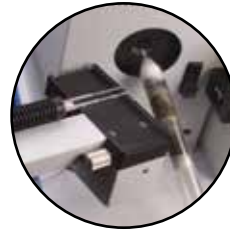
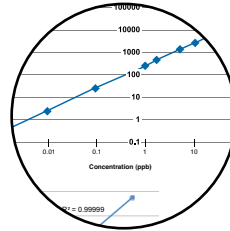




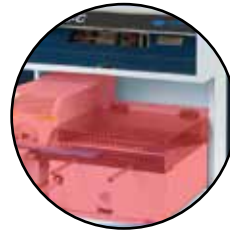
TELEDYNE LEEMAN LABS
Everywhere you look™



Innovative



Intuitive



Versatile



Hydra II_c
Mercury Analyzer

At Teledyne Leeman Labs; atomic spectroscopy is our business – our only business. We are industry leading innovators with a proven track record providing systems that deliver outstanding performance, robustness and operational simplicity.

Teledyne Leeman Labs Hydra mercury analyzers were the first to offer 'turnkey' operation for Hg analysis.

The *Hydra II* analyzers are state-of-the-art with improved performance, greater analysis throughput and more simplified operation. Furthermore, the *Hydra II* analyzers are built around an innovative 'integrated modular' design so systems can be easily reconfigured to perform either Hg analysis technique in the lab as your analysis requirements change.



Key Features of the *Hydra II_C*

- Maintenance of the catalyst and gold trap in minutes
- Pressure monitoring, indicates a problem with the catalyst or sample boat injector
- Standard usable range 0.001 ng – 1500 ng
- Configurable to a high mass analyzer in minutes, < 25,000 ng
- ≤ 0.001 ng instrument detection limit*



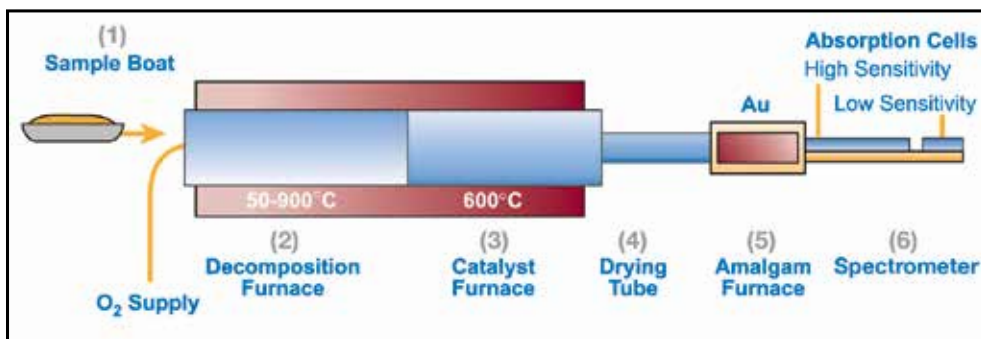
*System Blank Detection Limit is determined by 10 no-boat readings under ideal system conditions. The standard deviation of the 10 readings is multiplied by 3 to determine final value.

The Hydra II_c

Direct Analysis of Solids and Semi-Solids

The Hydra II_c is a fully automated analyzer that measures mercury in solid and semi-solid sample matrices directly without any acid digestion (sample preparation). It employs the technique of sample combustion (thermal decomposition), mercury concentration via gold amalgamation and detection by cold vapor atomic absorption.

The biggest advantage of the Hydra II_c is that no sample preparation is required. And, because no sample prep is required; no hazardous waste is generated that would have to be disposed of safely and with high cost.



Principle of Operation

A weighed sample is deposited into a sample boat (1) and then introduced into the Hydra II_c where oxygen begins to flow over the sample. The decomposition furnace temperature is then increased in two stages; first to dry the sample (2), then to decompose it. The evolved gases are carried through a heated catalyst (3) to produce free mercury while removing halogens, nitrogen oxides, and sulfur oxides. The remaining

combustion products including elemental mercury (Hg⁰) are swept through a drying tube (4) and a gold amalgamation trap (5) where elemental Hg is trapped and concentrated. After the amalgamation step, the trap is heated to release the mercury into a carrier gas which transports it into an atomic absorption spectrometer (6).

Eliminates Transcription Errors

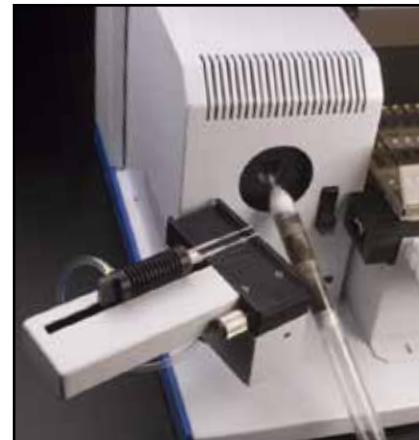


Weigh Sample

Sample Wt (g)	% Moisture	Dry Temp	Dry Time	Dump Temp
0.357000	0.00	300	1	800
0.000000	0.00	300	1	800
0.000000	0.00	300	1	800
0.000000	0.00	300	1	800
0.000000	0.00	300	1	800
0.000000	0.00	300	1	800
0.000000	0.00	300	1	800
0.000000	0.00	300	1	800
0.000000	0.00	300	1	800
0.000000	0.00	300	1	800
0.000000	0.00	300	1	800
0.000000	0.00	300	1	800
0.000000	0.00	300	1	800
0.000000	0.00	300	1	800
0.000000	0.00	300	1	800
0.000000	0.00	300	1	800
0.000000	0.00	300	1	800
0.000000	0.00	300	1	800
0.000000	0.00	300	1	800

Automatic Weight Transfer

Elegant yet Simple Design

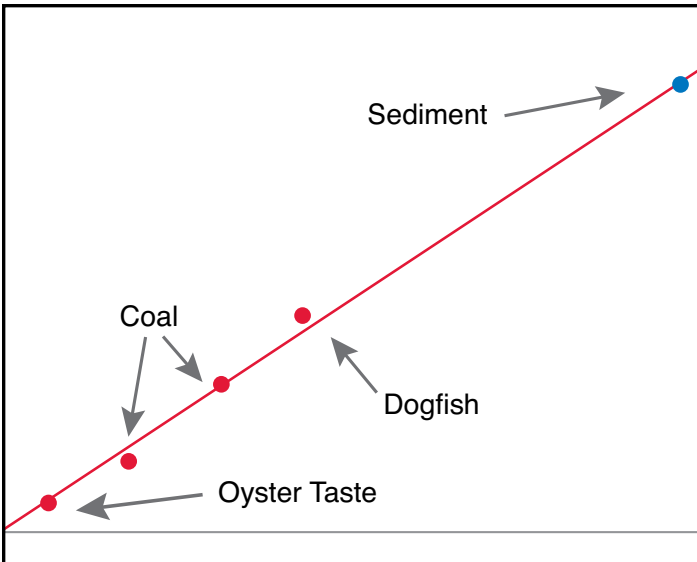


At the heart of the system is the catalyst tube which can be easily replaced without tools in as little as a minute.

Building sample sequences can take considerable effort. The Hydra II_c enables sample weights to be automatically transferred directly into the sample table saving time and eliminates transcription error.

Applications

- Beverages
- Blood
- Coal
- Effluent
- Fertilizer
- Feed
- Fly Ash
- Foods
- Hair
- Minerals
- Ore
- Petrochemical
- Sediment
- Sludge
- Soil
- Urine
- Wastewater
- Water



Matrix Independent Calibration

A key benefit of the thermal decomposition process is its ability to report accurate results regardless of differences in sample matrix. The table below shows the system accuracy for a diverse variety of sample types all obtained from a single aqueous calibration curve. Alternatively, certified reference materials may be used as standards to calibrate the system.

Sample	No.	Certificate ($\mu\text{g/g}$)	Measured ($\mu\text{g/g}$)	Recovery %
Bovine Liver	1577	0.016	0.0178	111.7
Blood	Lypho 1	0.0096	0.0091	94.8
Dogfish	Dorm-2	4.64	4.34	93.5
Oyster	1566	0.057	0.061	107.0
Soil	8406	0.06	0.061	101.7
Coal	HC-35150	0.176	0.177	100.6

Innovative Integrated Modular Design

The *Hydra II* modular design enables one system technique to be reconfigured to another in your lab should your analysis needs change saving money, time and bench space.

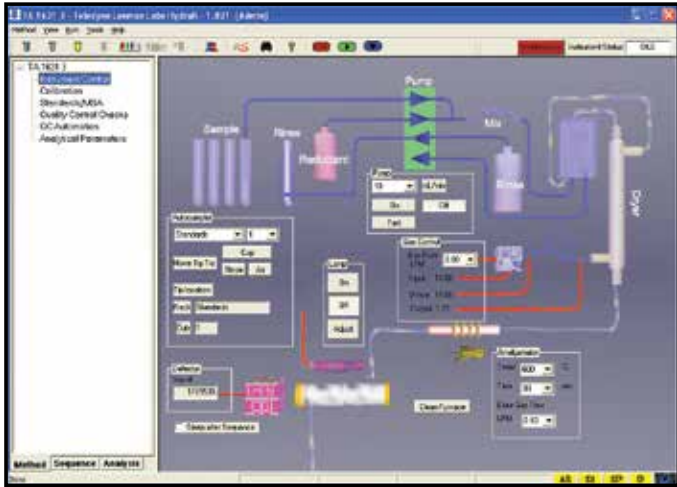


Hydra II_c Atomic Absorption Detection – Direct analysis of Solid and Semi Solids

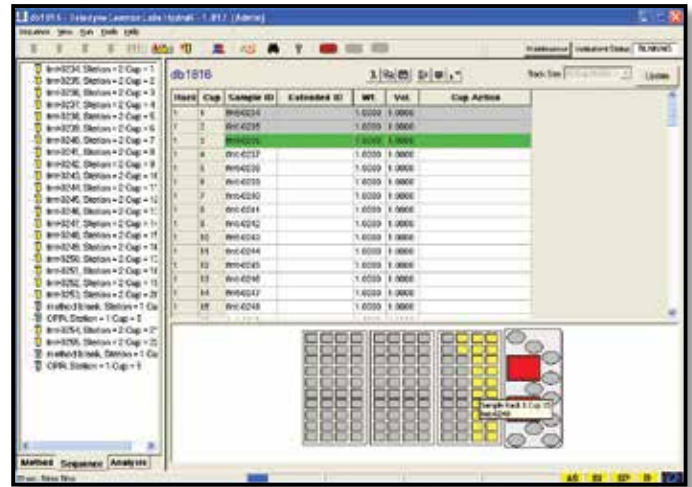


Hydra II_{AA} Atomic Absorption Detection – Liquid Samples

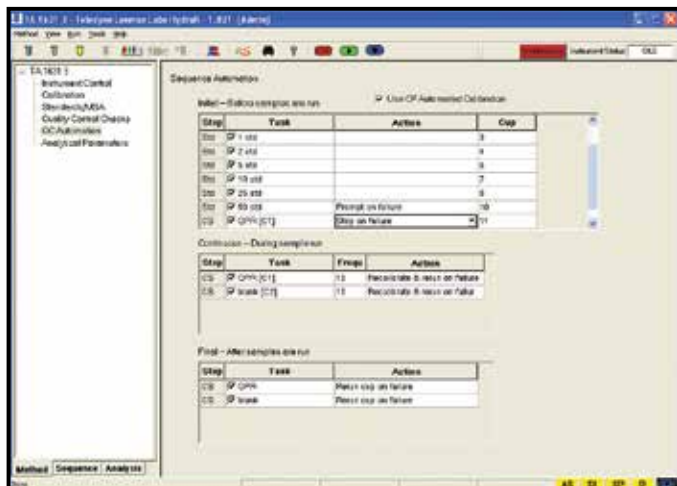
Software



Instrument Control is fully automated and appears on a single screen. The graphical display helps operators to understand how the system functions. System parameters are automatically stored and can be recalled at any time to satisfy audit requirements. On start-up, simply clicking the start button returns all system conditions to the last setting saved with the method.



'On-the-fly' **Sample Programming** saves valuable time by allowing the operator to start a sample sequence even if individual sample entries are not yet complete. Samples can be easily located, added and positioned using the convenient rack map display.



Intelligent Quality Control enables the analyst to define acceptance limits for quality control checks and to choose from a variety of corrective actions when the limits are not met. Each QC sample can be programmed as an initial, recurring, and/or final QC with unique corrective actions.



Preventive Maintenance. The software keeps a record of routine maintenance and notifies the analyst when maintenance is required. When a maintenance procedure is required, the *Hydra II* provides the analyst with step-by-step instructions, including audio/visual support. In this case, the gold trap was highlighted on the preventive maintenance screen and the Maintenance button was clicked to start the detailed instructions.

Technical Specifications

Minimum Computer Requirements	
Microsoft® Windows® 7 (32 and 64-bit) and Windows® 8.1 (64-bit only)	
2 GB RAM for Microsoft® Windows® 7 and Windows® 8.1	
Video running 1024 x 768 with 24-bit color	
Pentium Dual Core 2.3 GHz	
One available USB port	
One standard factory installed Ethernet connection, if network connection is desired	
Internet Explorer 4 or higher must be installed for the online Help to function	

Technical Specifications	
Carrier Gas (O ₂)	Supplied at 15 psi
Power Requirements	100/220 VAC, 50/60 Hz, 100W
Height	47 cm
Width	49.5 cm
Depth	49.5 cm
Weight	40.6 lbs (18.4 Kg)
Computer Interfaces	USB
Autosampler	AS
Warranty	12 month limited

Leeman Labs and Elemental Analysis

Our experience isn't limited to Mercury analysis alone. It extends to a variety of other techniques, with the same quality, precision, functionality and thorough engineering we've built our reputation on. If you're seeking elemental analysis for your specific application or industry, Teledyne Leeman Labs is the solution.

Inductively Coupled Plasma – Optical Emission Spectrometers (ICP-OES)

ICP-OES is ideal for low to trace level analysis of metals, metallic components in a very wide variety of sample matrices. Whether you need to measure sodium content of sea water or trace levels of toxic elements in drinking water, ICP is a powerful and effective tool for the job.

DC Arc Spectrometer

Our DC Arc Spectrometers are the ultimate solution for elemental analysis of the most challenging solid samples. The DC Arc can perform elemental analysis on samples that are difficult or nearly impossible to digest, or samples in their native form without digestion.



25

26

27

2

Ni

Cu

Zn



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