

**AOX/TOX, EOX and POX analyzers;
DEXTAR, ECS 1200 and ECS 3000**



**Total Halogen expertise fulfilling your Environmental
analytical needs**

AOX/TOX, EOX and POX analyzers; DEXTAR, ECS 1200 and ECS 3000

Complete AOX/TOX, EOX and POX Solutions for the Environmental Laboratory

Thermo Electron Corporation has developed the DEXTAR, the ECS 1200 and the ECS 3000, three AOX/TOX, EOX and POX analyzers offering fast, accurate and sensitive analysis of organic halogens. Each model is designed to offer customized solutions to match both current and future analytical needs.

Total Halogen Analysis – Meeting the Latest Standards and Regulations

Most organic halogens are toxic, carcinogenic, persistent and bio-accumulative, thereby posing a threat to the environment and to mankind. As a consequence, regulatory authorities in Europe and the United States have issued mandates defining maximum permissible levels of these compounds in soil and water.

Analyzing specific compounds in order to identify whether they stay within the permissible limits is both difficult and time-consuming. Therefore, standard methods have been developed to ensure fast and reliable screening for routine analysis. In general, there are three different methods:

- POX (Purgeable Organic Halogens) – This method is used to determine volatile organic halogens, including tri-halomethans and CFC's.
- EOX (Extractable Organic Halogens) – This method determines bio-accumulative organic halogens, including PCB's.
- AOX/TOX (Absorbable/Total Organic Halogens) – This method typically allows the highest recovery of organic halogens.

Microcoulometry is the reference method for the determination of total organic halogen content in AOX/TOX, EOX and POX samples. This method complies with ISO and EPA and leads to fast, quantitative, economical and absolute results.

Thermo's range of solutions can adapt to all these methods making them both flexible and versatile enough to meet customer requirements.



DEXTAR

Depth and Range of Application

Fast screening of organic halogens greatly relies on the analysis of AOX/TOX, EOX and POX content. Thermo coulometric systems are ideal for the following applications:

- Drinking water
- Surface water
- Ground water
- Effluent water
- Influent water
- Waste water
- Cooling water
- High salt-content water
- Process water
- Pulp and paper products
- Soil
- Sediment
- Sludge and waste oil

Thermo's DEXTAR, ECS 1200 and ECS 3000 Analyzers – Serving the Needs of the following industries:

- Drinking water laboratories
- Environmental laboratories
- Governmental Institutes and Research Facilities
- Pulp and paper laboratories
- Universities

Absolute Compliance Guaranteed

Thermo's DEXTAR, ECS 1200 and ECS 3000 analyzers comply with the international standards for AOX/TOX (DIN 38409 part 14, DIN 38414 part 18, ISO 9562, EPA 9020 and EN 1485), EOX (DIN 38409 part 8 and NEN 5777, 5735, 6402 and 6676) and POX (NEN 6401) analyses.



ECS 1200

DEXTAR – For Cost-effective Analysis

Thermo's DEXTAR analyzer is designed to measure AOX/TOX quickly and accurately in a wide range of water and solid matrices. It is ideal for laboratories performing a limited number of AOX/TOX analyses.

Key features include:

- Easy to use
- Compact design
- Low maintenance operation
- Vertical sample introduction to save bench space
- Maximum return on investment
- ISO, DIN, CEN and EPA compliant
- Fast generation of sample queues and application methods in Microsoft® Windows™-based Thermo Electron software (ThEuS)
- Short start-up time (less than 15 minutes)

ECS 1200 – For Routine Analysis

Thermo's ECS 1200 coulometric analyzer has been developed for fast and accurate measurement of AOX, EOX and POX in a wide range of water and solids samples. This instrument is especially suitable for laboratories performing an average number of AOX, EOX and POX analyses. The AOX, EOX and POX modules are easily interchangeable. The ECS 1200 can be upgraded with Thermo's ESA 2000 for full automation of the AOX batch method. The TOX column method is automated using Thermo's ECA 1700 auto sampler.

Key features include:

- Modular design reduces bench space and investment costs
- Fast and precise measurement of soil and water samples
- Low maintenance
- Easy to use and intuitive user interface
- Combined with auto sampler for low cost analysis
- CEN, DIN, ISO and NEN compliant

ECS 3000 – High Performance and High Throughput Analysis

Thermo's ECS 3000 is a robust coulometric analyzer that performs AOX/TOX, EOX and POX analyses for a wide range of water and soil samples, down to ppb level. The analyzer is especially designed for laboratories performing a large numbers of AOX/TOX, EOX and POX analyses. The ECS 3000 coulometric analyzer can be used in combination with auto samplers for liquids, solids or TOX columns for round-the-clock operation. The ECS 3000 is a stable and user-friendly system..

Key features include:

- Ultra low detection limit, high stability and reliability due to the temperature controlled titration cell environment
- High sample throughput and low cost per analysis due to perfectly matching auto samplers
- Low maintenance, optimal combustion and conditioning of gases results in near to zero downtime
- Fast and easy switching, between AOX/TOX, EOX and POX analyses, thereby resulting in more productivity
- CEN, DIN, ISO and NEN compliant

How do the analyzers work?

Once the pre-treatment is completed, the samples are oxidized at high temperatures. The combustion gases, carrying halide ions, are led through a sulfuric acid scrubber for water removal. The dry and clean gases are led into the titration cell, where a coulometric titration occurs with silver ions. The amount of current needed to regenerate the lost silver ions is directly related to the AOX/TOX, EOX or POX content of the sample.

COMBUSTION:



TITRATION:



ANODE:



ECS 3000



Sample Pre-Treatment

AOX/TOX Sample Pre-Treatment Systems

Thermo Electron Corporation has developed AOX/TOX sample pre-treatment systems that take advantage of the latest technology and proven methodology to satisfy today's laboratories' analytical needs.

Presto – Automated Column Method Pre-Treatment of AOX/TOX Samples

Thermo's Presto is a fully automated stand-alone filtration system. It incorporates the column method in order to perform accurate and reproducible AOX/ TOX sample pretreatment of water samples. The system features easy-to-connect column holders and supports pre-packed AOX columns. The volume and dosage speed are fully programmable. The Presto comes in three different models, the Presto -3, -6 and -18. Each model is designed to answer specific customer needs.

Key features include:

- Easy to use
- Fully automated operation
- Fast pre-treatment tailored to DIN or customized methods
- Easy maintenance



Presto 18



Presto 6



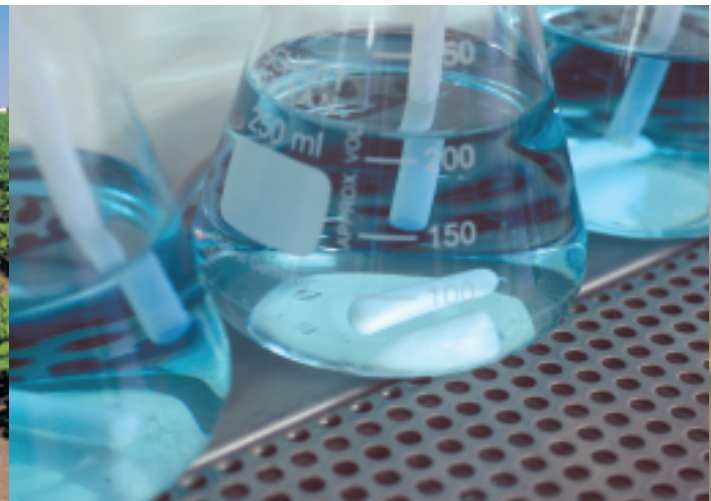
EFU 1000

EFU 1000 – Effective Batch Method Pre-Treatment of AOX/TOX Samples

Thermo's EFU 1000 is a filtration unit designed to use the batch method for the manual pre-treatment of AOX/TOX samples. The instrument consists of three independent filtration units, all of which are equipped with the patented quartz frit filter. The frit is used to separate the water from the activated carbon after the adsorption stage.

Key features include:

- Easy operation
- Closed filtration system thereby preventing any risk of contamination
- Re-usable and self-cleaning quartz frit
- Fast filtration



Auto samplers

Thermo's Auto Samplers

Thermo Corporation has developed a range of user-friendly AOX/TOX auto samplers that maximizes productivity by managing introduction of the samples to the analyzer.

ECA 1700 – Total Accuracy

Thermo's ECA 1700 is a 37-position column auto sampler designed for accurate and fast introduction of samples into the ECS 1200 or ECS 3000 analyzers.

The ECA 1700 has been especially developed to comply with the AOX/TOX column method. It is a simple and user friendly system with pre-packed high quality AOX/TOX columns. The purge flow and protective lid of the sample carousel offers optimum preservation of samples.

In conjunction with Thermo's ThEuS software, the ECA 1700 auto sampler allows single and dual column introduction, thereby increasing sample throughput and efficiency.



ECA 1700

ESA 2000 – Total Reliability

Thermo's ESA 2000 is a 47-position auto sampler intended to ensure fast and reliable introduction of quartz frits into the ECS 1200 or ECS 3000 analyzers.

The ESA 2000 is directly coupled with the AOX/TOX module. Samples are picked up from the sample tray and transferred automatically onto the quartz boat. Key features of the ESA 2000 auto sampler include:

- Optimal preservation of samples using purge flow and a protective lid on the sample carousel
- Laser check on sample cup positioning and retrieval
- Around the clock productivity
- Fully supported by ThEuS software

ELS 3000 – Total Automation of Liquid Samples

Thermo's ELS 3000 is an auto sampler especially designed for fully automated introduction of liquid samples, including extracts for EOX analysis.

The ELS 3000 auto sampler has 74 positions for 2 ml screw capped sample vials and can inject a maximum of 250 µl. The ELS 3000 key features include:

- Designed for a 24 hours operating environment
- All operations are fully controlled by Windows™ ThEuS software
- Easy connection to boat or universal syringe type liquids introduction modules
- Wash solvent and waste containers are included



ESA 2000





EXTRA POWER – The Total Organic Carbon (TOC) Option

Thermo's ECS 1200 and ECS 3000 AOX/TOX, EOX and POX analyzers can be combined with TOC to become a compact TOC/AOX analyzers using the ECA 1700, ESA 2000, ELS 3000 and ELS 2100 auto samplers. TOC/AOX analyzers offer reliable and accurate analysis of TC, TOC, TIC, NPOC, POC, AOX, EOX and POX parameters in liquid and solid samples. They incorporate a catalyst-free, high temperature combustion methodology with NDIR for TOC analysis,

and a coulometric titration methodology for AOX analysis. The low maintenance and modular concept enables the operator to exchange modules, parts and detectors with great ease. All parameters are fully EPA and DIN compliant.

ELS 2100 – TOC Water Sample Automation

Thermo ELS 2100 is a liquids auto sampler specifically developed for the automatic introduction of water samples appropriate for the analysis of Total Organic Carbon (TOC).

This 96-position XYZ auto sampler is designed to operate on a 24-hour basis and is a simple and user-friendly system suitable for laboratories with a high sample throughput.

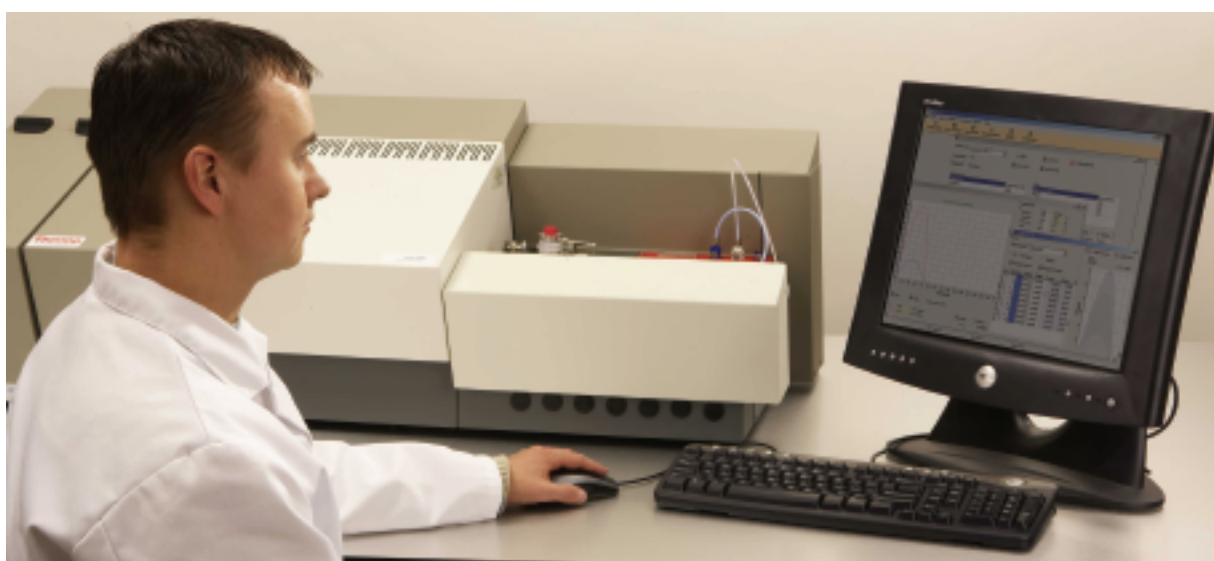
Sequential TC and IC analyses provide fast TOC results. While the analysis of a sample is being performed, the ELS 2100 auto sampler can simultaneously process NPOC analyses by adding acid and immediately purging the IC. A stirrer can be used to deal with solid particles of up to 300 μm .



What's in it for you?

The following table summarizes the key features of this innovative system:

FEATURES	ADVANTAGES	BENEFITS
modular design	easy and fast switching between AOX, EOX and POX	No need for three separate instruments. Reducing both benchspace and investment costs
dual temperature furnace	real-time information on temperature, precise control	maximum flexibility with respect to your applications
quartz tube	optimum combustion, no soot formation	easy maintenance, increased speed of analysis, less downtime
automation (AOX, EOX auto sampler)	higher throughput, 24-hour operation	low cost per analysis
large volume scrubber	optimum conditioning of gases	accurate data over longer period
Windows-based software (ThEus)	intuitive user interface	no need for extensive training, less error-prone
temperature-controlled titration cell environment	high sensitivity, broad dynamic working range	higher reliability
meets CEN, DIN, ISO and NEN standards	compliant with international standards	works with all customers, applicable in interlaboratory studies



ThEus Analytical Software – Ensuring Intuitive and Smooth Control of Your Total Halogen Analyses

The advanced user interface of the Thermo Electron Software (ThEus) ensures the smooth operation of the AOX, EOX, POX and TOC analyzers with user-friendly controls and operation. ThEus assists the

user to achieve routine analyses in an efficient, fast and reliable way. Instrument operation remains simple with the incorporation of clear and user friendly icons. This resourceful software makes it

possible to modify sample queues, evaluate data and calibrate lines completely independently. Results can be presented in customized print reports or exported in a variety of data formats.

Key features of ThEus include:

FEATURES	BENEFITS
One software solution for all trace Elemental analyzers	Reduces complexity and improves productivity
Real time measurement curves	Maximal analysis control, easy to compare samples at a glimpse
Multi-Elemental analysis	Optimal analysis control and time saving procedure
Selectable user and service levels	Security and data integrity
Customized application and analysis methods	Fully control of the analysis/system, flexible method structure,
Fully multi-tasking	Efficient, user friendly and time saving

The technologies you need.

The brand you trust.

The service you deserve.

Laboratory Solutions Backed by Worldwide Service and Support

Tap our expertise throughout the life of your instrument. As an industry leader in analytical instruments, Thermo extends its support throughout our worldwide network of Thermo-trained and certified engineers who are experts in laboratory technologies and applications. Put our team of experts to work for you in a range of disciplines, from system installation, training and technical support, to complete asset management and regulatory compliance consulting. Improve your productivity and lower the cost of instrument ownership through our product support services. Maximize uptime while eliminating the uncontrollable cost of unplanned maintenance and repairs. When it's time to enhance your systems, Thermo also offers certified parts and a range of accessories and consumables suited to your application.

To learn more about our products and comprehensive service offerings, visit our Web site at www.thermo.com.

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