



892 Professional Rancimat

Determination of the oxidation stability of

- Oils and fats
- Fat-containing foods
- Cosmetics

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YOU
CAN
TRUST

The 892 Professional Rancimat and StabNet in brief

The 892 Professional Rancimat, in together with StabNet software, is an analytical system for easy and reliable determination of the oxidation stability of natural oils and fats using the long-established Rancimat method.

THE MOST IMPORTANT APPLICATIONS

- Oxidation stability of vegetable and animal oils and fats
- Examination of the effectiveness of antioxidants
- Oxidation stability of oil and fat-containing foods and cosmetics
- Antioxidation capacity of various foods

The 892 Professional Rancimat is controlled via the PC by StabNet software. Determination itself, however, can be started very conveniently directly on the instrument. Each measuring position has its own individual start button. In addition, the integral color display provides an overview of the status of each individual measuring position. Disposable reaction vessels reduce the cleaning of accessories to a minimum, thereby saving time and cost.

The StabNet software meets all the requirements of modern analytical software. Apart from acquiring and evaluating data automatically, the database enables managing large volumes of data comfortably. User administration with freely configurable access rights as well as automatic backup functions ensure a high level of data security. StabNet is fully compliant with GLP, GMP and FDA 21 CFR Part 11.

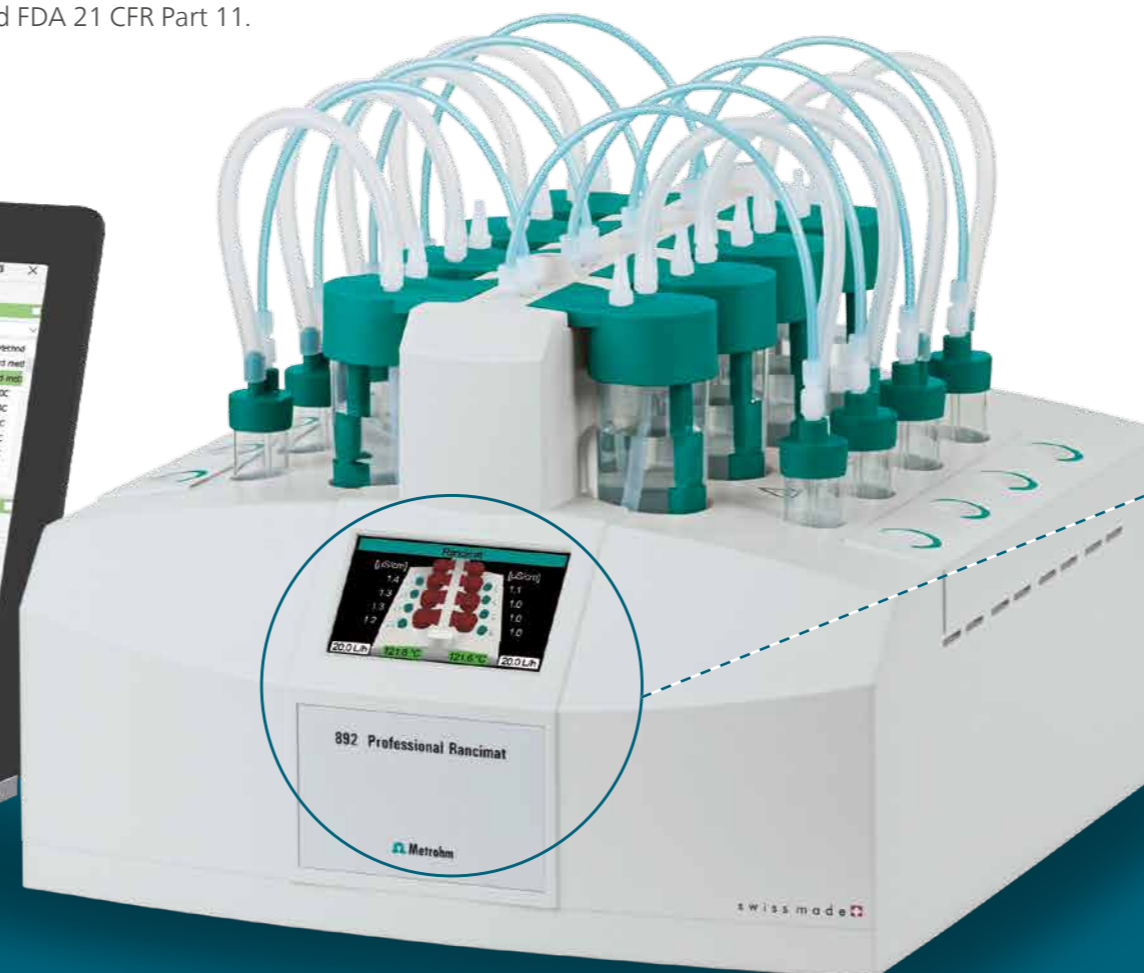
The most important advantages at a glance

THE INSTRUMENT

- All instrument functions controlled via PC
- Separate starting of each measuring position directly on the instrument
- Overview of the status of all measuring positions on the instrument display
- Unparalleled reliability and simple operation due to unique accessories:
 - Affordable disposable glass parts
 - Robust conductivity cells with electrical connections integrated in the reaction vessel cover
- 2 heating blocks with 8 measuring positions per instrument. Up to 4 instruments can be connected to 1 PC

THE SOFTWARE

- Clearly laid-out user interface
- Database with flexible filtering, sorting and statistical functions
- High transparency of results due to...
 - storage of all determination, method and instrument parameters
 - storage of the history for reevaluation or recalculation of measurement data
- High level of data security due to manipulation-proof database and automatic backup functions
- User administration with freely configurable access rights
- Meets all the requirements of FDA and GLP
- Monitor the working time of all accessories



Oxidation stability of oils and fats

The Rancimat test

The 892 Professional Rancimat measures the oxidation stability of oils and fats. The Rancimat method (named after our instrument) involves heating the sample and passing air through it to accelerate oxidation. The release of volatile acids due to oxidation is recorded as an increase in conductivity in the sample. The time until these products are released is called the induction time, which defines the sample's resistance to oxidation.

The induction time is a standard parameter utilized in the food industry to assess the quality of fats accurately and reproducibly for inspection of incoming goods, during production, and for final inspection.

Assessing the efficacy of antioxidants

Food contains natural or artificial antioxidants that slow down the decomposition of oils and fats. The 892 Professional Rancimat is the preferred solution for testing the efficacy of these antioxidants.

Induction time and peroxide value

Peroxide value and induction time are two valuable parameters to determine the quality of your products. The determination of the induction time measures the initial oxidative stability of a sample, while the determination of the peroxide value measures the extent of oxidation that has occurred.

This means the peroxide value reflects the current state of the oil while the induction time predicts how long the oil will remain in this state. Both tests provide important information on the quality of fats and oils.



Standards

The Rancimat method is included in various national and international standards, such as:

- AOCS Cd 12b-92 (AOCS – American Oil Chemists' Society) Sampling and analysis of commercial fats and oils: Oil Stability Index
- ISO 6886 Animal and vegetable fats and oils – Determination of oxidative stability (accelerated oxidation test)
- 2.4.28.2-93 Fat stability test on Autoxidation. CDM, Japan



Oxidation stability of foods

Many foods contain oils and fats, either naturally or as a result of production. Just like the pure substances, the hidden oils and fats are also subject to oxidation, which contributes to their spoilage. Thus, the 892 Professional Rancimat can also be used to determine the oxidation stability of foods containing oils and fats.

Foods with a very high fat content can often be analyzed directly. The only preparation required is a reduction in the size of the sample particles. In the case of foods with a high proportion of water or proteins in addition to fat, the fat phase normally needs to be separated off first. The isolated fat can then be measured with the 892 Professional Rancimat. In these cases the fat is extracted by cold extraction with petroleum ether.

TYPICAL EXAMPLES OF APPLICATIONS FOR DIRECT MEASUREMENTS

- Butter cookies
- Instant noodles
- Potato chips (crackers)
- Microwave popcorn
- Nuts

EXAMPLES OF DETERMINATIONS AFTER EXTRACTION

- Mayonnaise
- Salad dressing
- Chocolate
- Waffles
- Sausage products

Oxidation stability of cosmetics

Many natural cosmetics and other high-quality cosmetic products contain a substantial proportion of vegetable oils and fats. For example, cocoa butter is an ingredient in many lip and body care products. In contrast to paraffin-based products, these cosmetics spoil over time, partly as a result of the oxidation of the vegetable fats contained. Depending on the proportion of fat, the samples can be measured directly with the 892 Professional Rancimat or the isolated fat can be measured after cold extraction with petroleum ether.

Measurement of samples with low fat content

The classic Rancimat method only works for samples with high fat content. However, Metrohm has developed a method for the Rancimat where an indicator and carrier material is used. The added sample stabilizes the material and the resulting induction time is an indication of the antioxidation capacity of the sample.

APPLICATION EXAMPLES

- Suntan oil
- Lip balm
- Hand cream
- Body lotion

EXAMPLE APPLICATIONS WITH CARRIER MATERIAL

- Wine
- Tea
- Coffee
- Cosmetics
- Animal feed

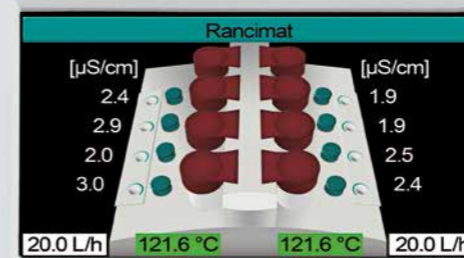


The 892 Professional Rancimat in detail



START BUTTONS ON THE INSTRUMENT

Next to each measuring position there is a button with which determination can be started immediately after the sample has been placed in the heating block. The start button is completely sealed on the outside, so no liquids such as oil or water can enter. Triggering is achieved with the help of capacitive finger detection and also works with gloves.



892 Professional Rancimat

EASY HANDLING OF THE REACTION VESSELS

Preparation of the reaction vessel, weighing-out of the sample and closing of the reaction vessel are very simple and safe. The use of disposable glass parts means there is no need for time-consuming cleaning after measuring. That not only saves working time and costs, but also improves the reproducibility of the measurement results, as new, clean measuring vessels prevent carryover effects and consequent interference with results.



MEASURING VESSEL COVER WITH INTEGRATED CONDUCTIVITY CELL

The conductivity cell is incorporated in the measuring vessel cover. When the cover is placed in position, the cell is immediately in the right position. At the same time electrical contact is made to the measuring electronics in the instrument. The conductivity cell itself is a robust stainless steel electrode that withstands even thorough cleaning with detergent and a brush or a wash cycle in the laboratory glassware washer without damage.

AIR SUPPLY

The air used for measuring is drawn in through a filter by the integral pump and water vapor is removed by means of a molecular sieve. The gas flow to the various measuring positions is controlled within the range of 1 L/h and 25 L/h according to the method settings in StabNet.



INSTRUMENT DISPLAY

The status of the instrument and of each individual measuring position can be watched on the color instrument display. It shows the temperature of the two heating blocks, the gas flow, the status of the measuring position and the conductivity measured in each measuring position.



StabNet – modern software for stability measurements

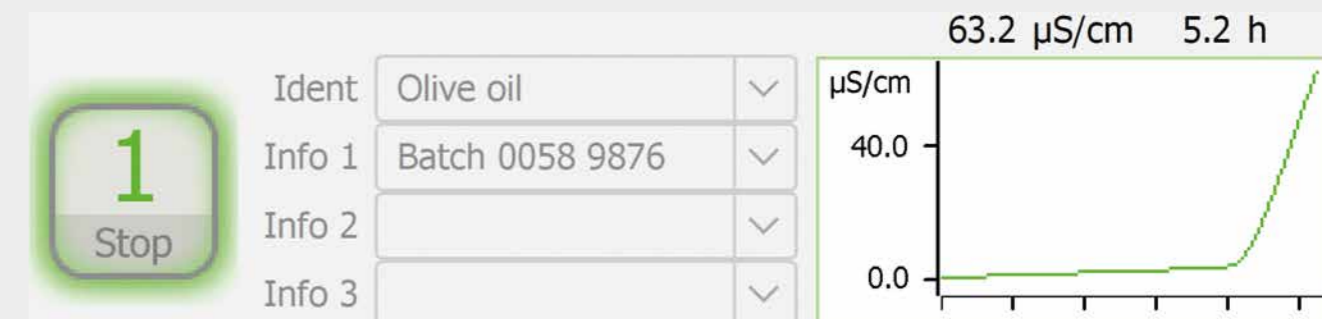


StabNet is the modern and user-friendly software for carrying out stability measurements and archiving the measurement data. The characteristic features of StabNet are its ease of use and flexibility.

This is evident already in the «Workplace» part of the program, where the day-to-day work is done. Here users will find all the elements that are needed to carry out determinations. The structure of the «Workplace» shows the setup of the 892 Professional Rancimat with its 2 heating blocks and the 8 measuring positions. Up to four 892 Professional Rancimats can be controlled simultaneously via StabNet.



For each heating block it is possible to load an individual method in which, amongst other things, the temperature and gas flow are defined. The heating is switched on manually in the «Workplace» part of the program. The heating can also be started automatically, and very conveniently, at a defined time with the help of a timer; the instrument will then be ready for use right on the start of the working day.



For each measuring position on the instrument there is a live display in the «Workplace» part of the program. The flashing Start/Stop button indicates a determination is running. From the corresponding live curve it is possible to see directly the current status of the determination and the already detected

end points. The sample identification and other information about the sample can be entered in up to 4 fields. Frequently recurring identifications can be stored as text templates and can then be simply selected on the «Workplace».

The symbols in the StabNet toolbar on the left edge of the program provide access to the other parts of the program: «Configuration», «Method» and «Data-base». Because of the clear symbols and the well laid-out structure the user interface is easy to follow and can be operated intuitively.

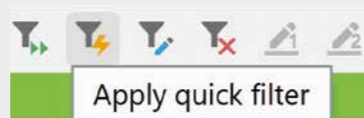


Completed determinations are stored in a database.

In the «Database» part of the program it is possible to view the determinations including all the determination, method and instrument parameters.

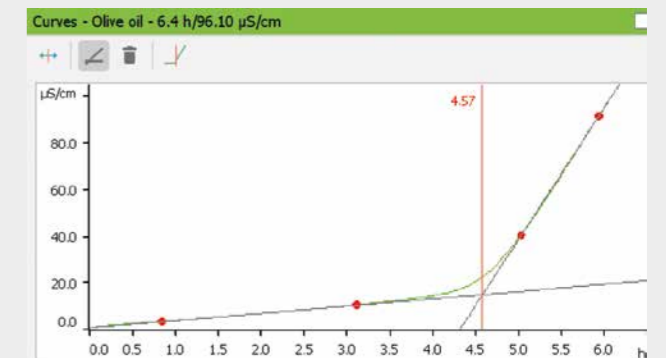


Convenient sort, search and filter functions make it easy to find data quickly.



Recalculation of determinations
Should it ever be necessary, determinations can also be processed at a later time, either by recalculation with different evaluation parameters or by manual evaluation of the curve with tangents. The original data are not lost. All versions of the determination are archived.

Using the History function it is possible to restore the original version or any interim version or the final version at any time.



Determination start	Ident	Info 1	Induction time [h]	Sample temperature [°C]	Determination version	Method name	User (short name)
2023-06-06 09:59:40 UTC+2	Biodiesel	FAME	3.92	120.0	3	Biodiesel 120 °C	Metrohm
2023-06-06 09:58:58 UTC+2	Biodiesel	FAME	3.94	120.0	3	Biodiesel 120 °C	Metrohm
2023-06-06 09:58:37 UTC+2	Biodiesel	FAME	8.11	110.0	3	Biodiesel 110 °C (EN 15751)	Metrohm
2023-06-06 09:58:15 UTC+2	Biodiesel	FAME	8.05	110.0	3	Biodiesel 110 °C (EN 15751)	Metrohm
2023-05-14 15:51:48 UTC+2	Linseed oil	sheff life 17.10.2023	3.89	100.0	7	Oil 100 °C auto	Metrohm
2023-05-14 15:51:05 UTC+2	Linseed oil	sheff life 17.10.2023	8.06	90.0	3	Oil 90 °C auto	Metrohm
2023-05-14 10:31:53 UTC+2	Linseed oil	sheff life 17.10.2023	17.54	80.0	3	Oil 80 °C auto	Metrohm
2023-05-14 09:08:36 UTC+2	Linseed oil	sheff life 17.10.2023	1.04	120.0	3	Oil 120 °C auto	Metrohm
2023-05-14 09:07:48 UTC+2	Linseed oil	sheff life 17.10.2023	1.97	110.0	3	Oil 110 °C auto	Metrohm
2023-05-11 11:25:37 UTC+2	Soy bean oil	sheff life 31.12.2023	20.44	90.0	4	Oil 90 °C auto	Metrohm
2023-05-11 11:25:16 UTC+2	Soy bean oil	sheff life 31.12.2023	43.02	80.0	4	Oil 80 °C auto	Metrohm
2023-05-09 09:59:04 UTC+2	Soy bean oil	sheff life 31.12.2023	1.49	130.0	4	Oil 130 °C auto	Metrohm
2023-05-09 09:58:24 UTC+2	Soy bean oil	sheff life 31.12.2023	9.83	100.0	4	Oil 100 °C auto	Metrohm
2023-05-08 11:45:27 UTC+2	Soy bean oil	sheff life 31.12.2023	2.46	120.0	5	Oil 120 °C auto	Metrohm
2023-04-11 09:05:04 UTC+2	Corn oil	sheff life 05.2024	22.75	100.0	3	Oil 100 °C auto	Metrohm
2023-04-11 09:04:22 UTC+2	Corn oil	sheff life 05.2024	47.64	90.0	3	Oil 90 °C auto	Metrohm

Sample	Determination	Result
Soybean oil	Determination start: 2023-05-18 17:23:24 UTC+1 Determination ID: 38e7f73c167b0d0a2c-78a3	Induction time: 11.88 h
Soybean oil	Determination start: 2023-05-18 10:53:01 UTC+1 Determination ID: 38e7f73c167b0d0a2c-78b6	Induction time: 20.81 h
Soybean oil	Determination start: 2023-05-18 10:40:16 UTC+1 Determination ID: 38e7f73c167b0d0a2c-78b5	Induction time: 37.21 h
Soybean oil	Determination start: 2023-05-18 10:40:16 UTC+1 Determination ID: 38e7f73c167b0d0a2c-78b5	Induction time: 1.62 h
Soy bean oil	Determination start: 2023-02-23 11:44:56 UTC+2 Determination ID: 38e7f73c167b0d0a2c-78b5	Induction time: 4.84 h
Olive oil refined	Determination start: 2023-05-28 07:55:53 UTC+1 Determination ID: 38e7f73c167b0d0a2c-787c	Induction time: 8.50 h
Olive oil refined	Determination start: 2023-04-15 15:45:20 UTC+2 Determination ID: 38e7f73c167b0d0a2c-787c	Induction time: 18.16 h

Report creation

The report generator offers complete freedom when it comes to creating the analysis report, whether it be an individual report with all the relevant sample and method information or a tabular report in the form of a table with all the results of a measurement series. StabNet contains a series of different report templates that can be adapted to the particular needs. As a result, a customized report can be created in next to no time; and a company logo can, of course, be added, if required.

The determination overview is freely configurable, so all measurement results can be scanned easily. The subwindows «Curve» and «Information» display

the measurement curve and other information on the determination, as well as method and instrument parameters for each determination that is selected.

Other helpful database functions

Statistical calculations

Confirmation of relevant results usually requires multiple determinations. StabNet offers the possibility of linking 2 or 4 replicate determinations together statistically. At the end of the multiple determinations, statistical data, such as the mean value and the absolute and relative standard deviations, are then calculated automatically in addition to the individual result.



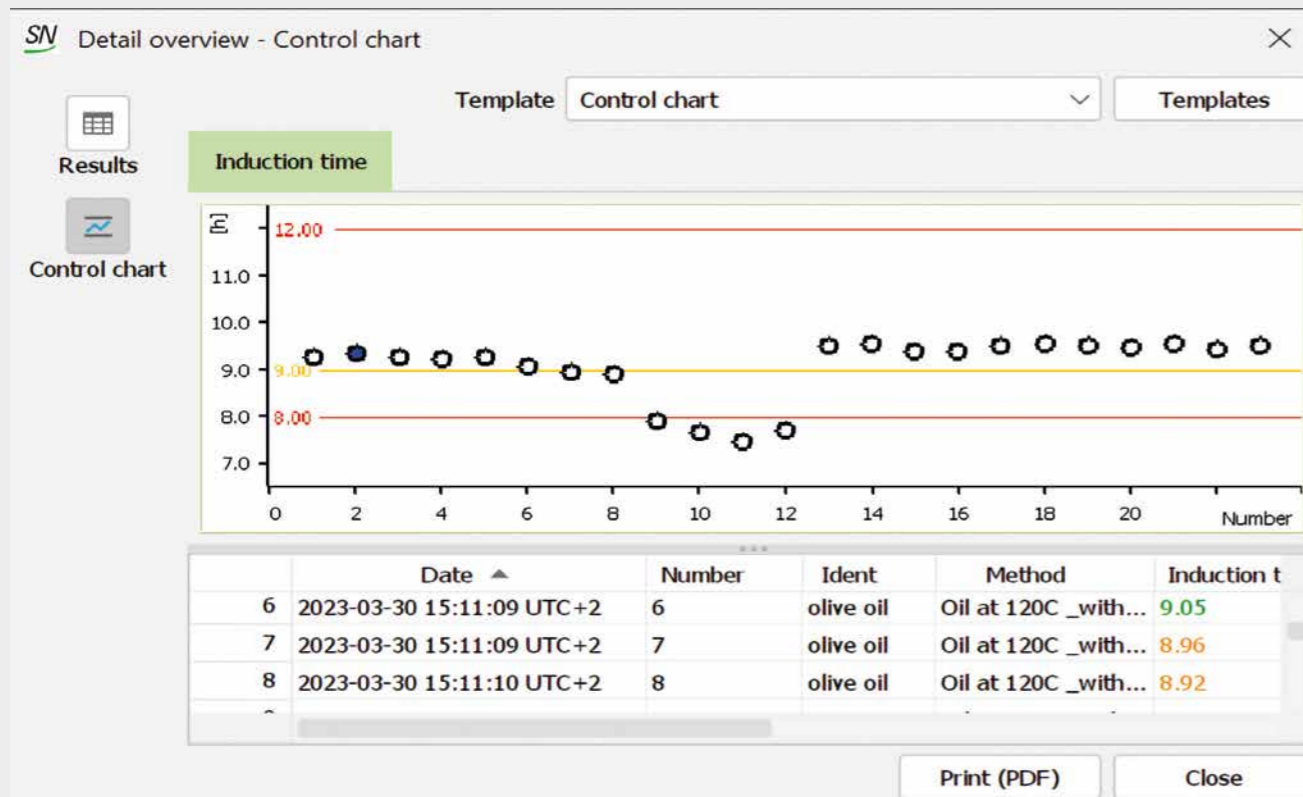
Temperature extrapolation

The Rancimat method is based on the fact that chemical reactions – in this case the oxidation of fatty acids – depend on temperature. With the help of «Extrapolation» it is possible to show the induction time or stability time results as a function of the temperature of the sample in the form of a graph. Moreover, «Extrapolation» enables recalculating results measured at one temperature in relation to a different temperature.

Thus, for example, extrapolation to room temperature provides a rough estimate for the shelf life of a sample. However, it must be kept in mind that mathematical extrapolation of hours to months and years

involves a high degree of statistical uncertainty. Furthermore, the measuring conditions do not correspond to the storage conditions. For these reasons, it is impossible to calculate the shelf life exactly in this way.

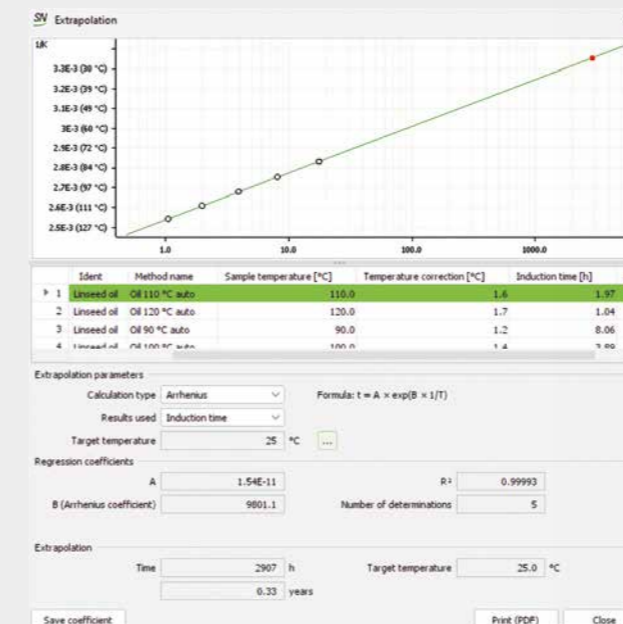
Two models are available for extrapolation. Firstly, there is the empirical Q₁₀ approach, which is based on the observation that the induction time approximately doubles with each 10 °C reduction in sample temperature. The second model also incorporates the reaction kinetics. It is based on the Arrhenius equation, which describes the temperature dependence of the reaction rate constant.



Detail overview and control chart

The function «Detail overview» shows trends and spreads in a clearly set-out chart. In addition, a table containing all the results of the selected determina-

tions and their statistical evaluation is displayed. Furthermore, a control chart provides the possibility for defining and visualizing warning and intervention limits.



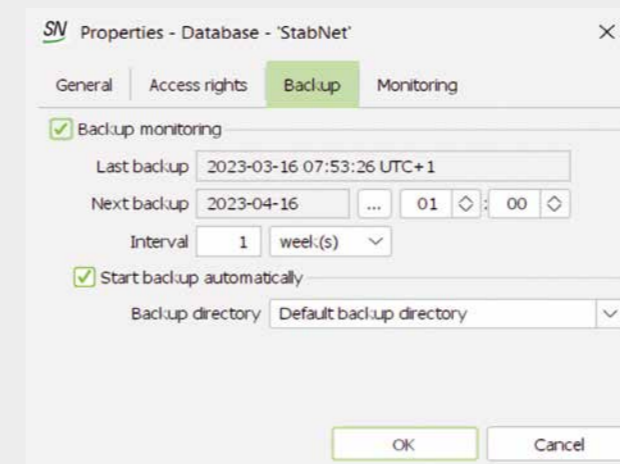
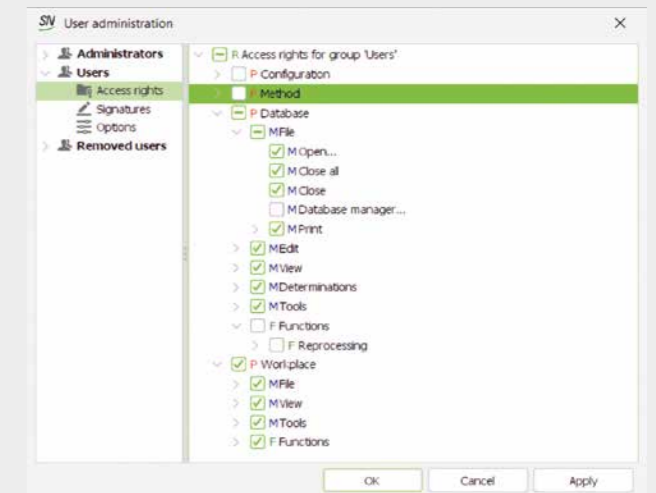
Data integrity necessitates complete, consistent, and accurate data throughout its lifecycle for transparency and traceability. Industry standards

(FDA, WHO, PIC/S, GAMP) follow ALCOA and ALCOA+ acronyms. Our StabNet software guarantees ALCOA and ALCOA+ requirements for data integrity.



Security

Data security and the traceability of results are becoming ever more important. In StabNet the access rights of each user can be defined in accordance with the in-house security scheme. Password protection prevents unauthorized access to parts of the program and to data. Furthermore, there is the possibility to add a digital signature to both methods and determinations in accordance with the guidelines of FDA Title 21 CFR Part 11.



Data backup

StabNet also supports data backup. The entire database is backed up at a freely definable interval. Lost data can therefore be restored in a very short time.

Technical specifications

892 Professional Rancimat

Heating blocks

2 aluminum heating blocks; electrically heated; can be set to different temperatures

Temperature control

Temperature range	50...220 °C, adjustable in 1 °C steps
Temperature correction	-9.9...+9.9 °C, adjustable in 0.1 °C steps
Deviation of the block temperature from the set value	< ±0.3 °C
Reproducibility of set temperature	Typically better than ±0.2 °C*
Temperature variations	Typically <0.1 °C*
Temperature difference between different measuring positions	Typically <0.3 °C*
Ambient temperature	<50 °C (at an operating temperature of 220 °C)
Response temperature of thermal protection	260 °C

Air throughput

Pump	Diaphragm pump
Adjustable range volumetric flow rate	1...25 L/h (at 25 °C and 1013 hPa)
Max. error from set value	± (0.25 L/h + 5% of the measurement value)

Conductivity measurement

Electrodes	Conductivity cell 6.0913.130 with double steel-pin electrode integrated in measuring vessel cover
Measuring range	0...400 µS/cm

Line power

Voltage	100...120 V and 220...240 V
Frequency	50...60 Hz
Power consumption	Max. 450 VA

Dimensions

Width	383 mm
Depth	461.5 mm
Height	276.5 mm (without accessories)
Weight	16.1 kg (without accessories)

* When operating temperature has been reached, with inserted reaction vessels with an identical filling and 20 L/h air throughput.

Minimum PC requirements for StabNet

Operating system	64-bit version of: <ul style="list-style-type: none"> - Windows 11 Pro / Enterprise - Windows 10 Pro / Enterprise - Windows Server 2022 - Windows Server 2019 - Windows Server 2016
RAM	8 GB
Hard disk space	Program: 1 GB Data: <ul style="list-style-type: none"> - Minimum: 10 GB - Recommended: 50 GB
USB port	1 for each instrument that is connected (maximum 4)
Screen	Minimum resolution: 1024 x 768
Network	10 Mbit/s, stable and permanent communication via TCP/IP



ORDERING INFORMATION

Instrument	
2.892.0010	892 Professional Rancimat Instrument for the determination of the oxidation stability of natural fats and oils. All accessories necessary for the performance of the determinations are included in the scope of delivery. The StabNet software is required for instrument control, data recording and evaluation and for data storage (not included).
Recommended accessories	
6.5616.100	Equipment for determining the temperature correction for Rancimats and PVC Thermomats
Consumables	
6.5706.020	Rancimat Consumable Kit
6.1428.107	Polystyrene measuring vessel, 50 pieces
6.2418.100	Air tube for oil measurements, 100 pieces
Options	
6.1111.010	Pt100 Temperature Sensor
6.1839.000	Iso-Versinic tubing
6.1429.050	Reaction vessel long for stability measurements, 100 pieces
6.2418.130	Air tube long for biodiesel measurements, 100 pieces
6.2059.000	Turning ring
6.2324.010	Conductivity standard 100 $\mu\text{S}/\text{cm}$ (250 mL)
6.2326.000	Silicone oil for stability measuring instruments (50 mL)
6.2757.000	Air collection tube for stability instruments
Software	
6.6068.202	StabNet 2.0 Full