FOSS

Analytical solutions for Laboratories

Dedicated Analytical Solutions

> Automated analysis can play an important role in fulfilling your goals. We demand that the automated solution must be comparable to the traditional method.

Your partner in the laboratory

Laboratory methods hardly change, but the tools for implementing them are always developing.

FOSS solutions take the burden of laboratory testing, avoiding repetitive, manual procedures while keeping contact with chemicals to a minimum. Automated procedures also help to avoid inevitable human error so that results are consistent and traceable.

Over time, the streamlined operations enabled by effective use of technology boost capacity and throughput for a rapid return on investment.

More than 30,000 laboratories around the world use a FOSS solution for their daily chemical analysis work. Our systems are supported by more than 250 detailed applications and local expertise worldwide.

For food, feed, agricultural and environmental testing
Our specialisation in food, feed and environmental testing allows us to fully understand our users' demands and deliver practical solutions. FOSS solutions cover a range of testing requirements including digestion, distillation, fibre analysis, sample preparation and rapid methods.

Main applications for FOSS solutions include:
- Nitrogen/protein
- Total and crude fat and other extractable matter
- Crude, detergent and dietary fibre
- Nutrient parameters in water and soil
- And many more

Industry collaboration and continuous improvement
Many years of collaboration with the industry ensures continuous improvement in analytical operations through development of innovative and practical solutions targeted at the demands of our core business areas.

Getting the full value
Completing the picture, FOSS offers support around the globe from trained local staff. A broad range of support and maintenance options is available. Coupled with the legendary robustness of FOSS Tecator instruments, it all adds up to a long instrument lifetime and great value for money.

Tecator™ Line - Same principles, new technology

From those distinctive Tecator orange instruments developed over 25 years ago to the sleek lines of the latest, fully automated solutions, FOSS has always been at the forefront of innovation in laboratory analysis. Today, the same design principles behind the original Tecator instruments continue.

The value of any FOSS laboratory solution can be summarised in three focus areas:

1 INNOVATION:

With the increasing demands of a competitive market, labs have to keep running faster. That is why a laboratory solution from FOSS gives you cutting edge technology and innovative design to streamline your lab procedures and optimise your business potential.

2 THROUGHPUT:

Running a lab can be costly and time consuming. A Tecator™ Line instrument from FOSS is designed to give you the highest level of automation. We make it possible to process an unrivalled amount of sample tests with the highest possible accuracy, at minimal cost.

3 SAFETY:

Safety is one of the cornerstones in good lab practice, therefore we have made it possible for your lab to run faster than ever before, without compromising on safety. Ultimately, safety is about taking care of people and this is why an instrument from FOSS is designed with the best safety features imaginable.

INNOVATION

Progress pays

FOSS innovations are helping to make a real difference to laboratory operations around the world in research or larger commercial laboratories alike. Constantly improving on established methods, our investment in innovative technology gives you new opportunities to improve your laboratory operations, for instance:

- Automation minimises manual operations and improves overall throughput
- Technology saves resources and time
- Use of water, chemicals, solvents and energy is minimised

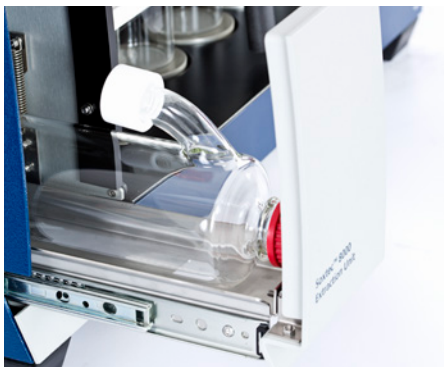
Year after year, constant investment in the work of our talented designers, scientists and engineers means that the next money-saving, time-saving, safety-improving solution is already on the way to you.

FOSS innovative solutions respect the official classical ways of doing reference methods in the lab and at the same time set new standards for time savings on sample handling and risk reduction. For the operator FOSS offers less manual handling, a safer working environment and an intelligent user interface that you can rely on.

Documentation of accuracy is part of any product development project. With FOSS' high quality standards our wet chemistry solutions serve as a basis for worldwide calibrations of indirect methods in many industries. Whatever your analytical solution, be it in-line, at-line or in the lab, calibration work will be needed on a regular basis.

Whether you want to optimise on production yields, monitor and control product quality or simply save on use of raw materials, our innovative lab solutions ensure that you will get the most of your process investments.

The unique, patented Hydrocap filter contains the sample all the way from initial weighing through hydrolysis to final extraction.



Easy and safe collection of solvents for disposal or re-use.

Hotplates with individual temperature control and automatic shutdown feature that allows out-of-hours operation.

THROUGHPUT

Less handling, more results

Not only does reduced handling improve safety. Capacity and overall throughput is boosted by the steady, consistent flow of results generated by automated solutions. From sample preparation to fully automated analysis, improved efficiency saves time as well as the use of chemicals and solvents, not to mention the money saved by reducing the use of highly-trained staff performing repetitive and time-consuming tasks.

The acid hydrolysis step to release bound fat in pre-fat analysis for example, is usually performed by boiling a sample in hydrochloric acid. After filtration and rinsing of the filter cake, the residue is dried and can then be subjected to solvent extraction. The procedure is time-consuming, and involves sample transfer steps that can cause loss as a main source of error.

FOSS has simplified the process with the help of its integrated fat analysis concept, eliminating the need for sample transfers.

A range of batch handling accessories and tools also help to improve throughput and reliability of results.

Reliable results are the foundation of any laboratory

No result is better than its reference. That's why FOSS automated chemical analysis solutions rely on a solid calibration based on officially approved reference methods* and regulations such as ISO, AOAC, IDF and EPA.

By using an officially approved method you will:

- Get results that are valid on a worldwide basis
- Save time by minimising work to validate the application
- Get accurate results on a wide range of samples with robust methods
- Be able to use the collaborative study data for your measurement uncertainty values

**The European standard for determination of acid detergent fibre (ADF) and acid detergent lignin (ADL) in feed and the AOAC standard for fat analysis*

12 place hydrolysis sample holder for unattended operation and higher throughput.

Operate 2 solvent extraction units from one control unit for reduced manual handling.

Batch handling and auto sampling for after hours operations.

SAFETY

Reducing risk

Because people and chemicals don't mix, we have found lots of ways to help you avoid contact with chemicals, solvents and the fumes they create.

With a FOSS solution:

- Automation reduces the risk of contact with chemicals and solvents
- The smart use of technology simplifies operations and reduces the risk of accidents
- Safe systems allow versatile operations, for example, allowing a broad range of solvents

After all, why should trained staff have to fill beakers or empty tubes when an instrument can do it under safe, controlled conditions?

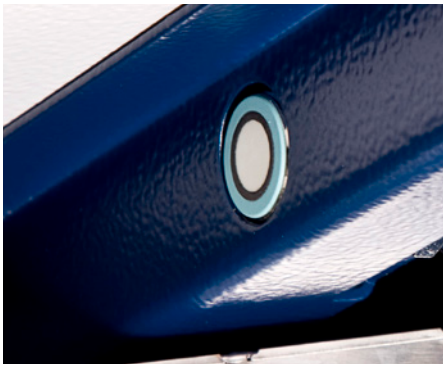
Operations can be performed with different levels of automation with automatic control of cooling water for instance. Temperature sensors, door sensors, electrical sensors and pressure sensors – you name it –they all alert you to dangerous situations. Enclosed systems and automatic draining systems minimise contact with chemicals, reagents and the fumes that they create.

Just load and walk away

The FOSS Soxtec™ system employs a patented four-step solvent extraction technique. It performs boiling, rinsing and solvent recovery. In its fourth step, the sample cup lifts off the hot plate, using residual heat to pre-dry while eliminating boil-dry risk. The entire process is a fully automatic, unattended operation. The system will shut down automatically when finished.

Speed dial for safe and consistent solvent addition eliminates manual handling of chemicals.

Built-in fume hoods prevent exposure to solvent fumes during addition of solvents.



Built-in safety sensors for improved operator safety.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A SOLUTION FO

Tecator™ Line

Fully automated

Highest throughput

Official methods

Unrivalled accuracy

Safest solution available

OR EVERY NEED





Labtec™ Line

Manual/semi-automated

Flexible operations

Official methods

High accuracy

High end safety features

Solvent Extraction

Fast and reliable results with high operator safety

Ever since the development of the revolutionary Rafatec solvent extraction unit in 1975, FOSS Tecator technology has continuously improved fat analysis operations, culminating most recently in the Soxtec 8000 series.

Offering unprecedented levels of automated fat analysis, the Soxtec™ 8000 total fat system consists of an extraction unit, a hydrolysis unit and a single filter that is common to both units. This allows you to perform Randall improved Soxhlet analysis in one integrated action. It's the first ever seamless solution for Soxhlet analysis. Avoid filter-to-filter transfer, save time and labour and avoid the risk (and cost) of human error.

Soxtec™ extractors range from the small (2 Position) ST 245 Soxtec™ to the fully automatic (12 position) Soxtec™ 8000 which can handle a potential seven batches (84 samples) per day.

Because people and chemicals don't mix we've found lots of ways to help you avoid contact with solvents and chemicals and the fumes that they create. What's more, the many safety features allow you to use a broad range of tested solvents, including some that are considered too flammable for use with other solutions. The only electrical part in the Extraction unit, the hot plate, is spark proof. The double temperature sensors ensure that the set temperature is sustained and that the ignition point is never reached for any solvent.

With the unique design of FOSS extraction systems and a range of FOSS application notes your lab will be able to handle almost any type of sample.

All Soxtec models fully utilise our batch handling concept to make sample processing as easy and safe as possible.

Solutions

Soxtec™ 8000 Tecator™ Line

The Soxtec™ 8000 extraction unit is a fully automated system for fast and safe determination of extractable matter. The standard model has six hotplate positions, extendable to 12, making it possible to handle up to seven batches (84 samples) per day. For total fat analysis, the Hydrocap filter is transferred from the hydrolysis unit to the extraction unit which then performs the four extraction steps boiling, rinsing, solvent recovery and auto shut down, fully unattended.

ST 255 Soxtec™ Labtec™ Line

The semi-automated ST 255 Soxtec™ is used for fast and safe determinations of soluble material. It is ideal for laboratories with a lower throughput, offering many of the benefits and features of the fully automated Soxtec, but at a lower price. The system allows for a throughput of up to six extractions, 36 samples per day and includes batch handling tools that ensure fast and safe handling of samples and cups.

ST 243 Soxtec™ Labtec™ Line

The ST 243 Soxtec™ is a six-place solvent extraction system used for fast and safe determination of soluble material in food, feed, soil, polymers, paper pulp and textiles. The system comes with an extraction and control unit as well as 26 mm/30 ml glass or cellulose thimbles.

ST 245 Soxtec™ Labtec™ Line

The ST 245 Soxtec™ is a two-place solvent recovery system used for fast and safe determination of soluble material in food, feed, soil, polymers, paper pulp and textiles. The system comes with an extraction and control unit as well as glass or cellulose thimbles. 26 mm./30ml. or 33 mm/65 ml thimble sizes are available.

Extraction Cups

To suit different applications Extraction Cups are available in either aluminium or glass. Aluminium cups are often preferred for quantitative, gravimetric analysis as they are unbreakable and offer rapid heat transfer, for reduced heating, cooling and drying times.

Approved methods:

The Soxtec systems are approved by the following methods:

- AOAC 2003.05 & 2003.06 Crude Fat in Feed, Cereal Grain and Forage (Diethyl Ether and Hexane extraction methods)
- AOAC 991.36 Fat (Crude) in Meat and Meat products
- ISO 1444:1996 Meat and Meat products – Determination of free fat content
- EN ISO 11085:2008 Cereals, cereals-based products and animal feeding stuffs – Determination of Crude and Total Fat content by the Randall extraction method
- EN ISO 6492:1999 Animal feeding stuff – Fat analysis
- US EPA method 3541 for the extraction of PCBs and semi volatiles in soil and sludge

Hydrolysis

Break the total fat bottleneck

The hydrolysis stage is often considered the bottleneck in total fat analysis because a limited flow of samples here means limited flow in the subsequent extraction phase. The unique Hydrocap single filter improves throughput by containing the sample all the way through from the initial weighing, through hydrolysis to final extraction. The filter fits into an easy-to-handle holder. This is placed in a 12 position hydrolysis system and then transferred directly to the extraction unit which has up to 12 positions.
The virtually seamless sample transfer from hydrolysis to extraction improves speed by reducing manual handling and avoids potential human error while the high capacity throughput improves your overall response time.

The Hydrotec™ 8000
The HydrotecTM 8000 performs automated acid hydrolysis of samples to break up bonds between fat and other components. Traditionally, hydrolysis units have a capacity of up to six samples and, at this capacity, instruments take up a lot of bench space in the laboratory. The HydrotecTM 8000 changes that paradigm. It has a twelve place sample holder with a folding action so that samples fit neatly into the hydrolysis unit.

Chemicals are added and removed by pump, improving safety and reducing the risk of human error.

After hydrolysis the samples and Hydrocaps are dried and placed in the specially designed tool for transferring to the extraction unit in sets of six hydrolysed samples.

The filter is made of an inert material that retains the fat during hydrolysis, but releases it during extraction.

The SC 247 SoxCap™
The SC 247 SoxCap™ is an integral part of the Soxtec systems. It offers total fat analysis in accordance with recognised methods. The SC 247 SoxCap™ performs hydrolysis, filtration and washing without any sample transfer. This patented technique offers high throughput together with minimum manual handling using batch handling tools.

The accuracy of the SoxCap method has been verified by comparison with the revised prEN ISO/DIS 7302 method, as the same samples were used and the analyses were performed at the same time. prEN ISO/DIS 7302 became ISO11085 on publication.

Solutions

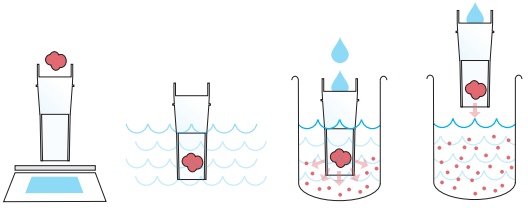
Hydrotec™ 8000 Tecator™ Line

The Hydrotec™ 8000 is ideal for the busy laboratory requiring high throughput of samples. It is an innovative, fully automated system that performs automated acid hydrolysis without sample transfer. It has a small footprint and unique batch-handling features. Automated acid rinsing until neutral PH is reached, is included.

SC 247 SoxCap™ Labtec™ Line

The SC 247 SoxCap™ performs hydrolysis, filtration and washing with no need for sample transfer and minimum manual handling using the batch handling tools. The patented technique is based on the SoxCap capsule's ability to hold the fat present in the sample during hydrolysis and release it during solvent extraction. Its capacity is six samples per batch and 36 samples per day.

The unique, patented HydroCap filter contains the sample from the initial weighing, through hydrolysis to final extraction; avoiding sample transfer errors.



Improved throughput with minimal cost

Innovation, throughput and safety – three major considerations for any laboratory doing Kjeldahl analysis.

Kjeltec savings
Automated solutions in the form of the FOSS Kjeltec™ series give you many ways to save compared to traditional non-automated methods.
Just considering the costs related to the different reagents, there are considerable potential savings with the Kjeltec instruments. Kjeltec solutions use less reagents and reduce both operating and disposal costs. Major contributors are from acids/bases and from catalysts.
Kjeltec also compares favourably to other automated solutions with cost reductions in the region of 30 – 40% obtainable.

Improving throughput and safety
Automation in distillation can make a huge difference to throughput, especially in combination with automated digestion using common tube racks. FOSS digestion systems working with Kjeltec distillation units do exactly that and come with a series of accessories that not only ease technicians work, but also turn critical manual handlings of hazardous chemicals into safe and reliable operations.
Your automated Kjeltec solution can include: dilutions of samples, addition of alkali, distillation, tube-draining, receiver solution addition, and even colorimetric detection. Besides the improvement in throughput provided by this level of automation, safety is also improved.
SAfE (Steam Addition for Equilibrium) technology improves safety when handling exothermic reactions and high accuracy bellows pumps ensure long term stability in alkali delivery. All units are equipped with an adjustable steam generator, dilution water and alkali addition together with tube emptying.

The Kjeltec™ series combines the best possible accuracy and precision, with the lowest possible cost/test. There are a number of models to match different needs.

Typical Applications
EN ISO 5983-2 (AOAC 2001:11) which applies to Protein/Nitrogen in Animal Feeds, Cereals, Forages, Oil seeds, Pet Foods and Fish Meal.
This standard is also the reference method for the determination of nitrogen/protein by:

- Indirect spectroscopic determinations (NIR/NIT)
- Dumas combustion method (ISO 16634)

ISO 20483 determination of the nitrogen content of cereals, pulses and derived products

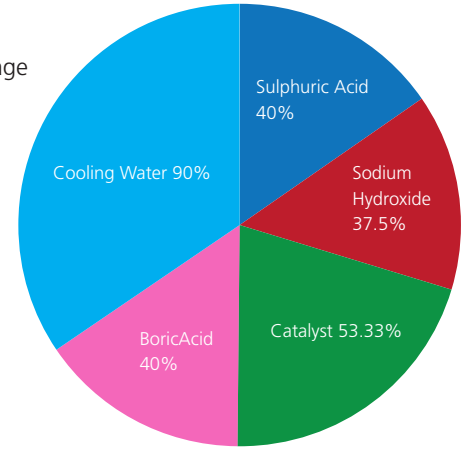
ISO 8968-2 (IDF/FIL 20-2) determination of the nitrogen content of liquid milk, whole or skimmed, by the block-digestion principle

ISO 8968-3 (IDF/FIL 20-3) determination of the nitrogen content of liquid, whole or skimmed milk, semi-micro method

ISO 8968-4 (IDF/FIL 20-4) determination of the non-protein nitrogen content of liquid milk, whole or skimmed.

ISO 937 (AOAC 981.10) Meat and meat products - determination of nitrogen content (Reference method)

Reduction in usage of reagents and cooling water.

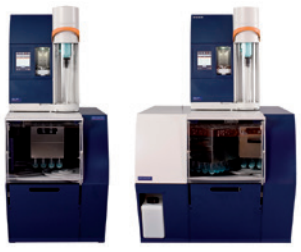


Kjeltec™ 8100/8200/8400 Tecator™ Line

The Kjeltec™ 8000 series features a range of automatic distillation units with varied levels of automation to suit the needs of your laboratory:



DISTILLATION UNIT	8100 Tecator™ Line	8200 Tecator™ Line	8400 Tecator™ Line
• Automatic dilution, alkali addition, distillation and tube emptying provide ease of use • Variable output steam generator broadens application area to other volatile components • Official and accurate procedures (ISO, AOAC, EPA, DIN) simplify validation • Patented SAfE* feature for safe distillation of tubes with salt cakes • Built-in safety systems for user protection • Self adjusting cooling water control saves water and reduces costs • Bellows pumps for accurate dispensing of reagents • Alkali resistant plastic splash head & tube emptying vessel for long lifetime	✓	✓	✓
• Receiver solution addition • Automatic safety door • External titration connection (Mettler, Metrohm, Schott, etc.) • Modularly upgradeable to analyser and sampler system		✓	✓
• Titration, calculation and reporting • Upgradeable to 20 or 60 place auto sampler for fully unattended operation • Interchangeable burette for easy titrant exchange • Ethernet connection eliminates communication problems with printers and balances • Touch sensitive colour display • Complete PC control of all registration and reporting through optional data management software - Compass			✓
Autosampler system 8420: 1 rack, 8 or 20 tubes, 250 & 400 ml		Upgrade-able	Optional
Autosampler system 8460: 3 racks, 8 or 20 tubes, 250 ml & 400 ml		Upgrade-able	Optional



Kjeltec™ 8420/8460 Tecator™ Line

An optional 20 or 60 place Autosampler provides the benefits of automation even at lower sample throughputs. Just load your sample racks directly from the digestion block and Kjeltec™ will perform accurate analysis unattended for more than four hours.

KT 200 Kjeltec™ Labtec™ Line

The KT 200 Kjeltec™ distillation unit provides a simple and reliable solution for safe and semi-automatic distillation. The possibility to pre-program alkali addition and distillation time supports the production of accurate results independent of operator. Accurate bellows pumps give long term stability in reagent delivery. The unit is equipped with sensors for safety door and level/overpressure sensors for the steam generator. SAfE technology reduces the exothermic reaction between alkali and acid during distillation.

Digestion

Reduced operator time and a more rational use of consumables

Digestion in Kjeldahl analysis can be time-consuming and expensive in acid consumption. Automated solutions help to minimise both these considerations.

Saving time
Factors affecting digestion time include:
- Type of sample
- Volume of acid (H_2SO_4)
- Amount of salt (K_2SO_4)
- Exhaust rate
- Catalyst
- Oxidising agents
- Temperature of Digestion block

With FOSS Digestor Systems, all aspects have been handled for reduced operation time.
FOSS digestors, are available in ergonomic and flexible versions from basic to fully automated systems for unattended digestion procedures. All units can be customised for individual needs including nitrogen/protein analysis and preparation steps for other control parameters such as COD, trace heavy metal analysis, hydroxyproline as well as AAS and flow injection analysis.

Reducing acid consumption
Acid losses in the digestion step cannot totally be eliminated – but it can be reduced dramatically.

The following is an example of the savings available with FOSS Digestor Systems:

Classical Kjeldahl digestion:	25 ml / sample
Tecator Procedure digestion:	12 ml / sample
Difference:	13 ml / sample

With 20 samples 260 ml H_2SO_4 is saved!
For a Lab with 40 samples per day, yearly savings are nearly 115 L H_2SO_4

The digestion procedure also makes it easier to remove fumes with an exhaust and an optional scrubber solution. The indirect savings from a cleaner and more acid free working environment can therefore also be considered.

Keeping track of tests
The software available with the Tecator™ Line Digestors supports Good Laboratory Practice (GLP) routines and accreditation procedures. Data for date, time, temperature, application used, operator, batch number, and ID number are constantly logged and all information can be transferred to a PC for archiving and report generation.

Solutions

Digestor 2508, 2520 and 2540 with lift Tecator™ Line

The Tecator™ Line Digestor with the Lift system, based on a digestor and a tube rack with 8, 20 or 40 tubes, facilitates fully automated procedures, eliminating heavy and risky handling of hot chemicals. A tube rack is placed in the lift. The application selected then fully controls the entire process. When digestion is completed the combined tube rack and exhaust manifold moves to the cooling position until a signal indicates "cycle over". Two way PC communication supports traceability and GLP.

Digestor 2508 and 2520 with rack Tecator™ Line

The Tecator™ Line Digestor with the rack system follows the same procedure as the digestor with the lift system. An exception to this is the combining/separating of the tube rack and exhaust manifold and movement into the cooling position which is performed manually when the signal is heard. The selected application controls all other functions as with the digestor with lift system.

DT 208 and DT 220 Digestor Labtec™ Line

With the Labtec™ Line Digestor all procedures are carried out by the operator. The temperature and time for the digestion are selected on the front panel. All other procedures are then performed by the operator once the digestor has reached the selected temperature. The Labtec™ Line digestor has a built in, user definable, time and temperature controller and display.

Scrubber 2501 Tecator™ Line

The optional Scrubber 2501 can replace the water aspirator for efficient fume removal when water is a scarce or expensive commodity, or simply when a higher level of automation is desired. The compact bench top Scrubber 2501 is self contained and is therefore unaffected by water supply issues. When the Scrubber 2501 is connected to a lift or rack system the program will fully control the function including switching from high to low aspiration settings.

SR 210 Scrubber Labtec™ Line

This semi-automated, variable scrubber is used in the digestion stage for neutralising corrosive fumes. The scrubber pumps fumes through a series of traps before entering the condenser.

EM 2508, EM 2520 and 2540 Exhaust Manifolds

Exhaust Manifolds designed for each Digestion Unit facilitate fume removal and containment and are strongly recommended for use with all digestion procedures. We strongly recommend the use of both exhaust systems and fume cupboards for these operations. This is simply Good Laboratory Practice (GLP) and avoids conflict with local Health & Safety (H&S) requirements.

RH 2508 and RH 2520 Reflux Heads

When a digestion unit is used for reflux chemistries, such as Chemical Oxygen Demand (COD), a Reflux Head connected to a suitable cold water supply should be used in place of the Exhaust Manifold. FOSS Reflux Heads are conveniently mounted in handling racks which match the tube rack in the digestor. The ball jointed condensers are designed for use with ball jointed digestion tubes. The Reflux Heads are compatible with Tecator™ Line Digestors with lift, Tecator™ Line digestors with rack and Labtec™ Line digestors.

Combustion

Reliable Dumas results at a low cost per sample within three minutes

The Dumas combustion method is an absolute method for the determination of the total nitrogen content in a usually organic matrix. The sample is combusted at high temperature in an oxygen atmosphere. Via subsequent oxidation and reduction tubes, nitrogen is quantitatively converted to N_2. Other volatile combustion products are either trapped or separated. A Thermal Conductivity Detector measures nitrogen and results are given as % protein or mg nitrogen which may be converted into protein by using conversion factors.

Fast, easy to use and automated, the Dumas method has become increasingly popular for measuring nitrogen in a broad range of food and feed products. The Dumatec™ 8000 offers a number of innovative features that makes the method simple for busy laboratories.

Fast and flexible

Instantaneous analysis of all nitrogen resulting from the test procedure gives you reliable Dumas measurements within three minutes. The innovative design avoids calibration standardisation between batches of the same sample type. This gives a fast start up time of 30 minutes. Urgent new samples can be added to the autosampler while a batch is in process.

Low running costs

Keep costs down compared to other solutions with the unique three-stage water removal system that ensures a long lifetime of the water trap. The software system controls the combustion with great precision for minimal consumption of oxygen. The use of helium is reduced because there is no need for a reference gas flow.

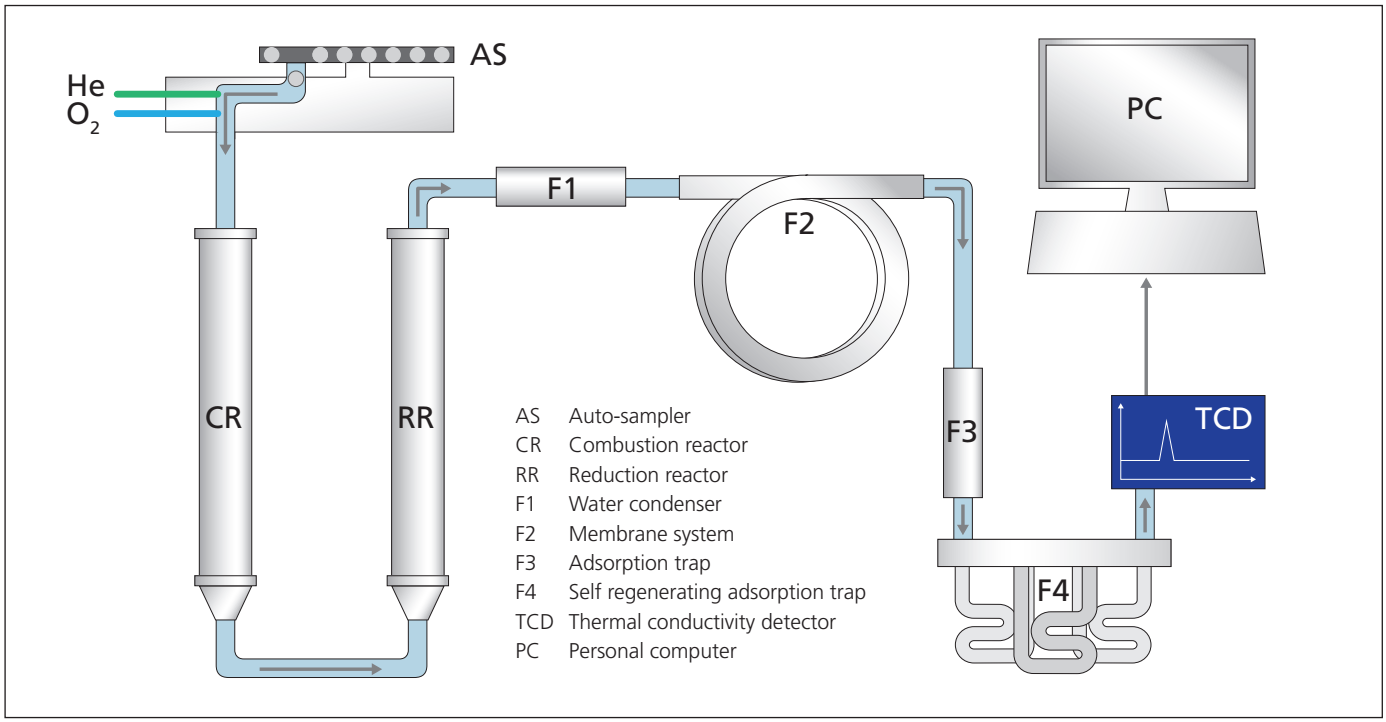
Operator time is also low, for example, it is easy and quick to remove the crucible and replace the quartz combustion reactor. Run samples are monitored automatically and the certified quality catalysts last for more than 800 analyses (sample dependent).

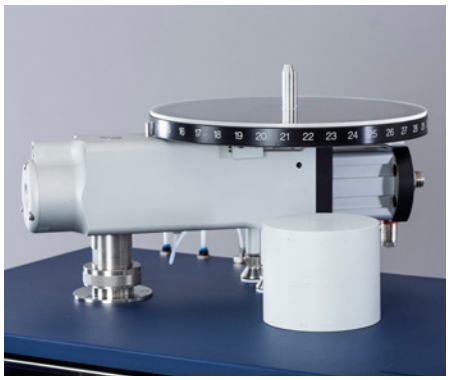
Reliable Dumas with reduced work

Dumatec helps to reduce the burden on your laboratory resources. For instance, removal of CO_2 is done automatically with the patented self-regenerating adsorption trap. A smart auto-sampler disc system allows users to test up to 117 samples in one go.

Dumatec™ 8000 Tecator™ Line

Dumatec™ 8000 gives busy laboratories reliable Dumas results in just three minutes at a low cost per sample. Innovative features reduce start-up time while extending consumable lifetime and software functions allow desktop-operation and traceability. Removal of CO_2 is done automatically with the patented self-regenerating adsorption trap within a six position carousel. A smart auto-sampler disc system allows you to test up to 117 samples, giving you batch handling flexibility.





The Dumatec™ 8000 is versatile for all sample types and easy and quick to use – just weigh samples in tin foil, pop in the auto-sampler disc and let it go. It is operated from a desktop using the Dumatec Software for easy handling of calibrations, traceability of data and report creation.

Crude, Detergent and Dietary Fibre Analysis

Free your laboratory resources with new levels of automation

Fibre as a parameter covers similar components with different functional groups, and Fibre is only defined by the applied laboratory method. For instance, Crude Fibre is defined as "The residue of plant cells after extraction by Acid and Alkaline Hydrolysis" while Dietary Fibre is defined as "The remnants of plant cells resistant to the alimentary enzymes of man".

Following standard methods

Fibre analysis is complex and standard methods are of great importance for reliable results. For decades, FOSS has excelled at following standard methods ensuring that your results are reliable.

The traditional methods for analysis of fibre involve repeated sample treatments, transfer, and filtration together with the handling of various, often hot, reagents. Each of these processes is a potential source of error or safety concern.

FOSS excels at the automation of the manual method on the basis of our many years of experience in the automation of basic chemical operations and comprehensive documentation from laboratory studies and round robin tests.

Specifically, the Fibertec™ system reduces errors and improves safety by containing the sample throughout the procedures, minimising the handling of reagents and ensuring fast, efficient filtration by use of integral vacuum & pressure systems.

Flexible options

Systems for crude and detergent fibres associated with animal nutrition and for dietary fibre provide comprehensive solutions to suit every need. These consist of hot and cold extraction units for simple determination of crude fibre and detergent fibre and related parameters according to standard reference 'crucible' methods such as Weende, van Soest etc., for use in the laboratory.

Typical Applications:

EN ISO 6865 (AOAC 978.10) which refers to Analysis of Crude Fibre (CF) in Feed, describes an analytical procedure based on the crucible or Fibertec™ method.

EN ISO 16472 (AOAC 2002:04) which refer to Analysis of Neutral Detergent Fibre (NDF) in Feed, describes an analytical procedure based on the crucible or Fibertec™ method.

EN ISO 13906 (AOAC 973.18) which refers to the Analysis of Acid Detergent Fibre (ADF) and Lignin (ADL) in Feed, describes an analytical procedure based on the crucible or Fibertec™ method.

Solutions

Fibertec™ 8000 Tecator™ Line

This is an automatic system that uses internally preheated reagents added to a closed system to minimise contact with hot reagents. It determines fibre content according to Weende, van Soest and other recognised methods. Single or sequential extractions including boiling, rinsing and filtration are performed under reproducible and controlled conditions.

Fibertec™ 1023 Tecator™ Line

This system includes a shaking water bath and a filtration module for quantitative determination of dietary fibre in a variety of sample types. The filtration module filters and collects six sample solutions and includes a system for rapid dehydration. The Shaking Water bath incubates 12 samples in each batch.

FT 121 Fibertec™ Labtec™ Line

The FT 121 Fibertec™ is a cold extraction unit, used for defatting of samples and for lignin determination at ambient temperature. The FT 121 Fibertec™ is used in connection with Fibertec hot extraction systems such as the Fibertec™ 8000 and the FT 122 Fibertec™.

FT 122 Fibertec™ Labtec™ Line

FT 122 Fibertec™ uses externally preheated reagents to determine fibre content according to Weende, van Soest and other recognised methods. Single or sequential extractions including boiling, rinsing and filtration are performed under reproducible and controlled conditions.

FC 221 FiberCap™, FC 223 FiberCap™ Labtec™ Line

The FiberCap system is specifically designed to provide a low cost, high capacity solution for fibre determination in accordance with the Weende and van Soest methods. Defatting, boiling, rinsing and filtration are performed under reproducible and controlled conditions. FiberCap™ capsule design with a snap on lid ensures accurate analysis and superior precision, while batch handling, used throughout the procedure, eliminates the risk of sample transfer.

Fibertec Models use the same crucible system, permitting samples to be dried and weighed between extractions if required.

Sample milling and homogenisation

Reliable tools for consistent sample preparation

Homogeneous test material is a prerequisite for reliable results, yet sample preparation is an often overlooked aspect of quality assurance. It has a huge impact on quality measures in terms of accuracy (closeness to the correct results) and precision (spreading of individual test results).

Homogenisation and sampling are sciences of their own: Particle size and the (statistically necessary) minimum sample amount are related. The empirical rule for estimation of minimum sample amount is that the minimum sample amount is proportional to the particle size of the test sample.

Reliable and reproducible results can only be obtained if:
- Correct sample preparation methods are employed
- Sufficient sample material is used
- All samples are prepared under the same conditions

FOSS has developed a range of equipment and tools for Sample Milling and Homogenisation.

Sample Mills
- CM 190 Cemotec:
  Coarsely grinds grain without moisture loss
- CT 193 Cyclotec:
  General purpose sample mill making uniform particles
- KN 195 Knifetec:
  For high fat, high moisture and fibrous samples

Homogenizers
- HM 294 Homogenizer & HM 297 Homogenizer
  For high fat, high moisture and fibrous samples

Solutions

CM 190 Cemotec™ Labtec™ Line

The CM 190 Cemotec™ Sample Mill is specially designed to grind grain and seed samples without loss of moisture. It is an excellent mill for all types of sample preparation where the requirements for fineness and uniformity of particle size are moderate.

CT 193 Cyclotec™ Labtec™ Line

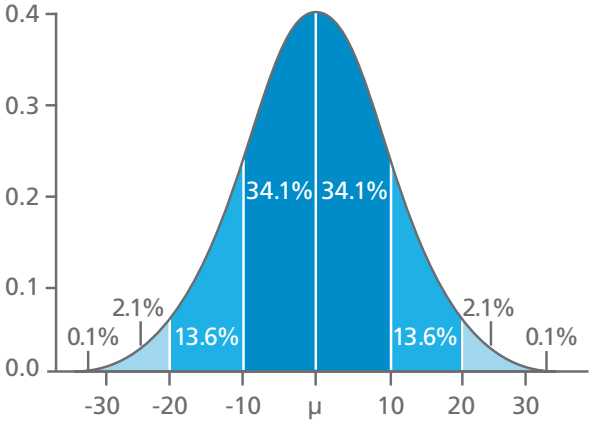
The CT 193 Cyclotec™ Sample Mill is designed for rapid, uniform grinding of a wide variety of feeds, grains, leaves, etc. and also for grinding of chemicals, pharmaceuticals and similar products. The Cyclotec offers a very rapid and convenient solution to accurate sample preparation for a variety of analytical techniques, e.g. Digestion, Extraction, Fibre, NIR.

HM 294 Homogeniser (1-phase, 1500rpm) & HM 297 Homogeniser (3-phase,1500/3000rpm) Labtec™ Line

The HM 294 and the HM 297 Homogenisers are designed for macerating and homogenising a variety of high moisture, high fat and fibrous samples in 20 - 60 seconds. Application examples include: reduction of forage and dry food and chemical products; homogenisation of meat, fish, fruit, vegetables and prepared foods, including pizza, pies and frozen meals.

KN 195 Knifetec™ (20,000rpm with cooling facility) Labtec™ Line

The KN 195 Knifetec™ Sample Mill is designed for the preparation of high fat, high moisture and fibrous samples such as; oilseeds, prepared foods, meat products, fruit, vegetables, grains, seeds, animal feed and petfood are examples of suitable sample types.



Even with homogenised solid samples the particle size will not only have one single value (e.g. 0.5 mm). Typically the particle size will be distributed according to a distribution curve, the normal (or Gaussian) distribution, the bell-shaped curve. The particle size for best results is less than 1 mm.

> Just load, start and walk away.
> FOSS automated solutions save time while reducing the risk of human error.

Secure your investment with a FossCare™ Support Agreement

Let FOSS take care of you for a maximum return on your analytical investment. Get a four year warranty as part of the new FossCare Premium Preventive Maintenance Agreement or two years as part of any other FossCare agreement. In addition to the peace of mind afforded by the warranty period, the continual preventive maintenance pays off by keeping your analytical instruments working perfectly every day, year after year.

Why preventive maintenance?

As with any analytical solution, it is essential that your FOSS instrument receives regular maintenance to ensure optimal performance and extended lifetime. Avoiding expensive downtime is a matter of following factory standards and preventively replacing parts before they wear out. In turn, this helps ensure reliable and consistent results at the highest level.

Preventive and predictive maintenance combined with global support from 300 dedicated service, application, software and calibration specialists keeps your instrument running perfectly all year round.

Benefits of a FossCare™ Support Agreement:

- Extended Warranty (two or four years depending on the chosen agreement)
- Regular maintenance; the instrument is diagnosed, cleaned, adjusted, tested, fine tuned and recalibrated
- Minimal downtime from replacing components before they are worn out
- Consistent, accurate and reliable results you can always trust
- Preventative maintenance visits when it suits you (your business)
- 24/7 phone support - no need to worry about closing hours or PO
- Low, fixed service budget prevents unexpected expenses
- Discounts on additional services, spares, training, reagents, consumables and software upgrades

Centralised calibration, management and configuration of instruments

For laboratories, and particularly the ones with multiple sites, our sophisticated networking tools enable internet-based remote instrument monitoring and diagnostics. With this software, internal or external experts can precisely configure and monitor FOSS instruments regardless of their location. Calibration updates and bias corrections are easily and safely handled centrally through the network and the system can be monitored on a daily basis.

"Because the machine has the ability to link directly to FOSS via the internet, and receive and transmit data, I have confidence of ongoing back-up support for the machine"

"… Networking with FOSS first of all provides us with "peace of mind" as we know there is a FOSS specialist managing and doing surveillance on our instrument. We have outsourced all complexity related to running our instrument, calibrations, diagnostics, etc. Networking makes sure that the performance of our entire setup is optimized at all times hereby allowing us to focus on our real business."

"… Adjusting slope/intercept, etc. is surely not my expertise so it is valuable having FOSS do this."

"… Having a large population of instruments the central security and management aspect of networking is extremely important. Operating our instruments is no longer dependent on having on-site specialists as all complexity is handled by our contact at FOSS."

FOSS a reliable laboratory partner – every step of the way

FOSS is known as the leading global provider of a versatile range of analytical solutions for the food and agricultural industries, helping producers to maximise the value of their production.

FOSS Chemical Analysis solutions offer fundamental, classical "wet chemistry" methodologies for the modern chemical laboratory, providing dedicated analytical solutions for every stage of the laboratory process. From initial physical sample preparation (grinding & milling), to chemical preparations based on Digestion, Distillation, and Extraction, all the way to final analysis, FOSS laboratory solutions are the key to achieving cost effective, fast and reliable results for laboratory customers.

FOSS instruments are dedicated to supporting the needs of your business. From commercial to industry laboratories, FOSS offers a broad range of solutions making it possible to choose the level of throughput, automation and safety to suits individual needs.

More than 50.000 FOSS analysis instruments are in operation in laboratories worldwide, including Commercial, Public & Industry labs, with over 90 of the world's top 100 food and agriculture companies using FOSS solutions.

FOSS analysers for laboratories have obtained several recognised international approvals like GLP, GMP & ISO.

FOSS is a privately-owned company employing over 1200 worldwide. FOSS has manufacturing, research and development facilities in Denmark and China. Solutions are sold and supported through FOSS sales and service companies in 25 countries and by more than 70 dedicated distributors.

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