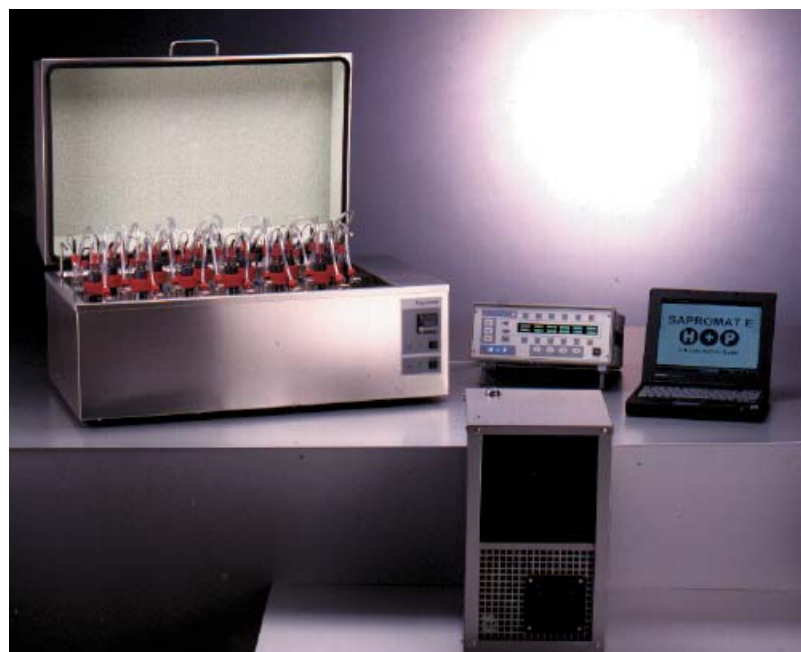
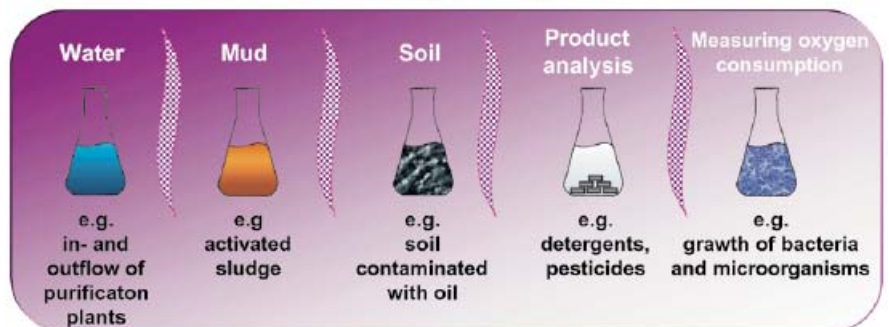


Determination of the biological oxygen demand in:

You are using a predecessor of Sapromat E?

The new measuring units, control unit and cooling unit work with your present unit without any problems.

We also offer a full range of spare parts. Our catalogue shows all spare parts for Sapromat units type B to type E. And if it is particularly urgent, we can offer 48-hour service for delivery of standard spare parts.



MEASURING UNITS

A measuring unit consists of a reaction vessel (500 ml) with a CO₂ adsorber integrated with the glass fitting, an oxygen generator and a pressure gauge. The vessels connected by pressure-sealed hoses form a closed measuring system that works independently of variations in barometric air pressure.

The test sample is circulated in the reaction vessel by a magnetic stirrer. Reaction vessels with volumes of 250 or 1250 ml are available on request.

THE NEW SAPROMAT® E BOD MEASURING UNIT

WATER BATH

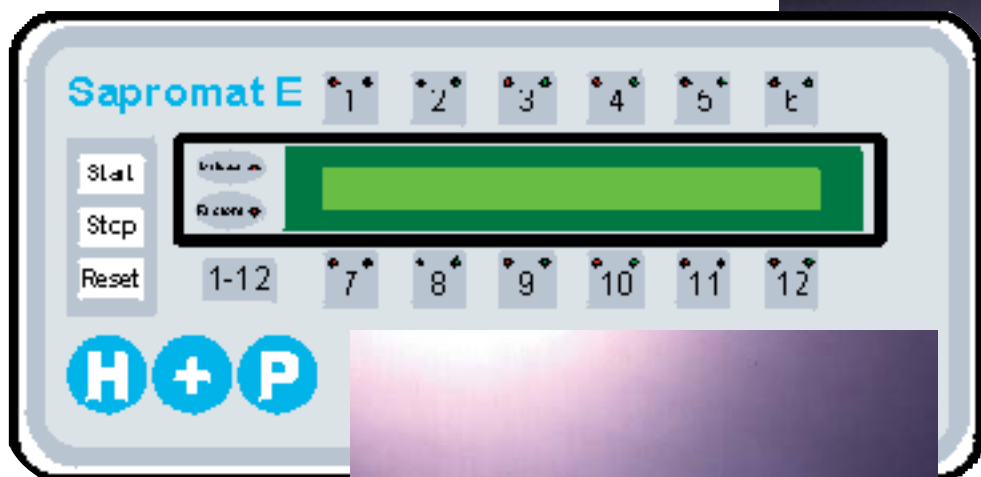
The water bath has room for a maximum of 12 measuring units. The heating and cooling system ensures a temperature constancy of $T < 0.1$ K. Possible temperatures range between 8 and 40 °C.

The magnetic stirrers required for circulation of samples all have a wear-free and silent inductive drive.

MODE OF OPERATION

Carbon dioxide is produced by microorganisms and their metabolism in the reaction vessel. The carbon dioxide is directly bound to the CO₂ adsorber inside the reaction vessel. In the closed measuring unit, a vacuum is produced to which the pressure gauge reacts.

The oxygen generator is activated by the control unit according to Coloumb's Law, and the existing vacuum is balanced with the oxygen produced. When the vacuum is compensated, electrolysis is terminated. According to Faraday's Law, the amount of oxygen freed by electricity is proportional to the amount of electricity (product of the strength of electric current and time). The BOD curve of the tested sample is determined from the amounts of sample and electricity.



CONTROL UNIT

115 VAC / 50-60 Hz and 230 VAC / 50-60 Hz, for controlling up to 12 measuring units simultaneously.

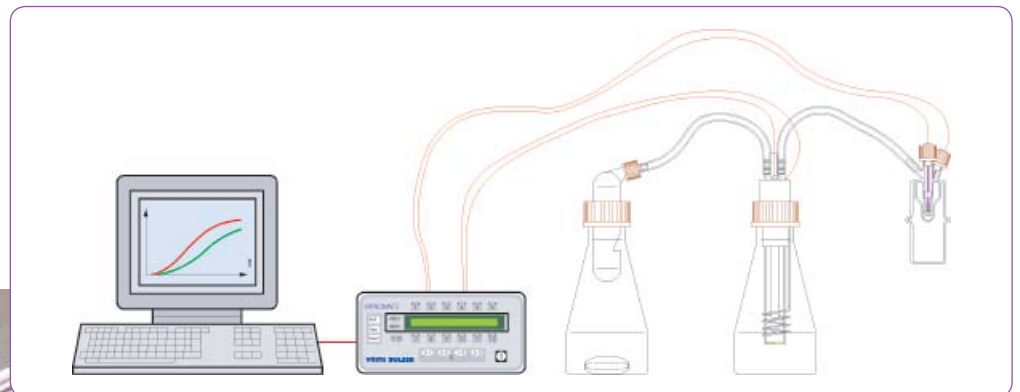
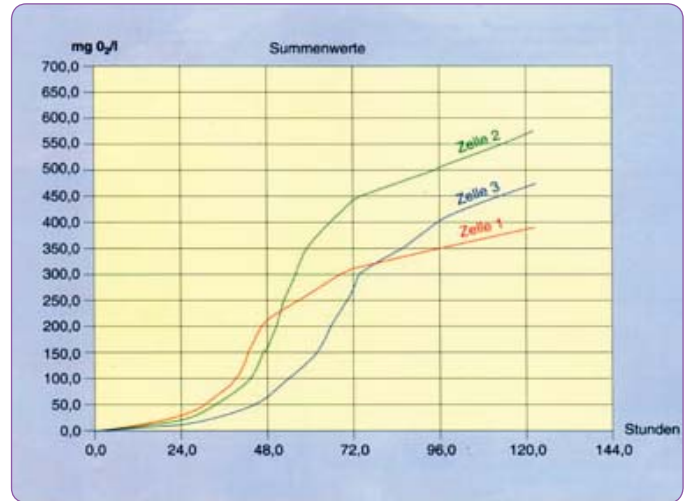
- Vacuum fluorescence text display
- Storage capacity for 15.000 measuring cycles (equivalent to 150 h of measurements)
- Digital power control
- Power outlet protected against short-circuits
- RS 232 serial PC interface

SOFTWARE

The software for data storage and analysis requires MS Windows 3.1 or higher. All printers supported by Microsoft Windows can be used.

To use the software, your PC must be an industry-standard Windows computer with at least a 486 CPU/66 MHz, 8 MB of RAM, 3½" floppy disk drive, one free serial interface (RS232) per Sapromat unit, and a hard disk with at least 20 MB of free memory. The software is able to control up to 4 Sapromat units (48 measuring units) simultaneously.

Available analyses include sums, differences and escapement according to Dr. Offhaus. They can be printed either as diagrams or in the form of tables graduated by any desired time interval. Measurement data can also be exported as a text file. Operators must possess basic practical MS Windows user skills.



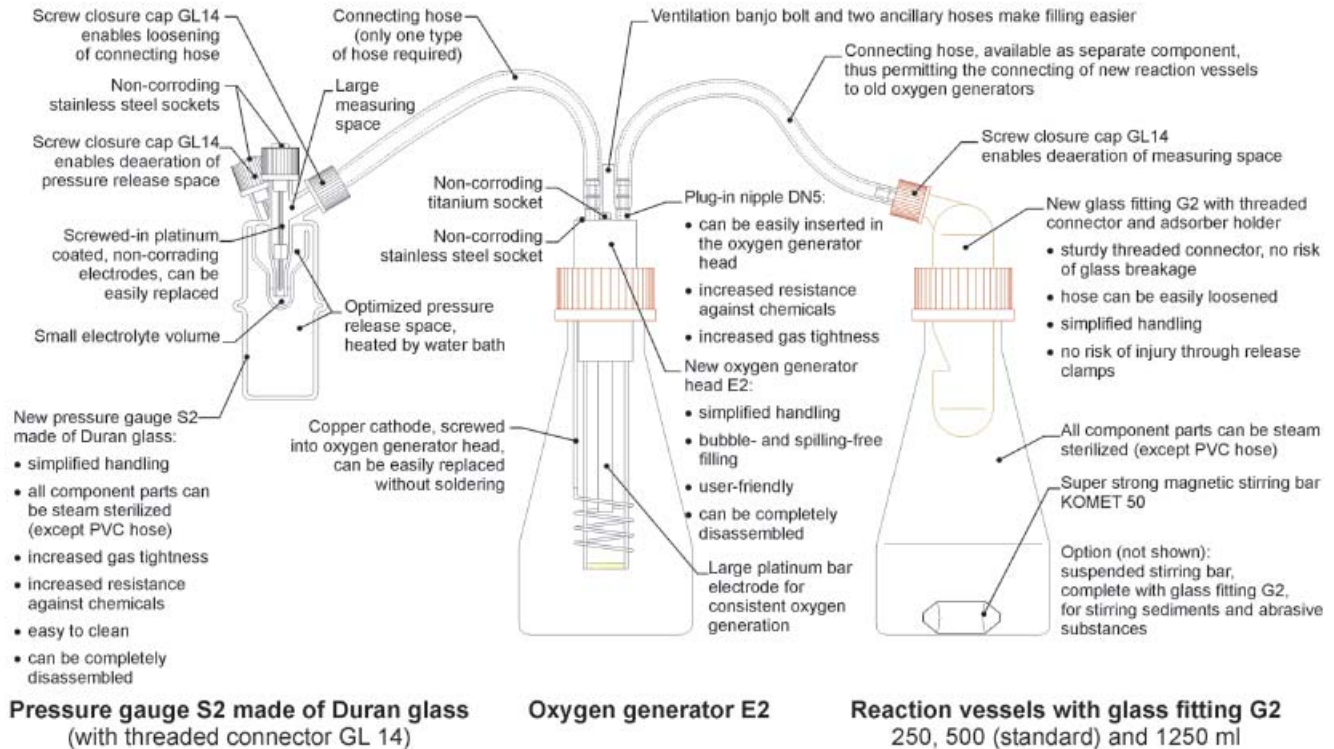
SPARE PARTS

We also offer any required spare parts you may require. All standard spare parts for type B to type E Sapromat units are listed in our Spare Parts Catalogue. For urgent requirements we offer an 48-hour service.

Please call us if you want to know more.

THE NEW SAPROMAT® E BOD MEASURING UNIT

For SAPROMAT BOD measuring device Measuring unit, 500 ml, complete



The entire measuring unit is designed so that pressure release and measuring spaces can be deaerated easily for faster sample testing. Each unit (pressure gauge, oxygen generator, reaction vessel) can be replaced separately and used for SAPROMAT type B to type E. Connecting hoses that can be steam-sterilized, plug-in nipples DN5 and hose nozzles DN5 available on request, rendering the entire measuring unit except the oxygen generator head able to be sterilized.

QUALITY CONTROL AND MAINTENANCE

Smooth operations and regular quality checks are very important factors in any laboratory today. The same goes for the BOD measuring units, which have to work with absolute reliability.

As Voith Sulzer Stoffaufbereitung GmbH informed you back in May 1996, we are now responsible for all warranty and other services for your Sapromat BOD measuring units. As per March 1998 we have taken over the sales activities of Voith Sulzer Stoffaufbereitung GmbH.

For 20 years now, [redacted] H has built a powerful service organization for [redacted] steam sterilizers. Our service personnel can be dispatched throughout the country, so we can respond to your needs quickly. Call us, tell us what unit you use and ask for a quote. We offer customized service for your measuring unit.



BOD Determination

$$m = \frac{A \cdot I \cdot t}{n \cdot F}$$

$$m = \frac{16 \text{ g} \cdot 0,0863 \text{ A} \cdot 36 \text{ s}}{2 \cdot 96479 \text{ As}} = 0,25 \text{ mg}$$

In a **sample of 250 ml** one count corresponds to a **BOD-value of 1 mg O₂** per litre

Factor	Constant	Unit
Mass m	0,25	[mg]
Atomic weight A	16	[g]
Amperage I	83,6	[mA]
Time t	36	[s]
Chemical Valence n	2	-
Faraday's Constant F	96479 · 10 ⁴	[A·s]

Water bath

Advantages

- Temperature constance
- high amount of heat (buffer)
→ stable system

Disadvantages

- high-priced

Incubator

Advantages

- Low original costs

Disadvantages

- measuring errors caused by system
- almost no temperature constance
- low amount of heat (buffer)
- instable system

TECHNICAL DATA

		SAPROMAT E®
Measuring units		12
Max. measuring units (Software)		48
Filling volume water bath		60 - 70 L
Temperature stability		0,1 K
Cooling power, can be automatically switched by temperature control unit		200/450 W
Dimensions	WxDxH (mm)	315 x 610 x 460
Space requirements	WxDxH (mm)	315 x 700 x 900
Weight (empty)	(kg)	87
Weight (filled)	(kg)	157
Perm. ambient temperature	(°C)	0 to +40 at 80% humidity
Supply voltage / frequency		115 or 230 VAC 50 - 60 Hz
Pressure (Pressure gauge)		0,2 mbar
Stirring power		80 W (2 x 40 W)
Order No.		71200
Order No.	Software	71296

