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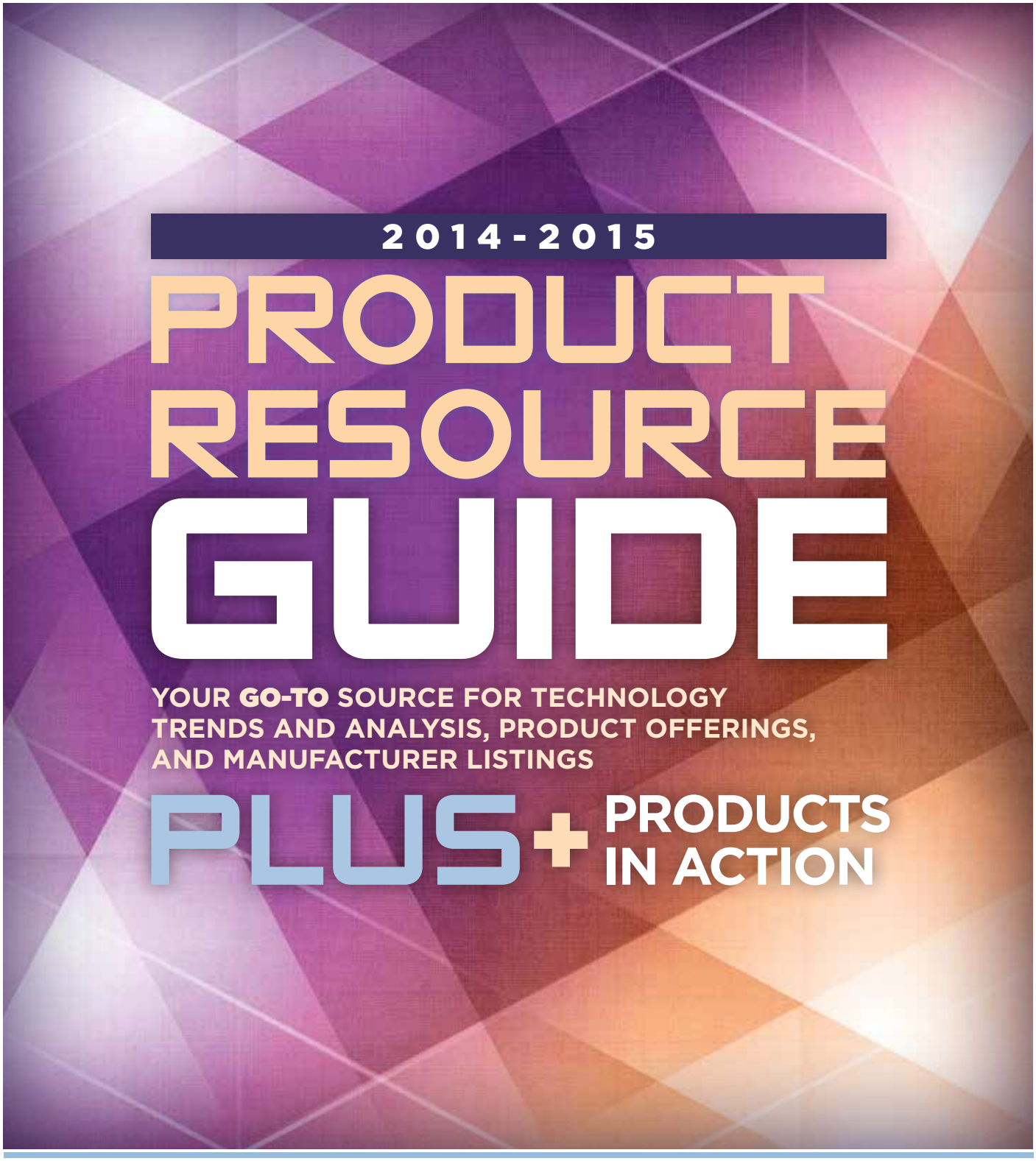
Run Your Lab Like a Business

August 2014 Volume 9 • Number 7



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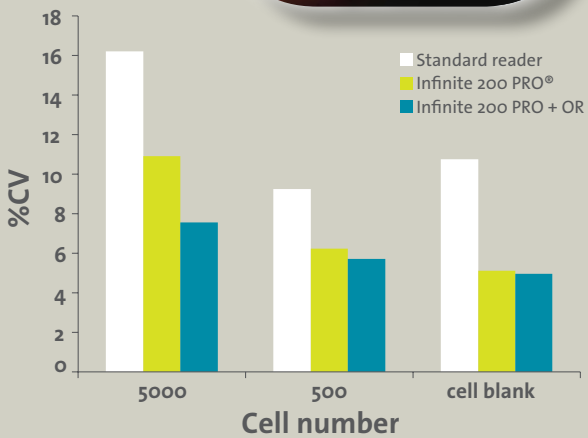

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2014-15 PRODUCT RESOURCE GUIDE

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Standing Pat

After making some fairly significant changes to our annual Product Resource Guide over the years, we've decided to stand pat, only adding a dab of new content and streamlining some of our product categories in this 2014-15 edition. Based on the overwhelmingly positive feedback we received about last year's guide, this is in no way a bad thing.

For example, we've received many great comments about how useful our "Questions You Should Ask When Buying A…" lists have been, so those return this year, along with updated manufacturer lists and new product releases for each category, the newest mobile laboratory apps, and the latest distributors list.

However, while many aspects of our guide remain the same, this year we add an element of fun to that established content with new lists of interesting tidbits about the product categories, which replace our lists of signs that you should repair and/or replace your equipment. The new content includes factoids such as when vacuum pumps were invented, recent trends in liquid handling, and where some of the largest glove boxes are located—just a little something to entertain you on your lab equipment search.

Of course, the guide still contains everything you need to get the purchasing process started for almost any type of lab equipment you require and is a great complement to our online Product Finder tools. Be sure to check out both whenever you need to go shopping for your lab.

All the best,

Rachel Muenz

Rachel Muenz

Assistant Editor

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3 THINGS YOU MAY NOT KNOW ABOUT LAB BALANCES

1. The single-pan analytical balance was invented in 1945 by Mettler Toledo company founder Erhard Mettler.
2. The first nanogram balance, invented by Sartorius in 1971, was used to weigh the moon rocks that astronaut Neil Armstrong brought back to Earth from his expedition.
3. The very first fully electronic precision balance was introduced by Mettler Toledo, then known as Mettler Instrumente AG, in 1973.

TOP 6 QUESTIONS YOU SHOULD ASK WHEN BUYING A LAB BALANCE

1. What is the heaviest sample you will weigh (including container weight) and what is the lightest sample?
2. What is the required +/- tolerance of your lightest sample?
3. How many decimal places in grams do you require for the displayed weight?
4. What type of samples will you be weighing and do you need to take into consideration the size of the weighing surface or the securing of a tare container?
5. Is on-site service available from a factory-trained service technician?
6. Do you need to interface the balance to another device such as a computer, printer, bar code reader, etc.?

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- Includes an easy to read full-color VGA touchscreen with numerical and QWERTY keyboard
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- Provides 14 practical weighing applications and four user-programmable touchless sensors for improved efficiency
- Features a versatile draftshield design with large weighing chamber with wide-opening doors which provide ample room to place large weigh boats or pipettes

OHAUS
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NIMBUS BALANCE SERIES FOR PRECISION WEIGHING

- Includes 15 models that deliver a full breadth of precision readabilities ranging from 0.1mg to 0.1g
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- Features 10 weighing units, including a customizable unit to handle a variety of everyday lab work

Adam Equipment
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INTELL-LAB™ LF SEMI-MICRO BALANCE

- Features "crossover" door systems to allow you to open the right side door by using the left hand slide, or vice-versa, and split and nested doors that don't protrude outside the balance housing
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BIOLOGICAL SAFETY CABINETS

4 THINGS YOU MAY NOT KNOW ABOUT BIOLOGICAL SAFETY CABINETS

1. At the beginning of the 20th century, German scientist Robert Koch constructed the first 'bio-containment' cabinet after discovering that germs could float in air. Despite various leaks and design flaws, this system allowed Koch to work safely with anthrax, tuberculosis and cholera.
2. Despite these early rudimentary biological safety cabinets, scientists continued to die of infections acquired in the laboratory. The incidence of laboratory-acquired infections grew at an alarming rate, with as many as 2,456 infections and 164 deaths by 1940. Particularly common lab-acquired diseases included tuberculosis, Q-fever and the bubonic plague.
3. During the 1940s, the high-efficiency particulate air (HEPA) filter was developed by the body which later became the Atomic Energy Commission.
4. The first clean air work station was developed by the Baker Company in 1951.

TOP 5 QUESTIONS YOU SHOULD ASK WHEN BUYING A BIOLOGICAL SAFETY CABINET (BSC OR MSC)

1. Do the samples/specimens/cultures need to be protected from environmental particulates?
2. Are chemicals involved in your application?
3. What are your size limits?
4. Does your procedure require modifications to the equipment that are uncommon?
5. What is the lifetime cost of each BSC?

RECENTLY RELEASED BIOLOGICAL SAFETY CABINETS

PURAIR BIO CLASS II, TYPE A2 BSC

- Minimizes and contains Biosafety Level 1-3 agents
- Maintains negative pressure inside the cabinet during operation to prevent contaminants from escaping the work area
- HEPA filtration scours 70% of the incoming room air to protect the products, while the remaining 30% of the exhausted air is filtered by a second HEPA filter

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S3 BIOSAFETY SYSTEM CLASS 1

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- Encloses the cell sorter right on the benchtop, providing an alternative to the large and expensive biosafety hoods traditionally used with cell sorters
- Adheres to the biosafety requirements of the International Society for Advancement of Cytometry and protects users and the environment from aerosols created during the cell sorting process

Bio-Rad
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1300 SERIES CLASS II, TYPE A2 BIOLOGICAL SAFETY CABINET PACKAGES

- Allow users to perform daily applications safely and efficiently
- Packages include: cabinet, manual and adjustable height-stand, factory installed UV light, and one set of armrests
- Deliver design and technology advancements such as excellent protection with proprietary airflow design, exceptional ergonomics for a safe and comfortable environment, and energy efficiency for operational cost savings

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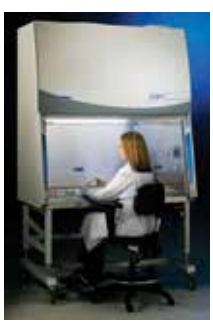

- Keeps the researcher safe from the biohazard agents being used
- Comfort is provided with an angled sash for a closer, more comfortable view; an electrical outlet cover that can be opened with one finger and gently and slowly self closes
- Offers a large interior work area and 27" of viewing height

Labconco
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BIOLOGICAL SAFETY CABINET MANUFACTURERS

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Clean Air Products	www.cleanairproducts.com
Erlab	www.erlab.com
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LABCONCO	www.labconco.com
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Sentry Air Systems	www.sentryair.com
Terra Universal	www.terrauniversal.com
The Baker Company	www.bakerco.com
Thermo Fisher Scientific	www.thermoscientific.com

CENTRIFUGES

TOP 6 THINGS YOU MAY NOT KNOW ABOUT CENTRIFUGES

1. The process of centrifugation can be traced back to the mid-15th century, when hand-driven centrifuge systems were used to separate milk.
2. In 1864, this ad hoc system of milk separation was commercialized by Antonin Prandtl, who developed the first dairy centrifuge for the purpose of separating cream from milk.
3. The potential of the centrifuge in the laboratory setting was first exploited by Friedrich Miescher. In 1869, Miescher used a crude centrifuge system to isolate a cell organelle. This process led to the discovery of an important new class of biological constituents, later to be known as nucleic acids.
4. In 1879, the first continuous centrifugal separator was demonstrated by Gustaf de Laval. This development made the commercialization of the centrifuge a possibility for the first time.
5. Swedish chemist Theodor Svedberg developed the ultracentrifuge in the 1920s, a feat which, along with his studies in the chemistry of colloids, won him the Nobel Prize for Chemistry in 1926.
6. Interest in the isolation of viruses brought Edward Pickels and Johannes Bauer together to build the first high-speed vacuum centrifuge suitable for the study of filterable viruses. Later, Pickels went on to develop the more convenient, electrically driven ultracentrifuge.

TOP 5 QUESTIONS YOU SHOULD ASK WHEN BUYING A CENTRIFUGE

1. What is the maximum g-force the centrifuge can generate?
2. How does the company's centrifuge differ from other ones that have the same speed and capacity?
3. What kind of warranty comes with the centrifuge and what does it cover?
4. If the company discontinues the product, for how many years do they provide accessories and parts for the centrifuge?
5. Ask about cost of the purchase—not just the price of the product being installed but the total cost of ownership, which includes price, service expectations, warranty, etc.

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Gain flexibility with MobileFuge

- Control and monitor the centrifuge from your Apple® iOS and Android™ device with MobileFuge
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Versatile across rotors and applications

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- User-friendly, large LCD screen

Ergonomic design

- Low work surface height for easier installation and unloading of rotors

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- Feature a snap cap for single-hand operation and a compact conical design, removing the contamination risks associated with manipulating small volumes in large tubes
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OPTIMA XPN AND AVANTI JXN SERIES CENTRIFUGES DESIGNED TO HANDLE THE MULTI-USER LAB WITH EASE.

Save Time and Improve Safety

Shared facilities, or common equipment rooms shared by several individual laboratories, often result in a laboratory having a number of unique users with varying levels of experience using floor-standing ultracentrifuges and high-performance centrifuges. This presents unique challenges to lab managers and facilities managers responsible for ensuring safe operation, maximizing uptime, and minimizing maintenance costs associated with these centrifuges. These tasks are easier to accomplish using features built into Optima XPN ultracentrifugues and Avanti JXN Series high-performance centrifuges by Beckman Coulter Life Sciences. This allows laboratories to focus on quality sample preparation and research results, instead of extensive training.

Easy to Use

Users will find it easy to learn, read and navigate the large LCD touch screen on these instruments, even from across the lab. The Windows®-based user interface makes training and usage easier while reducing setup time and the possibility for errors. Users can focus on getting results rather than learning the instruments. An on-screen context-sensitive "help" feature puts answers at the user's fingertips, saving time and effort. Up to 1,000 user-defined programs consisting of up to 30 steps each are available on the Optima XPN and Avanti JXN Series, so that virtually any protocol can be set up and stored for future use.

Protected Access

Password protection for up to 50 unique user profiles enables multi-user laboratory environments to control access. It's simple to allow users the appropriate security levels–Administrator, Super User or Operator. This way, the lab manager can control the level of access each user has to the centrifuge according to the permissions that follow. And with remote access, the user management can be done by the lab manager without leaving the office.

Detailed Run History and Rotor Tracking by Serial Number

Powerful tracking capability eliminates the need for paper logbooks that require manual entries. It also ensures that details of each and every run are recorded and linked to a specific user, which adds a level of accountability into the laboratory. Detailed run tracking builds an archive of each run that includes: the user operating the centrifuge, date/time, run parameters, and any diagnostics or errors that were issued during the run.

Users can also track the number of cycles accumulated on specific rotors used with Optima XPN and Avanti JXN Series centrifuges.

Freedom

In multi-user environments, users may find themselves having to walk down the hall, to another floor, or even into another building to get to centrifuges in a common equipment room. With remote monitoring and control of the Optima XPN and Avanti JXN Series centrifuges, users can access the centrifuge from virtually anywhere via personal computer or mobile device using the custom MobileFuge application available for iOS and Android™ devices. Using the email diagnostic alerts feature, lab managers can be notified whenever there is an issue with a centrifuge. This feature notifies lab managers of any issues, regardless of their location.

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CHEMICALS, REAGENTS & STANDARDS

TOP 5 QUESTIONS YOU SHOULD ASK WHEN BUYING qPCR REAGENTS

1. What key performance attributes does the company's reverse transcription and qPCR reagents offer that the competition does not offer? Do these attributes make your choice the most fit for your application?
2. Are you able to submit data files and questions to your reagent provider to help ensure your lab's success? Does your reagent provider offer on-site and electronic qPCR application support, and technical phone support before and after product purchase?
3. qPCR reagents have been on the market for many years. What improvements in enzyme engineering and buffering chemistry has the company taken to provide the latest in qPCR reagents performance?
4. Does your reagent provider offer technical support to enable successful transitioning to the newest qPCR reagent offerings whenever they become available?
5. What processes are in place to ensure minimal lot to lot variation of the reagents when generating data for a long-term study?

TOP 7 QUESTIONS YOU SHOULD ASK WHEN BUYING RNAi REAGENTS

1. Does the RNAi product provide transient silencing only or does it allow stable gene knockdown? Choice of RNAi products will be determined by whether you need to knockdown expression for several days or create a stable cell line.
2. Is the RNAi product suitable for your cells? How difficult it is to transfect your cells will determine the delivery method you require, such as tailored transfection reagent or lentiviral vector.
3. Ask if a ready-to-use product is already available; has the silencing of your gene(s) of interest already been validated and published?
4. Do the RNAi products guarantee a level of knockdown? What happens if you do not get the amount of gene silencing needed?
5. Are positive and negative controls provided with the RNAi products?
6. Does the RNAi product silence all known splice variants of my gene of interest and does it target the ORF or non-coding region of my gene?
7. How can I minimize the interferon response of RNAi transfection? shRNA instead of siRNA may be an option in some cases.

RECENTLY RELEASED CHEMICALS, REAGENTS & STANDARDS

TAQMAN MULTIPLEX REAGENTS

- Allow researchers to simultaneously analyze samples for multiple genetic markers of interest in a single qPCR
- Designed to reduce the cost of analysis and preserve starting material for applications such as plant genotyping or pathogen detection
- Include TaqMan QSY probe with new QSY quencher and two new ABY and JUN dyes

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Artel
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- Have been tested at 25 degrees C and are NIST traceable
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- Easy to use, simply empty the contents of one capsule in 100 ml of distilled water. They dissolve quickly and are preservative free
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CHILLERS & BATHS

TOP 5 THINGS YOU MAY NOT KNOW ABOUT CHILLERS AND BATHS

1. In 1748, artificial refrigeration was demonstrated for the first time by William Cullen of Glasgow University, UK.
2. In 1851, the first ice-making machine was invented by John Gorrie. Ice baths quickly became a popular way of cooling reactions and other lab processes, and this low-tech technique is still frequently used today.
3. In 1921, the first centrifugal water chiller was patented by inventor Willis Carrier. Before this time, chillers used a reciprocating compressor to move the refrigerant through the system. The main part of a centrifugal chiller is the centrifugal compressor. The design of the first centrifugal compressor was similar to the centrifugal blades in a water pump.
4. During the 1900s, lab processes that required elevated temperatures tended to be heated directly over a flame, or conducted in a water bath which was itself heated directly. However, the number of naked flames used in labs at this time represented a major fire hazard, particularly as many of the solvents being heated were highly flammable. This problem was resolved in the 1930s by husband and wife team Glen and Ruth Morey, who invented the heating mantle, a reliable and non-flammable heating device with electric resistance wires woven into a fiberglass cloth sheath. The first heating mantle was sold in 1939.
5. In 1950, the first industrial chiller was designed for use in the plastics industry.

TOP 6 QUESTIONS YOU SHOULD ASK WHEN BUYING A CHILLER OR BATH

1. Does the product have any exclusive features? What sets it apart from other vendor's chillers or baths?
2. Is the vendor ISO 9001 certified?
3. What refrigerants are used in the product? (This is applicable to chillers and refrigerated baths/circulators.)
4. Are the products energy efficient, environmentally friendly, and in compliance with RoHS guidelines? (No heavy metals used in printed circuit boards, etc.)
5. Can old/broken units be returned for disposal in an environmentally friendly manner? (Refrigerants reclaimed, metals and other materials recycled, etc.)
6. Does the company accept trade-ins and, if so, what happens to the old unit? (Should be disposed of properly.)

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We started with the form factor: how to gain a large work area with a limited footprint. As with most great innovations – the solution was simple – we removed the control head to create more space. And we didn't stop there. Designed from the ground up – we added enhanced remote monitoring capabilities, energy efficiency, global voltage input, and other tools and features to give you control and optimal precision so you can stay focused on uncovering the answers to science's most perplexing questions. Introducing the **NEW Thermo Scientific™ VersaCool™ Refrigerated Circulating Bath**. We lost our head, so you don't lose your cool.

# of going headless

• thermoscientific.com/versacool

We removed the control head to create our largest bath work area, while maintaining a compact footprint.

The tool-less, drip-less VersaRack and VersaLid offer enhanced safety and faster cleanup.

Global voltage input automatically detects the appropriate voltage enabling operation anywhere in the world.

PolyScience

PolyScience is a leading manufacturer of liquid temperature control solutions. Since 1963, PolyScience has responded to the needs of laboratory, plastics, medical, chemical and industrial markets with countless innovations. Our product offering includes circulating water baths, unstirred general purpose water baths, chillers and coolers and a range of application-specific products.

POLYSCIENCE TEMPERATURE CONTROL SOLUTIONS

In recent years, PolyScience launched a revolutionary line of precisely controlled units, redefining the Circulating Water Bath market. Introducing touch-screens and other patented technologies, including Swivel 180™, LidDock™ and DuraTop™, were just some of the major cosmetic and functional changes. Both the Swivel 180™ Rotating Controller (which allows the user to rotate the controller independently from the bath) and the LidDock™ lid-stowing system (which gives the lid a place to perch, other than the lab bench) maximize lab space and enhance the user experience. The DuraTop™ precision-molded phenolic bath top remains cooler at high temperatures, resists laboratory chemicals, and is easily cleaned and disinfected.

90 Circulator models including:

- Refrigerated, Heated, and two Immersion Circulators
- Six controller options
- Various communication protocols
- Reservoir sizes from 6 to 75 liters

This year, PolyScience is launching a brand new, re-imagined line of General Purpose Water Baths. For the first time, premium digital water baths are available at the price of an analog bath, allowing laboratories to upgrade and receive an enhanced feature set (including an LCD display that shows actual and set temperatures simultaneously and a built-in timer) at a fraction of previous costs. These new water baths also reach set temperature in a fraction of the time and use 1/3 less electricity, compared to previous models.

PolyScience Recirculating Chillers provide circulated cooling for incubation water jackets, electron microscopes and larger distillation systems. With different sizes and cooling capacities, PolyScience Benchtop and 6000 Series Chillers fit your lab needs.

PolyScience also manufactures a wide range of specialty products including:

- Histology Products
- Calibration Baths
- Viscosity Baths
- 75 and 190 Liter Refrigerated Baths for accelerated beverage aging studies

Whether you're in a life science lab or a quality control lab, PolyScience can meet your temperature control needs.

For more information,
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PolyScience®
Temperature Control Solutions

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Premium Digital Water Baths at analog prices.

Large, backlit LCD display shows set and actual temperature

Optional high clearance lids available

Clear, hinged cover tilts out of the way, lets condensation drain back into the bath and keeps samples in view

Rear-mounted drain**

Handles for easy positioning

Reach set temperature in a fraction of the time*

Built-in timer

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User-defined temperature presets

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- Circulating Baths
- General Purpose Water Baths
- Chillers
- Specialty Products

*Compared to previous models.

RECENTLY RELEASED CHILLERS & BATHS

VERSACOOL REFRIGERATED RECIRCULATING BATH

- Features a new "headless" design suitable for use as a recirculating refrigerated bath or heated circulator to circulate fluid from the bath to specific applications
- Can easily be used on or under a bench, fume hood, industrial and even mobile installations
- Advanced communications and control features are designed to ensure that samples are properly maintained

Thermo Fisher Scientific
www.thermofisher.com

LX ECONOMICAL IMMERSION CIRCULATOR

- Suited for basic liquid heating applications in baths as large as 20 liters
- Combines simple, intuitive operation with a large digital display to deliver convenient temperature control for a variety of day-to-day laboratory applications
- Features a temperature range of ambient +10° to 98°C and ±0.07°C temperature stability

PolyScience
www.polyscience.com

PRESTO A40 TEMPERATURE CONTROL SYSTEM

- Made for highly precise temperature control and rapid temperature changes
- Provides large heating and cooling capacities covering a working temperature range from -40°C to +250°C
- Highly efficient components allow extremely fast compensation of exothermic and endothermic reactions
- Features an integrated 5.7" industrial touch screen
- Also includes permanent internal monitoring and self-lubricating pumps

JULABO
www.julabo.com

TC-550SD CIRCULATING BATH

- Provides temperature control from -20°C to +170°C for Wells Brookfield Cone/Plate Viscometer and standard accessories like Small Sample Adapter™, Enhanced UL Adapter™, and DIN Adapter
- Accommodates one 600mL beaker containing test sample for temperature conditioning
- PC control using Rheocalc T Software allows automated temperature profiling of materials by bath working with viscometer

Brookfield
www.brookfieldengineering.com

EXPERIENCE THE BENEFITS OF GOING HEADLESS

Lab managers and industry operators continually face daily challenges and pressures to be more efficient, increase throughput and do so all while simultaneously improving data accuracy, analysis and reporting. That's why we are continually evolving, innovating, and advancing our technologies to accelerate the path of discovery and enhance value to customers. The new Thermo Scientific™ VersaCool™ Refrigerated Circulating Bath is the first of its kind to feature a "headless" design, allowing for an increased number of samples that can be temperature controlled at one time while maintaining the bath's footprint.

The VersaCool has, as it name implies, versatile design features that make it suitable for under bench, fume hood, industrial and even mobile installations. A wide variety of remote communication and monitoring capabilities, powerful pumping and redundant safety features make it well suited for medical and academic researchers, developers of pharmaceuticals and industrial applications. The modern look, high tech features and global voltage will simplify ordering and stocking for international companies looking to offer equipment with their products that reflect the same quality and innovation as their own.

In the laboratory, it's all about maximizing results and sample integrity while minimizing space and energy usage. The VersaCool is an important advancement that leverages more than 150 years of innovation in temperature control technologies. Its headless design innovation improves capacity and ergonomics for the user, and the advanced controls, including Bluetooth connectivity, improve usability while optimizing power consumption

Being the first bath circulator of its kind to feature a "headless" design, the VersaCool increases the number of samples that can be temperature controlled at one time while maintaining the bath's footprint. With no heating or cooling coils located in the bath work area, the technology is easier to clean and maintain.

Remote communication and control enables users to monitor, notify, and control their application even when they are not in the lab. This means the user can operate the bath from their office, on a train, or anywhere around the globe where they can connect to the internet

Many businesses do not allow for foreign mobile devices to be connected to a location's Wi-Fi. Connecting over Bluetooth allows for user to view the current temperature, change a set point, start a ramping program and be alerted to any warning or fault condition. Furthermore, it allows for users to connect without the need for IT to become involved. All VersaCool circulating baths come standard with Bluetooth connectivity and a mobile app will soon be available for Android and IOS telephones and tablets.

We didn't set out to design one of the world's most innovative refrigerated circulating baths. We simply set out to solve the issues that labs like yours face every day. The VersaCool helps address your daily challenges, so you can stay focused on what you enjoy doing most – uncovering the answers to science's most perplexing questions.

Thermo SCIENTIFIC

A Thermo Fisher Scientific Brand

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www.thermoscientific.com/versacool

CHILLER & BATH MANUFACTURERS

Anova	www.waterbaths.com
Boekel	www.boekelsci.com
Brookfield Engineering	www.brookfieldengineering.com
Cincinnati Sub-Zero	www.cszindustrial.com
EYELA	www.eyelausa.com
Grant Instruments	www2.grantinstruments.com
Hoefer	www.hoeferinc.com
JeioTech	www.jeiotech.com
Julabo	www.julabo.com
Lab Armor	www.labarmor.com
Memmert	www.memmert.com
PolyScience	www.polyscience.com
SP Scientific	www.spscientific.com
SO-LOW	www.so-low.com
TECA	www.thermoelectric.com
TEK-TEMP Instruments	www.tek-tempinstruments.com
Thermo Fisher Scientific	www.thermoscientific.com
Torrey Pines Scientific	www.torreypinesscientific.com

Refrigerated & Heating Circulators

ANOVA

Temperature Control Instruments for Lab and Industry

www.waterbaths.com

281-277-2202

CO_2 INCUBATORS & INCUBATORS

TOP 6 THINGS YOU MAY NOT KNOW ABOUT INCUBATORS

1. In the 1800s, researchers began searching for the ideal in vitro environment in which to maintain cell culture stocks. The first CO_2 incubator developed consisted of a simple bell jar containing a lit candle. Cultures were placed under the lid of the jar alongside the lit candle, before the jar was moved to a dry, heated oven. This system may be considered the first "air-jacketed" CO_2 incubator.
2. Laboratory incubators were first properly introduced during the second half of the twentieth century, when doctors realized that they could be used to identify pathogens from the bodily fluids of patients.
3. During the late 1960s, the first dedicated, commercial CO_2 incubators were developed.
4. In 2001, a patent was granted for an ambient-temperature stabilization control system for laboratory incubators. This device was able to effectively maintain the incubator temperature within a desired range and to accurately control the rate of heat loss from the incubator as the ambient temperature rose.
5. In 2003, a patent was issued for a high-efficiency microplate incubator. This incubator offered superior temperature uniformity and stability through a simple construction in which multiple incubation chambers were stacked to conserve laboratory space. The multiple incubation chambers could be electronically controlled by a single temperature control assembly in a master incubator. A water reservoir that could be filled externally was provided inside the chamber.
6. Many manufacturers now offer environmentally friendly models using Peltier technology that save energy and reduce room air conditioning loads.

TOP **6** QUESTIONS YOU SHOULD ASK WHEN BUYING A CO_2 INCUBATOR

1. What measures have been taken in the design to avoid contamination and what features are included to remove (sterilize versus decon) contamination?
2. How does the CO_2 sensor contribute to optimal cell growth?
3. How does the humidity contribute to optimal cell growth?
4. Ask for the uniformity and accuracy data versus asking for a water jacket or air jacket.
5. Do you need O_2 control to simulate the environment for your experiment accurately?
6. Calculate the total cost of ownership on the product over one year including product price, install, regular cleaning labor, material such as HEPA filter, etc.

RECENTLY RELEASED CO_2 INCUBATORS/INCUBATORS

CELL*IQ*™ CO_2 INCUBATOR

- Recovers set internal CO_2 conditions in less than two minutes after each door opening, preventing the large fluctuations in CO_2 concentration that impede cell growth
- Three types of contamination control protect sensitive samples
- Minimal shelving and interior components make the incubator easy to clean and maintain
- Features a built-in touch screen control panel

Panasonic Healthcare
us.panasonic-healthcare.com

ACCUTHERM MICROTUBE SHAKING INCUBATOR

- Uses Peltier technology to rapidly heat and cool precious samples
- Intuitive control panel with large color display allows users to easily program and view temperature, time and speed settings
- Eight interchangeable aluminum blocks accommodate PCR plates and tube sizes from 0.2mL to 15mL
- Features a temperature setting range of 0-105°C and mixing speed range of 300-1,500 rpm

Labnet International
www.labnetinternational.com

SRI3P B.O.D. THERMOELECTRIC COOLED INCUBATOR

- Thermoelectric cooling technology eliminates the need for a refrigeration compressor
- Uses 71% less power than alternative models and reduces room air conditioning loads by 75%
- Includes 35 pound capacity shelves, which eliminates sagging
- Meets APHA specifications for Biochemical Oxygen Demand (BOD) and include a mechanical convection system
- Features a 3 cu. ft. capacity

Sheldon Manufacturing
www.shellab.com

C AND CB SERIES CO_2 INCUBATORS

- Provide temperature uniformity and stable pH, optimal growth conditions for cultures
- Also offer high humidity without condensation
- Include hot Air Self-Sterilization at 180°C
- ANTI.PLENUM™ "less is more" minimized surface area reduces contamination
- Stainless steel construction makes cleaning easy
- Also include gas mixing head for even CO_2/O_2 distribution and sterilizable CO_2 sensor

BINDER
www.binder-world.com

INCUBATOR MANUFACTURERS

BINDER	www.binder-oven.us
BMT USA	www.bmtus.com
Boekel Scientific	www.boekelsci.com
CARON Products	www.caronproducts.com
Eksigent	www.eksigent.com
Eppendorf	www.eppendorfna.com
ESCO	www.escoglobal.com
Hach	www.hach.com
Jeio Tech	www.jeiotech.com
Labnet International	www.labnetlink.com
NuAire	www.nuaire.com
Panasonic Healthcare	www.panasonic.com/biomedical
SHEL LAB	www.shellab.com
Thermo Fisher Scientific	www.thermoscientific.com
Torrey Pines Scientific	www.torreypinesscientific.com
UVP	www.uvp.com
Wheaton	www.wheatonsci.com

COLD STORAGE

TOP 5 THINGS YOU MAY NOT KNOW ABOUT LABORATORY COLD STORAGE

1. One third, or 150, of the world's largest collection of donated brains for autism research was ruined due to a freezer failure at the Harvard Brain Tissue Resource Center in late May 2012. Alarms meant to go off to signal rising temperatures did not sound and by the time an official checked on the brains, they had already decayed.
2. The New York Blood Center lead by the Howard and Abby Milstein Foundation is the largest blood center in the world, aside from the Red Cross, delivering a safe blood supply to about 20 million people and 200 hospitals.
3. In the 11th century, the refrigerated coil, which was able to condense aromatic vapors, was invented by the Persian scientist Ibn Sina (Avicenna). He used refrigerated tubing to distill essential oils.
4. Artificial refrigeration was demonstrated for the first time by William Cullen of Glasgow University, UK in 1748.
5. The first refrigeration machine based on vapor rather than liquid was invented by Oliver Evans in 1805.

TOP 5 QUESTIONS YOU SHOULD ASK WHEN BUYING A LAB REFRIGERATOR/FREEZER

1. How is the product manufactured? Ask about the quality of the materials used and the product life expectation based on manufacturing testing.
2. What is the warranty? What does it include and for how long? Will anything void the warranty?
3. How green is the product? Ask the company to provide details on energy efficiency and have them relate it to your return on investment (e.g. in four years will you save enough money in energy costs to pay for your freezer/fridge?).
4. How much sample capacity are you getting for your space?
5. What are the optimal voltage/wiring conditions for running the fridge/freezer? If the building is older, will low voltage or voltage fluctuations affect the performance of the freezer/fridge?

NOR-LAKE® SCIENTIFIC -86°C SELECT™ ULTRA-LOW UPRIGHT FREEZERS

Designed to meet the demanding requirements for scientific and laboratory research. Advanced engineered design incorporates the latest in cabinet, refrigeration, temperature control and monitoring features. Provides energy efficient, convenient, safe and reliable performance for optimal storage temperature environments necessary for a wide range of life science, pharmacy, biological, medical, clinical, and industrial applications.

CONSTRUCTION

- CFC free polyurethane cabinet and door foam insulation.
- High-impact, smooth scratch and corrosion resistant painted exterior and smooth white painted interior, provides attractive appearance and easy to clean surfaces.
- Interior and exterior of the freezer cabinet are white painted galvanized steel.
- Combination cabinet mounted multi-bulb and door perimeter gaskets provide multiple points of door sealing. Ensures reliable frost resistant performance and enhances energy efficient cold performance for long term sample security and storage.
- Interior doors (5) independent hinged steel inner doors are constructed of insulating material with magnetic catch and easy pull handles. Reduces cold loss during door openings and sample retrieval.
- Five internal storage compartments with four heavy duty reinforced stainless steel shelves. Shelves are adjustable in 1 inch increments. Compatible with optional stainless steel storage racks, fiberboard boxes and dividers for multiple storage needs.
- Multi-feed patent pending cold wall evaporator design provides superior refrigerant flow and maximizes cooling power by ensuring that the evaporator is always 100% in contact with the freezer wall, maximizing cold transfer into the freezer and heat removal from the chamber.

SELECT™ CONTROL SYSTEM

- Advanced PLC (programmable logic) microprocessor controller (door mounted eye level display and interface) includes real time clock, event logging alarm history, advanced alarms, alarm-test, and memory functions.
- Password protection (2 levels, setpoints and parameters) security for power, temperature and alarm settings.
- Key pad, multifunction, menu driven, LCD display for trouble free access on monitoring of all control features.
- Temperature adjustable in 0.1°C increments. Temperature display to 0.1°C increments.
- Control probe located in rear wall bottom left corner for optimal and accurate temperature measurement and control.

SELECT™ REFRIGERATION SYSTEM

Nor-Lake Scientific's Select™ Refrigeration system ispowered by an advanced low noise high performance cascade refrigeration system using two next generation 1 HP hermetically-sealed compressors.

Exclusive engineered super capacity (tri-tube) capillary tube system delivers refrigerant on demand matching with advanced heat exchangerdesign providing optimal heat removal and superior low temperature performance.

Evaporator design enhances refrigerant flow increasing the overall efficiency, temperature uniformity and recovery performance.

Air cooled condenser, high capacity with large surface area. Washable condenser filter maintains optimal efficiency and performance.

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-86ºC Select™ Ultra-Low Upright Freezers

Designed to Meet the Demanding Requirements for Scientific and Laboratory Research.

Select™ Control System

- **Upright models available in 27.5ft , 23.3ft and 18.9ft internal storage capacity**
- **Operating temperature range -50ºC to -86ºC**
- **Next generation 1HP low noise high efficiency compressors**
- **Exclusive cascade refrigeration and cabinet design**
- **Programmable logic microprocessor controller with LCD digital display**
- **High/low audible and visual temperature alarms, remote alarm contacts**
- **Door ajar alarm, on board diagnostics, surge protector, password protection, real time clock and battery backup of controller display**
- **Available options-CO2 and LN2 Backup systems, chart recorder, inventory storage systems**
- **UL/CUL listed**

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Committed to our environment

Designing an Ultra-Low Freezer You Can Trust for Your Sample Storage

Understanding "How It's Made Matters" was the tenet around which the Helmer Scientific Ultra-Low Freezer was designed and developed. Care was taken to focus on each aspect of the product to ensure that every component works together to create an optimized system that instills confidence in the user.

The benefits of the Helmer Ultra-low freezer go beyond what you can see and include design elements that provide a barrier against heat, an optimized refrigeration system, intelligent monitoring and diagnostic support, outstanding serviceability, and advanced manufacturing technologies that guarantee TrueBlue™ performance.

Design Matters

A unique Heat Barrier System™ was designed to provide four (4) levels of containment, combining an ice-resistant sealing surface with non-conductive materials to keep heat out, providing superior temperature uniformity and reducing frost. Robust, high-quality materials were used in the design of the outer door, inner doors, and the frame and cabinet design. These combine to reduce the amount of heat transfer, provide a tighter closure to minimize changes in interior temperature during door openings, and provide a compressed sealing surface to prevent cold air leaks.

Cooling Matters

The refrigeration system has been designed to optimize performance and protect the compressor. It provides maximum heat exchange delivering excellent uniformity and fast temperature response, increasing the overall efficiency and reducing the compressor run time. In addition, great attention to detail was paid to ensure the system works with the compressor to improve its reliability. The system can also adapt to changing environmental conditions and heat loading of product to further ensure reliable refrigeration performance.

Intelligence Matters

Our ultra-low freezers are smart. The i.C3® Information Center provides critical information at hand, offering peace of mind and early detection of alarm states. Intelligent diagnostic information and temperature data is readily available on the home screen while samples are safely stored inside as a result of the many security features. Integrated access control is included on every ultra-low freezer to ensure sample protection and integrity.

Serviceability Matters

Our outstanding serviceability was created by design. Field technicians were included on our design team to help organize the ultra-low freezer systems to create a freezer that is easily serviceable, reducing both downtime and repair costs.

Manufacturing Matters

Advanced manufacturing techniques promote maximum reliability. Ultra-low freezers are assembled in our state-of-the-art, eco-conscious manufacturing facility by highly trained team members in a temperature and access controlled room that provides the controls needed to ensure consistent, reproducible results.

It's all about sample protection and integrity. We get it.

Confidence Matters. That why
"How It's Made Matters".

Helmer SCIENTIFIC

14400 Bergen Boulevard
Noblesville, IN 46060
1-800-743-5637
www.helmerinc.com

Ultra-Low Freezers

Sure, we could have designed an Ultra Low Freezer like everyone else. But we didn't. That's not our way. We believe in starting at the beginning, finding the best, most forward-looking way to design and engineer each component, and using manufacturing techniques that ensure quality results.

Why do we care? Because ...

How It's Made Matters.

TrueBlue™ www.helmerinc.com

Helmer SCIENTIFIC

TOP **6** QUESTIONS YOU SHOULD ASK WHEN BUYING A LOW TEMPERATURE FREEZER

1. How long does it take to get to -80°C after set-up / install (cool down time)?
2. If there is a power failure, how long will it take to get to -60°C (holdover time)?
3. How often do the compressors have to run (compressor run time)?
4. What is the max and min temp variation from set-point across the chamber (temperature variation)?
5. What is the capacity, how many racks and 2" / 3" boxes can it store (sample storage)?
6. What are the optimal voltage/wiring conditions for running the ULTF? If your building is older, will low voltage or voltage fluctuations affect the performance of the freezer?

RECENTLY RELEASED COLD STORAGE PRODUCTS

TWIN GUARD ULTRA LOW FREEZER

- Designed for -86°C storage of high-value biological samples
- Two independent compressor systems, combined with optional liquid nitrogen or liquid CO_2 back-up systems, protect precious samples in the unlikely event of one compressor's failure
- Built with a vacuum insulation panel to ensure temperature uniformity and can be set to run in an energy saving mode

Panasonic Healthcare
us.panasonic-healthcare.com

TWINCORE ULT FREEZER

- Designed for -86°C storage of high-value samples
- Employs two optimized autocascade compressors but only requires one compressor to hold temperature up to -86°C
- Features an advanced 7" LCD touchscreen control panel, inventory management system, and each unit is assigned an IP address for monitoring functions by the Z-Sc1 WIZBOX network or user's in house system
- Does not require a CO_2 backup

Z-SC1 Biomedical
www.z-sc1.com

UFV 500/700 SERIES ULTRA-LOW FREEZERS

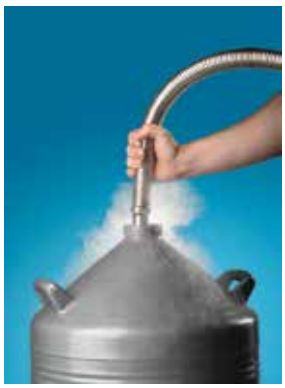
- Provide reliable and safe operation sample protection
- Include motorized automatic door lock and optional RFID for user-friendly operation
- Feature quiet operation of only 49 dB
- Offer low energy consumption with water cooling option
- Data logger replaces paper chart recorders
- Also includes a high storage capacity, communication integration with security and alarm, and stability with adjustable feet and casters

BINDER
www.binder-freezer.us

TECHFLEX TRANSFER HOSES

- Vacuum jacketed hoses provide a maintenance-free, durable, frost-free cryogenic method to transfer cryogen liquids
- Lightweight inner flex reduces cooldown losses
- Higher quality liquid and faster liquid cryogen delivery improves equipment efficiency
- Design eliminates hazardous ice and dripping water, increasing safety
- Insulated hose is safe to touch, even with -196°C (-320°F) liquid nitrogen or -269°C (-452°F) liquid helium

Technifab
www.transferhoses.com

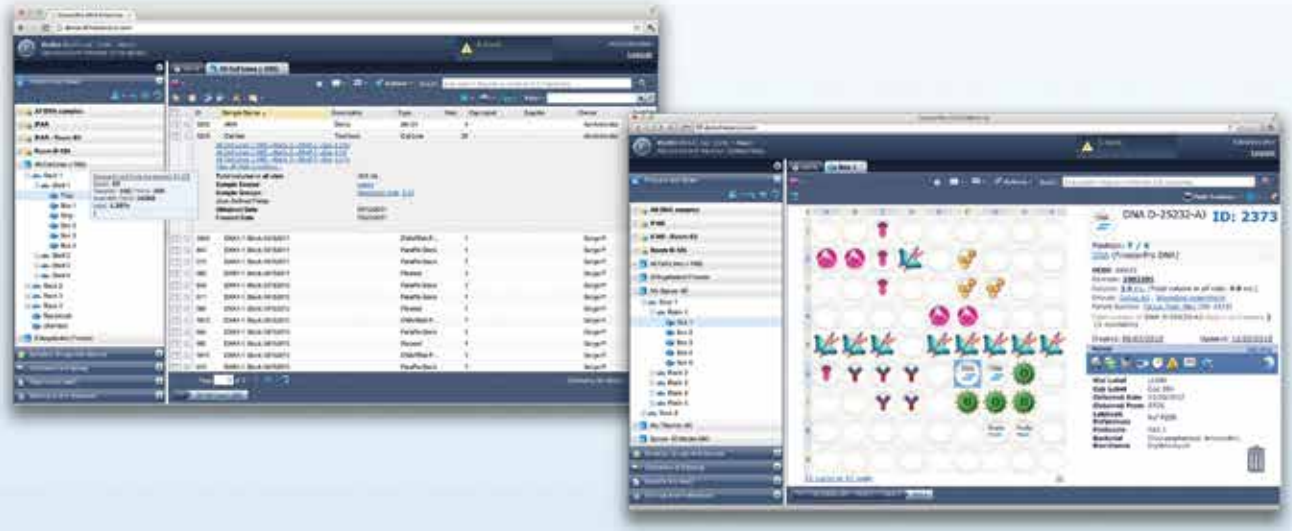


RuRo

Laboratory Information Bliss™

Freezer pro®

Sample Management System



FreezerPro was designed purely for sample management. This focus allows it to eliminate wasteful inefficiencies and help streamline laboratory production without the resource requirements associated with adopting a LIMS.

FreezerPro enhances user's ability to work, collaborate and learn through traceability, automation, configurable reporting, communication tools and hardware support. For thousands of users worldwide, FreezerPro is Laboratory Information Bliss™.

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Visit www.RURO.com for more information

Compliance:

FDA 21 CFR Parts 11, 21, 58, 210, 211, 820
cGLP/cGMP (Good Laboratory Practice and Good Manufacturing Practice)
Section 508 Accessibility Guidelines
HIPAA Accountability Act of 1996
HIPAA Patient Safety and Quality Improvement Act of 2005 (Patient Safety Act)

Compatibility:

- PC/MAC
- Tablet
- Smartphone
- Web-based

COLD STORAGE PRODUCT MANUFACTURERS

Angelantoni	www.angelantoni.it	NuAire	www.nuaire.com
Baker BioScience Solutions	www.bakerbio.com	Panasonic Healthcare	www.panasonic.com/biomedical
Caron Products	www.caronproducts.com	Ruro	www.ruro.com
Darwin Chambers	www.darwinchambers.com	SHEL LAB	www.shellab.com
Eppendorf	www.eppendorfna.com	So-Low	www.so-low.com
Freezer Concepts	www.freezer-concepts.com	SP Scientific	www.spscientific.com
Helmer Scientific	www.helmerinc.com	Thermo Fisher Scientific	www.thermoscientific.com
Marvel Scientific	www.marvelscientific.com	TTP Labtech	www.ttplabtech.com
MIDSCI	www.midsci.com	Z-SC1	www.z-sc1.com
Nor-lake	www.norlake.com		

EVAPORATORS

TOP 4 THINGS YOU MAY NOT KNOW ABOUT EVAPORATORS

1. Dr. Neal McNiven developed the first multiple sample, high-speed nitrogen evaporator, the forerunner of many similar devices.
2. Some dry block evaporators can be filled with aluminum or glass beads.
3. Today's evaporators often handle multiple samples at once, but each must be processed without being impacted by the others. Scientists must make sure that there's no cross-contamination, which requires careful control of the airflow.
4. A cool use for evaporators outside the lab is on large ships which often contain evaporating plants to make fresh water so they don't have to rely as much on supplies from shore.

TOP 5 QUESTIONS YOU SHOULD ASK WHEN BUYING AN EVAPORATOR

1. What are your sample sizes? Microtiter plates and micro centrifuge tubes work best in a centrifugal vacuum concentrator. For large samples up to 450ml, a vortex evaporator is recommended.
2. What are your samples? Acids require an acid-resistant system. Solvents damage plastic and rubber components, so an appropriate system to prevent damage is recommended. A -50C cold trap is ideal for aqueous-based samples, a -85C cold trap traps most solvents, and a -105C cold trap is recommended for alcohols.
3. Are your samples heat sensitive? Even at ambient set point, vacuum concentrators add heat through friction. A concentrator that has refrigeration built into it will give you the temperature control recommended to maintain the viability of heat liable samples.
4. Do you have limited space? A floor model with casters or a small all-in-one benchtop model can be moved out of the way when not in use.
5. Do you prefer vacuum evaporation or nitrogen blow-down? Some samples require evaporation under nitrogen, which is gentler, for volatile solvents.

RECENTLY RELEASED EVAPORATORS

"ODOR REDUCTION" FUNCTION FOR EZ-2 EVAPORATOR

- Enables evaporator to be sited on the open bench rather than taking up valuable fume hood space
- Automatically adds a repeated vent and vacuum cycle to the end of a method, which purges the evaporation chamber of residual solvent vapors
- Three settings are available to optimize vapor removal without releasing trapped solvent from the cold trap

Genevac
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RV 8 ROTARY EVAPORATOR

- This entry-level model is recommended for all standard evaporation applications
- Comes equipped with the newly designed HB 10 heating bath, which has enhanced safety features
- In addition to the vertical glassware, all glassware in the IKA RV 10 range can be used
- Lift mechanism allows the evaporation flask to be positioned quickly and precisely while using only one hand

IKA
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AQUACOUNTER® EV-2000L OIL EVAPORATOR

- Utilizes azeotropic distillation and completely separates water from sample matrices, thus eliminating any side reactions with interfering substances
- Especially useful for determining moisture in difficult samples such as heavy oils, grease, peanut butter, etc.
- This CE approved evaporator can be used with KF titrators
- Heating range is from ambient temperature to 200°C

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S-EVAP-KD SOLVENT EVAPORATOR FOR KD FLASKS

- Comes in multiple models, allowing either 5, 8, or 10 samples to be evaporated at once
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- Recover up to 97% of starting solvent volume with individual or central solvent collection options
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The compact EZ-2 Series Evaporator from Genevac uses the most advanced proven technology in evaporation science. The EZ-2 accurately controls vacuum and temperature to enable rapid evaporation of a wide range of solvents and prevent bumping and cross contamination. Compatible with a wide range of sample holders the EZ-2 will easily integrate within the workflow of many laboratories. Options are available to enable routine, safe removal of potentially explosive solvents such as diethyl ether or pentane and also removal of acids including concentrated hydrochloric acid (HCl).

Typical Applications

Enhanced Sample Preparation for Environmental Analysis

The EZ-2 is the evaporator of choice for environmental labs concentrating or drying samples prior to analysis, such as pesticide residues. Environmental analysis methods on the EZ-2 Envi, Plus or Elite can be easily optimised to suit the precise requirements of the analytical process. Samples may be completely dried or concentrated to a small volume, either by addition of a solvent keeper, or by using the SampleGenie system which allows a large volume to be directly concentrated into an GC / HPLC autosampler vial. Use of SampleGenie with the EZ-2 effectively automates the evaporation and sample transfer process delivering enhanced recovery of volatile analytes and a higher degree or reproducibility than other methods. White paper download: www.evaporatorinfo.com/info9_e.htm

Screening of Metabolic, Toxicological & Forensic Samples

Metabolism, Toxicology and Forensic studies look at the passage of a drug or chemical into and through the body. They range from routine safety screening for workers potentially at risk to chemicals through to pharmaceutical drug safety testing and drug prescription compliance and monitoring in the clinical environment. Genevac systems provide an invaluable tool to researchers in these environments, providing fast, safe evaporative sample preparation free from artefact, contamination and sample loss. The EZ-2 is able to dry a wide range of samples and sample formats, and can dry up to 8 shallow well microtitre plates in parallel making it ideal for those who are performing forensic or metabolic studies.

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Safe Removal of Strong Acids

Labs which routinely use high concentrations of hydrochloric acid in their evaporator should select the EZ-2 with HCl resistance option. Available as a low-cost option available on the EZ-2 Standard, Plus and Elite – the EZ-2 HCl system has key elements produced in Hastelloy®, glass and PTFE to provide full protection against acid corrosion. The latest models of the EZ-2 Plus with HCl Resistance option also enable evaporation of concentrated nitric acid. White paper download: www.evaporatorinfo.com/info9_e.htm

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SAFE FLUID ASPIRATION IN CELL CULTURE

Abstract:

Cell culture requires safe mechanisms for fluid/media aspiration and decontamination. Integrated purpose built systems eliminate many of the hazards of traditional aspiration methods and enable immediate decontamination.

Article:

Protocols in cell culture laboratories often call for the immediate disinfection of fluids upon removal from tissue culture flasks. Work with human cells, other animal derived cell types, and potential pathogens are applications where lab techs (and their Environmental Health and Safety Officers) often prefer to immediately disinfect aspirate rather than transfer waste to the autoclave.

Traditionally, aspiration of culture waste in a Biological Safety Cabinet (BSC) was performed using makeshift equipment; a Pasteur pipet, some rubber tubing, two side arm flasks, a HEPA filter—all connected to house vacuum. A quantity of sodium hypochlorite solution ("bleach") was added to the collection vessel to decontaminate the aspirate. Constant air flow from the aspiration pipet diluted the chlorine gas liberated by the addition of aspirate, reducing its corrosive effects on the system. This type of crude apparatus can lead to laboratory contamination with spillage of aspirate outside the BSC via tipping or breakage of the unstable flasks, or over-aspiration. With the expansion of cell culture, and laboratory designers moving away from central vacuum systems, demand has arisen for purpose-built cell culture fluid aspiration systems.

Integrated fluid aspiration units offer compact, safe alternatives to "home-made" systems. They enable more secure transfer of collected waste for autoclaving and some systems are compatible with immediate chlorine bleach decontamination in the collection vessel. With purpose built systems the pump is located

close to the collection vessel; when sufficient vacuum in the collection vessel is created the pump is switched off to reduce noise. A hand controller with an on-demand flow valve maintains the vacuum level during periods of non-aspiration. As the pressure rises in the vessel during use, the pump is switched back on to restore the vacuum level, and the process continues cyclically. In addition, these purpose-built systems are designed with safety and stability in mind, so that they may be placed in more locations without fear of the vessel being accidently tipped over resulting in a spill.

If bleach solution is used with one of these systems, chlorine gas is released but without constant airflow of a central vacuum system to dilute the gas, it can corrode the entire vapor path of the vacuum system. If the system from the collection bottle onwards is not made from highly corrosion resistant materials such as borosilicate glass and fluoropolymers, immediate disinfection will result in premature failure of the system.

If immediate disinfection of aspirated fluid is desired, or required by safety protocols, a system with glass collection vessel and fluoropolymer pump, like the VACUUBRAND® BVC control G, or BVC professional G is necessary. Both systems feature quiet, long-life VACUUBRAND® Chemistry-design diaphragm pumps designed for aggressive vapors as well as a bleach-resistant borosilicate glass collection vessel, with a protective plastic coating. For convenience, they include variable vacuum level, a comfortable hand controller with pressure sensitive aspiration button, and removable fluid path for decontamination. The BVC professional G adds a contact-free liquid level sensor to discourage over-aspiration, and allow quick collection vessel changes, without exposure to bottle contents. These modern, integrated aspiration systems eliminate many of the negatives of traditional improvised cell culture aspiration methods, resulting in a much safer and comfortable laboratory environment.

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FREEZE DRYERS

TOP 6 THINGS YOU MAY NOT KNOW ABOUT FREEZE DRYERS

1. Some zoos use freeze dryers to increase the concentration of tranquilizers so that they work for larger animals such as bears or even elephants.
2. Andean civilizations preserved potatoes using a freeze drying (also known as lyophilization) process. This food was called chuño.
3. During the Second World War, serum being sent from the US to Europe for treating wounded soldiers needed to be refrigerated, but because refrigeration technology did not exist in transport vehicles at the time, many serum supplies were spoiling before getting to hospitals. This led to the freeze-drying process being developed for commercial use in order to make serum chemically stable so that, even without refrigeration, it could be transported without going bad.
4. Freeze drying has been used to restore documents that have been damaged by water.
5. Freeze dryers have also been utilized to prepare river-bottom sludge for hydrocarbon analysis and in producing synthetic skin.
6. The restoration of historic/reclaimed boat hulls is another process that uses freeze dryers.

TOP 5 QUESTIONS YOU SHOULD ASK WHEN BUYING A FREEZE DRYER

1. What solvents are you using? A temperature differential between the sample's eutectic temperature and collector temperature of 15 – 20 degrees is required. If solvents such as acetonitrile are used, a cascade freeze dryer is required.
2. How much sample in liters will you run? When choosing a freeze dryer, vendors recommend loading half of the listed capacity. For example, a 6L freeze dryer will hold 3L during the run.
3. Do you want to freeze dry in flasks, tubes, or bulk? Many drying accessories are available. On a manifold or drying chamber, flasks can be placed on each port. Test tubes and serum vials can be placed inside of the flasks for multiple samples per container. If samples are bulk, a tray dryer would be a good choice.
4. Do you need to stopper under vacuum?
5. Is this a shared freeze dryer? A hybrid pump is recommended to prevent damage to the pump.

RECENTLY RELEASED FREEZE DRYERS

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- Features a new Intellitronics™ controller offering enhanced functionality and intuitive touchscreen navigation
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- Integrated performance and leak testing ensure system is always working optimally
- Alarm alerts, delivered via email, help notify the user of potential problems with the system

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FREEZONE® PLUS 4.5 LITER CASCADE BENCHTOP FREEZE DRY SYSTEM

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- A vacuum pump and sample containers, such as flasks, are the only additional components necessary for a complete system

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FUME HOODS

TOP 6 THINGS YOU MAY NOT KNOW ABOUT FUME HOODS

1. Working in around 1900, Thomas Edison seems to have been one of the first scientists concerned about laboratory ventilation. Edison used the fireplace chimney in his lab to exhaust noxious fumes and odors from his experiments into heated rubber compounds, using the natural draft of the chimney to expel the gases.

2. In 1923, one of the first recognizable fume hoods in the modern sense of the word was in use at the University of Leeds. This unit consisted of a large cupboard standing at working height and incorporated vertical rising sashes arranged like parallel windows.

3. Considerable advances in fume hood technology were made during the Second World War in response to the fear of exposure to highly toxic chemicals and radioactive materials. Against this catastrophic backdrop, significant progress in safety, ventilation, and fume hood design was made.

4. In 1943, John Weber, Jr. working at the Ames Laboratory in Ames, Iowa, developed the concept of a constant face velocity, variable exhaust flow fume hood control. This design was applied to a vertical rising sash hood served by a dedicated hood exhaust fan. The concept eventually became a standard feature employed on many fume hoods at that time in atomic laboratories, especially where ventilation containment within the hood was critical.

5. In the early 1950s, John Turner, working in the Engineering Department at Oak Ridge National Laboratory (ORNL), suggested replacing vertical rising sashes with horizontal sliding sashes in order to reduce energy consumption. He also introduced the use of a mechanical damper that worked off the imbalance between external and internal hood pressures.

6. The greatest innovation enjoyed during the 1970s was the development of auxiliary air fume hoods, which conserved energy by introducing outside air into the hood, reducing the loss of tempered air from the laboratory. This type of fume hood requires the use of two duct and blower systems.

Aura® Elite Fume Hoods

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Mystaire® ductless fume hoods are self-contained, filtered enclosures that remove hazardous fumes, vapors and particles from virtually any laboratory application.

Standard Features:

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- LCD readout of airflow in linear feet per minute or meters per second
- Variable airflow control with automatic airflow sensor calibration — no service technician required
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FIGHTING FOR LAB SAFETY WITH S.C.A.T. EUROPE

After 15 years of constant improvement, S.C.A.T. SafetyCaps belong to the global safety standard in pharmaceutical and chemical laboratories. They enable operators to get solvent vapors under control and create perfect solvent conditions for their HPLC systems. The automated caps think ahead and fight health and environmental hazards directly at their origin - the solvent receptacle. Good laboratory practice often requires more useful and cost-efficient solutions than fume cupboards or extraction hoods. This is why S.C.A.T. caps are installed within seconds and provide 100% protection. In addition, solvent costs will be cut down remarkably by protecting the solvent reservoir with a SafetyCap. Even waste fluid containers can now be rebuilt into safe disposal devices, instead of being a hazard source.

Running a trouble-free HPLC lab requires avoiding accident risks, as well as keeping the system free of contamination. The SafetyCap system fulfils both functions with one simple and solid cap. The self-acting air valve blocks vapors and gases while pressurization and HPLC operation can take place as usual. However, the operator will realize significant quality advancement. Where contamination once used to cause retention time shifting and distortion of the chromatogram, there is now stability and reproducibility. The caps offer multiple sized tubing and capillary connectors which make them suitable for all types of liquid chromatography systems - regardless of their brand or manufacturer.

Securing your waste containers is just as easy. Putting the SafetyWasteCap on top turns a common canister into a disposal device with advanced safety features. The integrated exhaust filter collects hazardous vapors and prevents overpressure inside the container. The device even stays safely locked while discharging waste fluids via tubing directly from the HPLC system.

Wherever sample or solvent residues have to be discharged manually, the S.C.A.T. caps offer an integrated safety funnel which closes automatically after filling. This keeps the disposal device safely closed and prevents accident risks.

The modular system offers many additional features which can be added to the standard solvent caps. One of them is the integrated level sensor, helping the operator to keep an eye on filling levels and avoid unnoticed overflow. For those who do not operate HPLC systems and want to get their waste disposal under control anyway, S.C.A.T. also offers a wide range of safety funnels and disposal devices. There is also a series made of electroconductive plastic material against sparking and static charge.

Taking responsibility for health and environment protection is one of the lab manager's obligatory duties. On the other hand, it is easy to comply with these requirements quickly and cost-efficient, because the S.C.A.T. system has been developed especially for this purpose.

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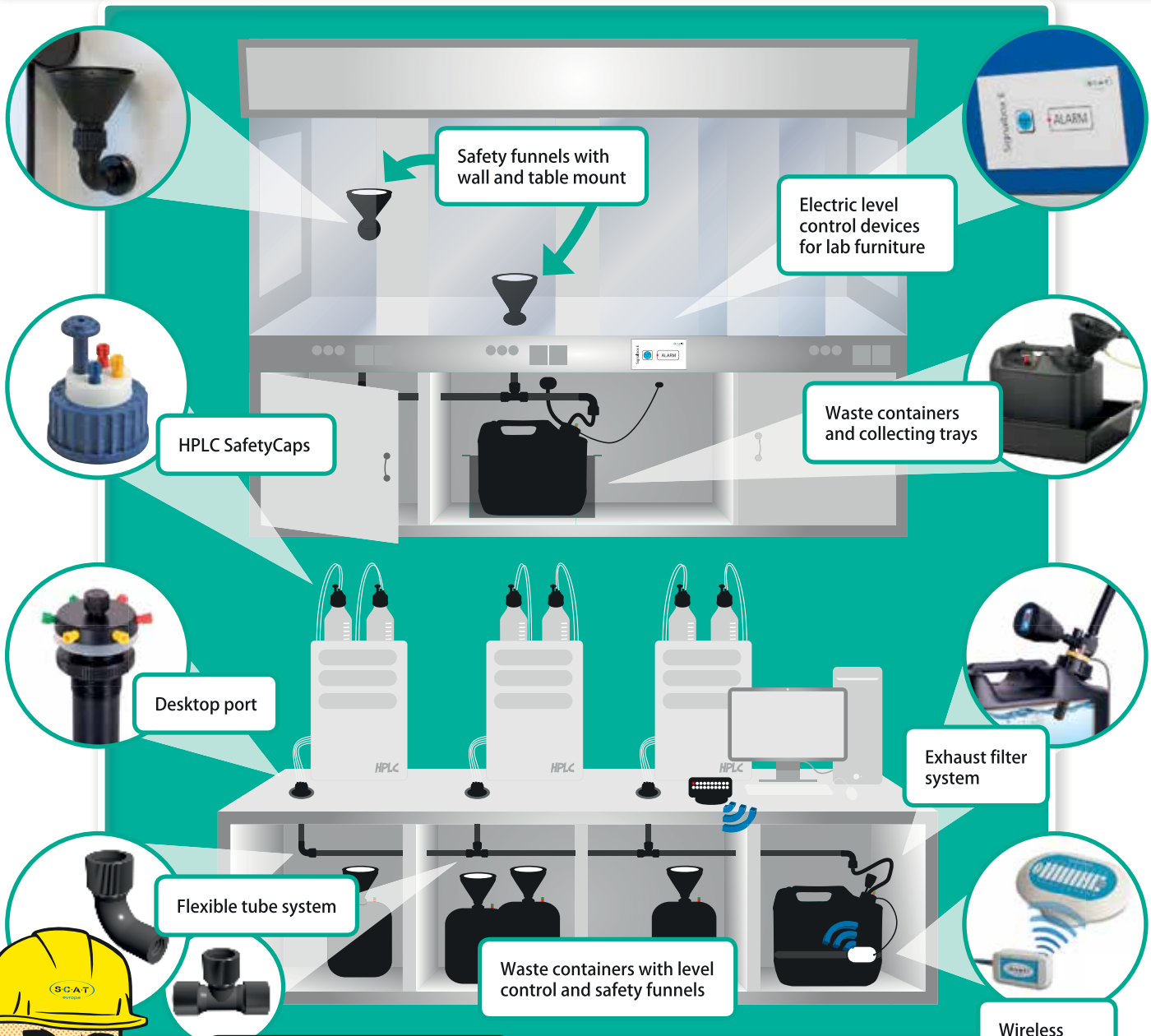

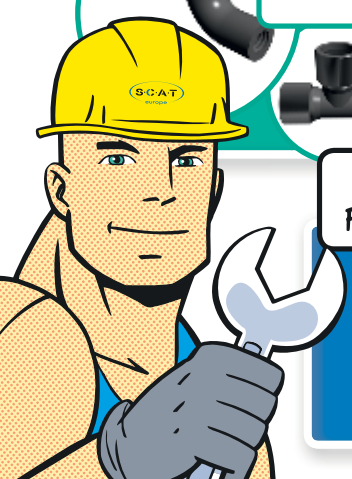

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TOP 6 QUESTIONS YOU SHOULD ASK WHEN BUYING A FUME HOOD

1. Can your lab go ductless? Ductless hoods are a viable solution for most routine laboratory applications. If a total exhaust hood is not an absolute requirement for the process being performed, a ductless solution often makes more sense.
2. What is the hood constructed from, *how* is it constructed, and how does this affect equipment life cycle? Based on your application, will any of the chemicals being used attack, degrade or physically alter the construction material of the hood? Will the hood stand up to harsh corrosives?
3. What type of safety controls are included in the base cost of the unit?
4. Has the manufacturer/distributor gone through a thorough application review process? Does the suggested filtration make sense?
5. How hard is installation? Will there be a future/potential need to move the hood after it has been installed the first time? Should the hood be portable?
6. What are the capital, installation and operational costs? From the lab manager's perspective, capital costs are but a fraction of the overall budget. Installation/labor costs and operational costs must be factored in as well.

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- Performs very well at low air volumes
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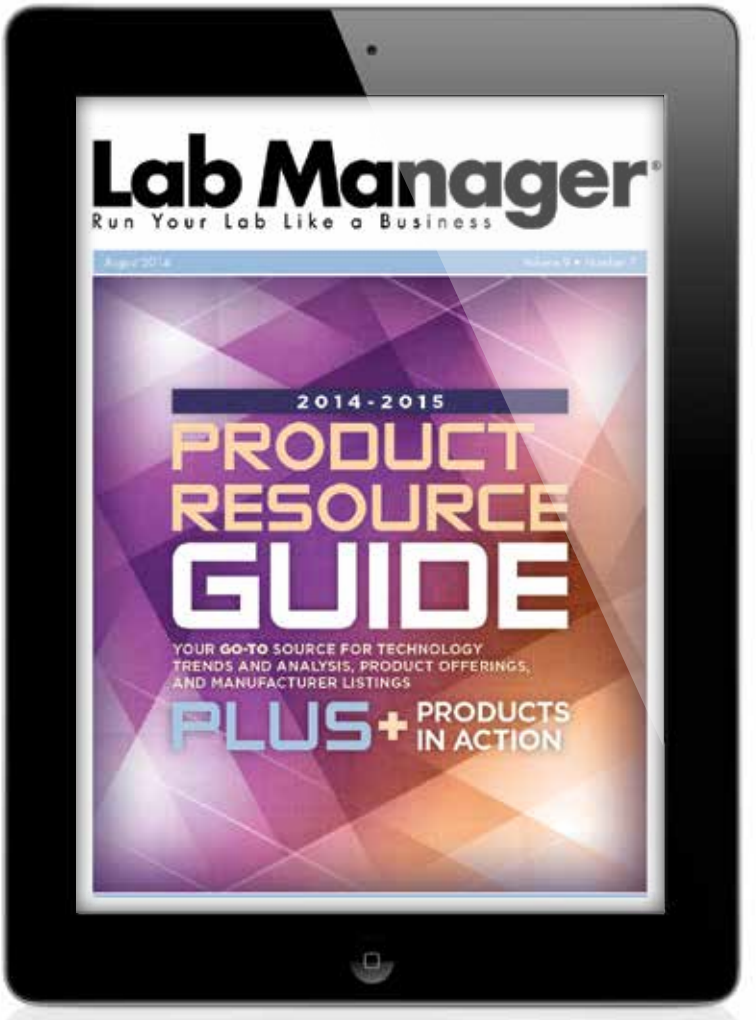

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GAS GENERATORS/ SPECIALTY GASES

TOP 3 THINGS YOU MAY NOT KNOW ABOUT GAS GENERATORS AND SPECIALTY GASES

1. Kipp's apparatus, one of the earliest laboratory gas generators, was invented by Dutch pharmacist Petrus Jacobus Kipp in 1844. It was used for the preparation of small volumes of gases but fell out of use in laboratories once gases became available in cylinders.
2. The ongoing helium shortage has created a robust market for hydrogen in gas chromatography.
3. Those who use gases and/or gas cylinders in the lab know extreme care needs to be taken in their handling. Unfortunately there have been many accidents relating to gas cylinders over the years, most often due to unsafe procedures, with one of the worst occurring in March 2006 in a research laboratory building at University of Haute Alsace (France). A leak in a gas cylinder led to an explosion of ethylene in the enclosed lab, followed by a fire that burned for five hours. One professor was killed and a trainee seriously injured while 20 more people also sustained injuries.

TOP 6 QUESTIONS YOU SHOULD ASK WHEN BUYING A GAS GENERATOR

1. What application do you need a supply of gas for? Depending on the experiment or application you may need one or more hydrogen, nitrogen or a zero-air gas generators.
2. How many systems will your gas generator supply? There are a number of sizes of gas generator that will service one or many systems for a number of applications.
3. If you need to supply gas to more than one system, are you planning on having a central source of gas? The number of labs you need to supply will determine whether you opt for a larger, central generator or numerous, smaller generators.
4. Is space an issue in your lab? It may be that you need a smaller, standalone generator that can be stored or stacked away to save space.
5. What are the safety parameters that you must adhere to when using gases? A generator significantly reduces the hazardous risk that comes with on-site gas supplies, but it's good to discuss your gas options with your safety representative.
6. What service proposition comes with the gas generator? There are a number of options when managing a generator, whether that's getting an education in self-maintenance, knowing a service representative will be able to maintain the unit regularly or having the ability to send a unit back to the manufacturer.

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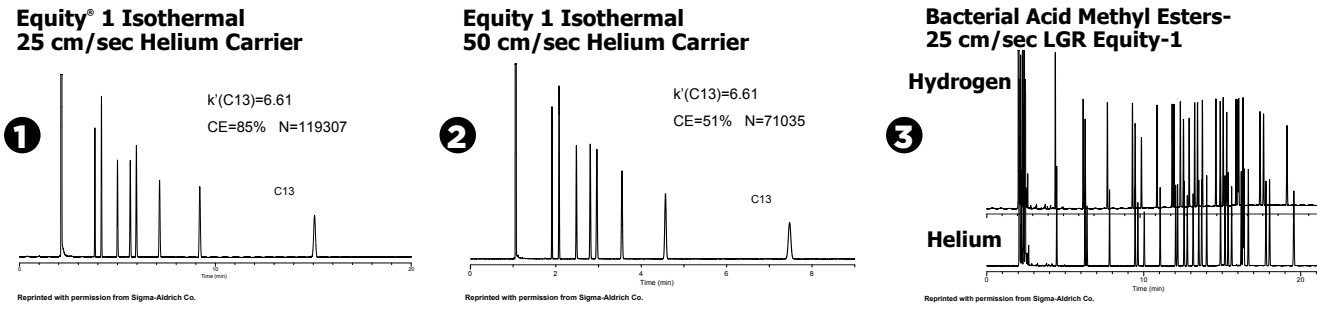
CONVERTING FROM HELIUM TO HYDROGEN FOR GC CARRIER GAS

Using Hydrogen to Replace Helium as a Carrier Gas for GC

Author: Peter Froehlich, Peak Media

Helium (H_e) is commonly used as GC carrier gas, but it is a non-renewable resource, and there is a global shortage that has caused prices to increase significantly. As a result, many GC users are switching to hydrogen (H_2) as a carrier gas. H_2 provides many advantages over H_e including, higher resolution, more rapid separations at lower temperatures, longer column life, and cost savings. H_2 gas is obtained by the electrolysis of water and many laboratories supply it to the GC using an in-house H_2 generator.

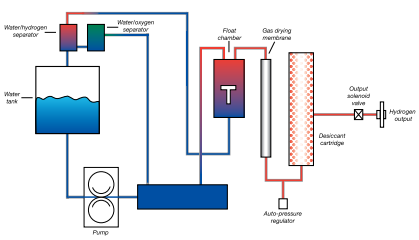


Figures 1, 2, and 3 demonstrate the equivalence of Helium and Hydrogen in typical separations.

Generating Hydrogen via an In-House System

H_2 is generated by the electrolysis of water using two metal electrodes immersed in a strong electrolyte (e.g. 20 % NaOH). To provide high purity H_2, a Pd cathode is used; as only H_2 (and its isotopes) can pass through it. Some systems electrolyze water using another metal for the cathode and then remove water with a desiccator. While the initial cost of that approach is lower, the H_2 collected contains significantly more oxygen and moisture than when a palladium cathode is used. The Parker Balston Model H2PD-300 Hydrogen Generator (Parker Hannifin Corporation, Haverhill, MA) includes a palladium cathode, and can generate 99.99999+% pure H_2 with an oxygen content of <0.01% and a moisture content of 0.01 ppm at a maximum flow of 300 mL/min. Alternatively, water can be electrolyzed using a proton exchange membrane via the Parker system, which does not require a strong caustic.

How the generator works



A Parker Model H2PK-300 Hydrogen Gas Generator

Benefits of Generating H_2 via an In-House System

Safety - In-house generators supply the desired volume of gas on demand at low pressure. Tanks, on the other hand, contain a considerable amount of hydrogen gas; if a leak occurred, gas would be released into the laboratory leading to the potential of asphyxiation and/or explosion.

Convenience - An in-house system provides H_2 on a continuous basis. In contrast, when a tank is employed, the operator must ensure that it contains a sufficient amount of gas for the desired operation (e.g. automated overnight runs). In many facilities, replacement tanks are stored in a remote (outdoor) location for safety reasons and specially qualified personnel may be required to perform tank replacement.

Elimination of Contamination - When a tank is used, the connection to the GC must be broken to replace it, potentially leading to the introduction of moisture and/or oxygen into the system.

Cost - The overall cost of operation of an H_2 generator is considerably lower than the use of tanks. An in-house generator requires only electricity and water. The payback period of an in-house generator is approximately a year. In calculating the cost of tanks, a variety of factors must be considered, including rental fees, contract negotiation, vendor price increases, inflexible delivery schedules, long procurement processes, and demurrage.

Environmental Benefits - The energy requirements for an in-house generator is low. When tanks are employed, the gas must be compressed to 2000 psi. Once the tank is filled, it must be transported to the end user's site and the empty tanks must be returned to the supplier.

Together, we can conserve helium by converting GCs to hydrogen carrier gas.

Helium is a non-renewable resource. There is a global shortage of helium that has caused prices to increase significantly. Many GC users are already switching to hydrogen as a carrier gas.

Hydrogen provides many advantages over helium including, higher resolution, shorter run times, longer column life, and cost savings. Many instrument manufacturers now provide resources to make switching carrier gas easier.

A hydrogen generator is a safe, convenient, and an inexpensive solution to storing hydrogen cylinders. Learn more at solutions.parker.com/conservehelium.

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filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

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ENGINEERING YOUR SUCCESS.

solutions.parker.com/conservehelium

RECENTLY RELEASED GAS GENERATORS/SPECIALTY GASES

ZERO NITROGEN GENERATORS

- Designed to transform standard compressed air into a safe, regulated supply of 99.9995% pure nitrogen with <0.1 ppm hydrocarbons
- Include a heated catalyst module and are specifically designed to replace P5 argon/methane mixtures as well as ultra-high purity nitrogen
- Feature an economy mode which allows the generator to switch into standby mode when there is no demand from the downstream instrument

Parker Balston
www.parker.com

544 SERIES INTELLISWITCH IIV GAS DISTRIBUTION & MANAGEMENT SYSTEM

- Automatically switches between two high-pressure, high-flow gases to provide interchangeable service and continuous supply
- Offers reliable high-flow, high-pressure switching in demanding applications and environments
- Proprietary economization software virtually eliminates liquid cylinder vent loss and substantially reduces residual return
- Web server allows for remote monitoring and email notification of events to users

CONCOA
www.concoa.com

NA1970 DOUBLE CARTRIDGE NITROGEN GENERATOR

- Features a max nitrogen output of 80 LPM
- Produces nitrogen gas to support up to 100 sample positions
- Generates a 99.9% pure stream of nitrogen
- Has a lower cost than some generators because this model must be used with an oil-less air compressor (not included)

Organomation
www.organomation.com

FLEXSTREAM™ MODULAR GAS STANDARDS GENERATOR

- Offers total flexibility for creating precision gas mixtures
- Dilutes the emission from permeation or diffusion tubes with an inert gas, typically nitrogen or zero air, to create trace concentration—ppm, ppb, and pptr—mixtures
- Features up to six independently controlled channels
- System can be controlled remotely by a PC or process computer using Modbus® connectivity

KIN-TEK
www.kin-tek.com

GAS GENERATOR/SPECIALTY GASES MANUFACTURERS

Air Liquide	www.airliquide.com
Airgas	www.airgas.com
CONCOA/Controls Corporation of America	www.concoa.com
Environics	www.environics.com
Gasco	www.gascogas.com
Ionicon Analytik	www.ionicon.com
Kin-Tek	www.kin-tek.com
Linde	www.linde-gas.com
Organomation	www.organomation.com
Parker Balston	www.labgasgenerators.com
Peak Scientific	www.peakscientific.com
Praxair	www.praxair.com
Proton Onsite	www.protononsite.com
Thermo Fisher Scientific	www.thermoscientific.com
VICI Metronics	www.vici.com

PROTON ONSITE HYDROGEN GENERATION SYSTEMS

The Proton OnSite line of hydrogen generators is the simpler, more cost-effective, and less complex approach to supplying hydrogen for laboratory and scientific applications. Offering units that produce from 300 cc/min to 18.8 slpm of gas, these generators use Proton OnSite's patented Proton Exchange Membrane (PEM) electrolysis technology to produce gas at +99.9999 percent purity without the need for high-pressure liquid hydrogen tanks, or compressed gas storage. It's the safe, cost-effective solution for any lab.

Serving Large Labs with a Complete Hydrogen Solution

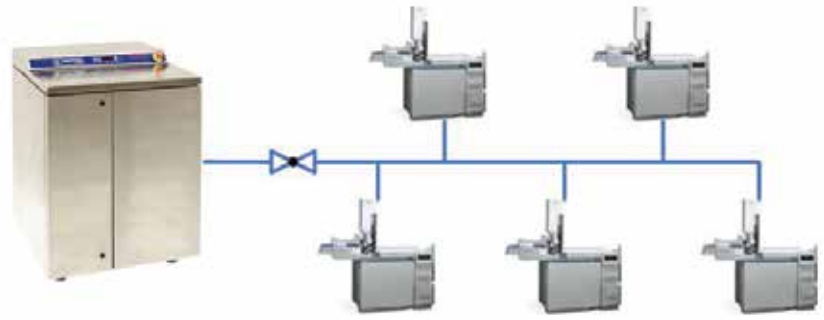
Many lab managers understand the value of switching from delivered gas to an on-site hydrogen gas supply. On-site generation offers a pure, constant and safe supply of hydrogen gas as opposed to delivered cylinders. But, for large laboratories that cover multiple rooms and floors, switching to hydrogen gas generators is a tough decision. A large lab may have tens or hundreds of Gas Chromatography (GC) systems which would need many small generators to meet the full demand of FID and/or Carrier Gas requirements, and that is often not economically viable. Lab managers in large facilities can avoid having to invest in numerous gas generators by installing a single, larger Proton OnSite hydrogen generator and plumbing it into each lab as a 'lab server'. That way they can receive a stream of gas at the flick of a switch, anywhere in the building.

A Unique Proposition

Proton OnSite's large PEM electrolyzers are the only generators in the laboratory market with the ability to run as a Lab Server. One S-Series hydrogen generator can supply up to 200 GC units with ultra high-purity hydrogen gas that can be maintained and managed from a single source. Proton OnSite's technology can also ensure that pressure, flow and purity are constant throughout the building, and can be monitored at all times.

Safety First

Ensuring safety is paramount for a facility that deals with thousands of liters of hydrogen gas each day, considering a single hydrogen cylinder storing 6,300 liters of gas has the explosive potential of 35 lbs of TNT. A facility with hundreds of GC systems fed by cylinders of hydrogen has a tremendous explosive potential, so a lab manager that opts for delivered cylinders has to invest in signiticant satety intrastructure to mitigate those risks. By replacing those cylinders with a single centralized Proton OnSite hydrogen gas generator that only produces gas when necessary and has a limited capacity, labs can dramatically reduce both the explosive potential and the amount of time and money spent handling heavy, dangerous cylinders.



Making the Helium Switch Make Sense

Most laboratories are facing a future with a less reliable and more expensive helium gas supply, causing them to explore their carrier gas options. Large labs that wish switch to on-site hydrogen gas will have to invest in many small hydrogen generators for each lab, creating upfront costs that can be tough to justify. But, hydrogen is quickly becoming less expensive than helium and is a more efficient carrier gas. The lab server solution allows large labs to justify the switch while providing their practitioners with a carrier gas that offers superior, cost-effective results.

A Proton OnSite hydrogen gas lab server can be installed into a large facility in hours and are easier to maintain than several generators or rooms filled with heavy, dangerous cylinders. The lab server is the only option for large laboratories that need pure and constant hydrogen gas in every room and on every floor.

Proton OnSite S-Series Hydrogen Generator

The Proton OnSite S-Series hydrogen generation systems produce up to 18.8 slpm of ultra-high purity hydrogen gas for multiple use with multiple GC systems. A single S-Series hydrogen generator, when installed into a large lab's gas systems, will be able to serve numerous floors and rooms with a constant, pure stream of hydrogen gas at the flick of a switch.

With a production rate of 4.8, 9.6 or 18.8 slpm, Proton OnSite's compact S-Series hydrogen generator produces the equivalent of four cylinders of better-than-ultra high purity grade hydrogen every day. Proton OnSite hydrogen generation systems help many industries eliminate the cost associated with delivering and using hydrogen.

PROTON ON SITE™

+01-203-949-8697
www.protononsite.com

GC SYSTEMS

TOP 6 THINGS YOU MAY NOT KNOW ABOUT GC SYSTEMS

1. The history of gas chromatography (GC) dates back to the first experiments of Mikhail Tsvet separating plant pigments using paper chromatography in 1903.
2. Schuftan & Eucken introduced vapor as the mobile phase in the 1930s.
3. German physical chemist Erika Cremer created the technique of gas chromatography in 1944.
4. Solid state gas chromatography was developed by German graduate student Fritz Prior in 1947. His work was overseen by Cremer.
5. English chemist Archer John Porter Martin, who built the foundation for the development of GC, created liquid-gas chromatography in 1950.
6. The XII Olympic Winter Games in Innsbruck, Austria used gas chromatography for rapid drug screening in routine testing of athletes.

TOP 6 QUESTIONS YOU SHOULD ASK WHEN BUYING A GC SYSTEM

1. What factors come into play when determining the GC system specifications you require in terms of cycle time, enhanced operator benefits, increased productivity and flexibility for specific applications?
2. What differentiates the vendor's GC system from others offered, in terms of performance?
3. How do you validate the specification claims presented by the vendor?
4. Has the data processing software been designed for enhanced analytics, with workflow in mind and does it support critical compliance requirements?
5. What are important price points to keep in mind when selecting a GC system?
6. Laboratories need fast and effective services, including an effective distribution of instruments, spare parts, education, and service personnel. How does the company serve these needs worldwide?

RECENTLY RELEASED GC SYSTEMS & ACCESSORIES

HYDROGEN SENSOR FOR GC SYSTEM

- For the 7890B gas chromatography system
- Helps GC users move away from costly helium carrier gas by providing the additional level of security many organizations require in order to use hydrogen
- Self-calibrating sensor automatically executes a safe sequence for the shutdown of the GC system if even a small hydrogen leak is detected, preventing potentially hazardous situations

Agilent
www.agilent.com

NEW TRACE 1300 SERIES GC SYSTEM OPTIONS

- Now includes Instant Connect Helium Saver module, designed to reduce helium consumption an average of 80 percent
- High-capacity TRACE 1310 auxiliary oven, with multi-valve, multi-column capacity enables use of up to four conventional detectors simultaneously
- Dedicated Instant Connect flame photometric detector for traces of sulfur, phosphorous or tin-containing species
- Instant Connect gas sampling valve module

Thermo Fisher Scientific
www.thermoscientific.com

SERIES 8100 GAS CHROMATOGRAPH

- Broad, flexible platform allows for custom, application-specific system configurations for research, industrial, laboratory, academic, and QA/QC environments
- Accommodates up to two independently controlled detectors that can be operated either individually, in series, or in parallel depending on the ordered configuration
- Features an ambient plus 5°C to 450°C operating temperature, independently programmed and controlled temperatures at multiple locations and more

GOW-MAC
www.gow-mac.com

CALIDUS™ MICRO GAS CHROMATOGRAPH

- Provides users with the durability, utility, reliability and economy it takes to be applied in-lab, online, at-line and in the field with universal success
- Sturdy, 1/8" gauge aluminum housing makes the unit tough enough for demanding applications
- Features a light weight of only 25 lbs. and small footprint of just over 1 sq. ft.
- Cycles 10 to 50 times faster than traditional GCs

Falcon Analytical
www.falconfast.net

GC SYSTEM MANUFACTURERS

Agilent	www.agilent.com	LECO	www.leco.com
Bruker	www.bruker.com	OI Analytical (Xylem)	www.oico.com
APIX	http://apixtechnology.com	Parker Balston	www.labgasgenerators.com
Buck Scientific	www.bucksci.com	PerkinElmer	www.perkinelmer.com
CDS Analytical	www.cdsanalytical.com	Quadrex	www.quadrexcorp.com
Falcon Analytical	www.falconfast.net	Shimadzu	www.shimadzu.com
Forston Labs	www.forstonlabs.com	Teledyne Tekmar	www.teledynetekmar.com
GenTech	www.gentechscientific.com	Thermo Fisher Scientific	www.thermoscientfic.com
GOW-MAC	www.gow-mac.com	Torion	www.torion.com
Inrag	www.inrag.ch	Waters	www.waters.com
JEOL	www.jeolusa.com	Zoex	www.zoex.com

GEL ELECTROPHORESIS

TOP 4 THINGS YOU MAY NOT KNOW ABOUT GEL ELECTROPHORESIS

1. Electrophoresis relies on a basic process—particles moving in an electric field, more or less, and this phenomenon has been known for more than 200 years.
2. The use of sucrose for gel electrophoresis was first reported in the 1930s.
3. Starch gels were introduced in 1955, followed by acrylamide gels in 1959 and agar gels in 1966.
4. In 1983, pulsed field gel electrophoresis enabled separation of large DNA molecules and capillary electrophoresis was introduced.

TOP 9 QUESTIONS YOU SHOULD ASK WHEN BUYING ELECTROPHORESIS EQUIPMENT AND GELS

ELECTROPHORESIS EQUIPMENT

1. How many gels, per experiment, can you run at once in a single electrophoresis cell?
2. Can you run handcast and precast gels with the same electrophoresis equipment?
3. Can you blot in the same tank as you run the gels?

GELS

4. How fast can you run a set of gels with optimal performance?
5. How fast can you visualize your proteins in the gel?
6. Do you need any special buffers or sample buffer to run your gel?
7. Does a precast gel give you the same separation as a handcast gel?

TRANSFER OF PROTEINS FROM THE GEL TO A MEMBRANE FOR WESTERN BLOTTING

8 How fast can you transfer proteins from your gel to a membrane?

9 How efficiently can you transfer your high MW proteins from your gel to a membrane?

RECENTLY RELEASED GEL ELECTROPHORESIS PRODUCTS

PRECISION PLUS PROTEIN™ DUAL COLOR STANDARDS

- Provide strong marker persistence throughout electrophoresis and western blotting, even during rigorous stripping and reprobing protocols, making the product a more effective tool for monitoring separation and estimating protein molecular weights
- Feature increased brightness for better identification of target proteins on gels and blots as well as easier monitoring of gel electrophoresis and confirmation of transfer quality

Bio-Rad
www.bio-rad.com

AMERSHAM™ IMAGER 600 MULTIPURPOSE IMAGING SYSTEM

- Designed to enable capture and analysis of high resolution digital images of protein and DNA samples in gels and membranes
- Delivers high performance imaging to chemiluminescence, fluorescence and colorimetric applications
- Wide dynamic range allows weak and strong signals to be quantitated accurately at the same time
- Full system automation means there is no need for adjustments after startup

GE Healthcare
www.gelifesciences.com

G:BOX CHEMI XX6 & XX9 IMAGE ANALYSIS SYSTEMS

- Suitable for scientists needing a versatile system capable of exceptional imaging of 1D and 2D gels, as well as chemi and fluorescent blots
- Feature high resolution, high quantum efficiency (73% quantum efficiency at 425nm) low noise CCD cameras with the highest level (f0.95) auto-focus lens and 6 and 9 megapixel resolution respectively
- Provide imaging areas of 32.3cm x 25.6cm

Syngene
www.syngene.com

QSEP1 PORTABLE DNA ANALYZER

- This capillary gel electrophoresis based instrument is designed to replace the traditional labor intensive gel electrophoresis processes
- Portable and cost-effective
- Features dimensions of 15x15x20cm and a weight of 5 kg
- Introduced to the market in 2014

BiOptic
www.bioptic.com.tw

GEL ELECTROPHORESIS PRODUCT MANUFACTURERS

AMRESCO	www.amresco-inc.com
Beckman Coulter	www.beckmancoulter.com
Biometra	www.biometra.com
BiOptic	www.bioptic.com.tw
Bio-Rad	www.bio-rad.com
GE Healthcare	www.gelifesciences.com
Hoefer	www.hoeferinc.com
Life Technologies	www.lifetechnologies.com
Kewaunee Scientific	www.kewaunee.com
Spectroline	www.spectroline.com
Syngene	www.syngene.com

GLOVE BOXES

TOP 3 THINGS YOU MAY NOT KNOW ABOUT GLOVE BOXES

1. At the now deactivated Rocky Flats Plant, a United States nuclear weapons production facility near Denver, Colorado that operated from 1952 to 1992, workers used glove boxes with lead-lined gloves. The glove boxes in the plant were also huge—up to 64 feet in length in order to contain the equipment used to make the plutonium triggers the plant manufactured.
2. A fire in one of the glove boxes at Rocky Flats in 1969 produced the costliest American industrial accident of the time. It took 600 workers two years to finish cleanup of the site, however, enhanced safety features were introduced as a result of the incident.
3. Adam Savage from the popular TV show —Mythbusters— recently constructed a custom glove box for a friend's birthday to simulate how an astronaut's glove functions in the vacuum of space. The box showed just how tough it is to complete even simple tasks in space. (http://www.tested.com/art/makers/459939-inside-adam-savages-cave-space-glove-vacuum-chamber/)

TOP 5 QUESTIONS YOU SHOULD ASK WHEN BUYING A GLOVE BOX

1. What applications are you using the glove box for?
2. Are the incubation and processing separated in order to prevent contamination?
3. How much will the glove box cost to acquire and maintain? Are warranties offered?
4. What are your future needs?
5. What sort of safety features does the glove box have?

RECENTLY RELEASED GLOVE BOXES

ECO MODE OPTION FOR 2014 GLOVE BOX MODELS

- Available on all MBRAUN glove box systems for 2014
- ECO Mode has been designed to use less energy and operate more efficiently, saving labs valuable time and money
- Designed to reduce noise emission and reduce overall power consumption up to 90%
- An optional feature for all MBRAUN glove box models

MBRAUN
www.mbraun.com

BACTRONEZ ECONOMY ANAEROBIC CHAMBER

- Features a 13.7 cu.ft. workspace and a 300 plate capacity incubator
- Boasts airtight construction of stainless steel and rigid Plexiglas, for unobstructed vision and integrity
- Patented cuffs form a comfortable seal around the operator's arms permitting bare hand manipulation of plates and specimens inside the working chamber, making work more comfortable and efficient

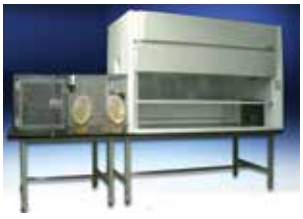
Sheldon Manufacturing
www.shellab.com

PROTECTOR® STAINLESS STEEL FILTERED GLOVE BOX

- Now included on the on the NanoSafe Tested™ registry
- In the ASHRAE 110 test, the glove box proved to contain aerosolized silicon dioxide particles no larger than 26nm effectively, greater than 99.99% on a particle number basis
- Designed for use in controlled atmospheres (dry boxes) or for use with hazardous materials
- Series includes controlled atmosphere, multi-hazard, and double glove boxes

LABCONCO
www.labconco.com

SE UNIFLOW GLOVE BOX FUME HOODS



- Can accommodate the loading of materials through either the right or left side of the hood by means of sealed access doors
- Material can be transferred from fume hood to glove box for proper handling and inspection of hazardous materials
- Accessories include work surfaces, tables, work benches with adjustable height and locking casters

HEMCO
www.hemcocorp.com

GLOVE BOX MANUFACTURERS

Air Science USA	www.airscience.com
Banthrax	www.banthrax.com
Coy Labs	www.coylab.com
Erlab	www.erlab.com
Germfree	www.germfree.com
HEMCO	www.hemcocorp.com
Innovative Technology	www.gloveboxes.com
Labconco	www.labconco.com
mBraun	www.mbraunusa.com
NuAire	www.nuaire.com
Plas-Labs	www.Plas-Labs.com
SHEL LAB	www.shellab.com

HOMOGENIZERS

TOP 4 THINGS YOU MAY NOT KNOW ABOUT HOMOGENIZERS

1. New applications are being developed for the high-speed, high-performance class of bead beaters that use beads to impact the sample, including things like mixing suspensions, lotions, pastes, and dry-grinding solid materials.
2. For the mechanical approach, homogenization relies on a motor and a mixer called the generator probe. According to one expert, there were 316 stainless-steel probes that could be more easily cleaned or taken apart. After that came disposable plastic probes and then packs of reusable stainless-steel probes.
3. Higher throughput is a recent trend in homogenizers.
4. Another recent development is the use of single-use systems as sample sizes become increasingly smaller and volumes of processing samples increase. Single-use systems serve as an efficient solution for busy labs—reducing risks of cross-contamination and saving time by eliminating the need for sample storage transfers and cleaning.

Homogenizers come in two main categories. Lab-size homogenizers handle small volumes, from the microliter scale to several liters. Process homogenizers—for large-scale manufacturing—handle volumes of 50 or more liters. Within those categories, the kinds of homogenizers seem nearly as broad as the range of manufacturers. For example, some homogenizers use sonication to break up tissue and others use mechanical mechanisms. Users can also equip the same homogenizer with a range of rotor-stator elements, including ones made specifically for the homogenization of soft or more fibrous tissue.

TOP 6 QUESTIONS YOU SHOULD ASK WHEN BUYING A HOMOGENIZER

1. How does the homogenizer differ from the competition? What makes it superior in quality and cost effective for the scientist?
2. What accessories are necessary to run the unit? Are there pre-assembled bead kits to use that will simplify the homogenization process?
3. Does the company offer demo units for the scientist to test out?
4. Does the company offer application and technical phone support before/after the product purchase?
5. Ask about replacements in case the product parts break down with use.
6. Finally, ask about cost of the purchase, installation charges, and warranty extension costs.

RECENTLY RELEASED HOMOGENIZERS

T 65 BASIC ULTRA-TURRAX® DISPERSER

- Provides powerful dispersing for volumes from 2 - 50 l (H20) for typical pilot plant stations
- Available in digital version
- A fixed speed of 7200 rpm enables users to work at a high circumferential speed even with small rotor diameters
- Features three rotor-stator configurations
- Gives users reproducible operations due to constant speed even with changes in viscosities

IKA
www.ika.com

DIGITAL BENCHTOP HOMOGENIZERS

- Can homogenize, emulsify, blend and/or mix
- Two models available:576 W 300DS series for volumes from .03ml to 5L and the 1305 W 400DS series for volumes from .03ml to 30L
- Feature a motorized PRO TRAC stand and 3-Turn speed knob to adjust RPM in the hundreds
- Also include a bright LED display and user-friendly controls

PRO Scientific
www.proscientific.com

BEAD RUPTOR

- Combines maximum power with a broad array of processing accessories
- Quickly grinds, lyses, and homogenizes biological samples with high processing power
- Provides an efficient, consistent, high-yield and quality homogenization usually in less than 40 seconds
- Can simultaneously homogenize multiple samples in either 2mL, 7mL, 35mL or 96-stripwell tubes

Omni International
www.omni-inc.com

BULLET BLENDER STORM

- Breaks down 24 tissue samples simultaneously within minutes
- Comes standard with built-in Air Cooling™ Technology to keep samples cool during powerful homogenization
- Simple user interface and two settings—time and speed—allow scientists to multitask homogenizing soft cell types
- Prevents sample to sample cross contamination
- Comes with 2-year warranty; manufactured in the USA

MIDSCI
www.midsci.com

HOMOGENIZER MANUFACTURERS

Branson Ultrasonics	www.bransonultrasonics.com
Glas-Col	www.glas-col.com
Hielscher Ultrasonics	www.hielscher.com
IKA	www.ika.com
KINEMATICA	www.kinematica.ch/en.html
Microfluidics	www.microfluidicscorp.com
MIDSCI	www.midsci.com
MP Biomedical	www.mpbio.com
Omni International	www.omni-inc.com
Precellys	www.precellys.com
PRO Scientific	www.proscientific.com
QIAGEN	www.qiagen.com
Qsonica	www.sonicator.com
Sartorius BBI Systems	www.sartorius.com
Sonics & Materials	www.sonics.com

HPLC COLUMNS

TOP 5 THINGS YOU MAY NOT KNOW ABOUT HPLC COLUMNS

1. The first chromatography column was developed by the Russian botanist Mikhail Tsvet who, in 1901, washed an organic solution of plant pigments through a vertical glass column packed with an adsorptive material. He discovered that the pigments separated into a series of discrete colored bands on the column, divided by regions entirely free of color.
2. Column chromatography was popularized during the 1930s when the chemists Richard Kuhn and Edgar Lederer successfully used the technique to separate a number of biologically important materials.
3. In 1938, Harold C. Urey and T. I. Taylor developed the first ion exchange chromatography column based on a zeolite stationary phase. This technique allowed, for the first time, the separation of particles based on their charge.
4. In 1941, the concept of using water as a stationary liquid supported on inert silica in conjunction with a mobile chloroform phase was developed by two British chemists, Archer Martin and Richard Synge. Their design enabled the solute molecules to be partitioned between the stationary liquid and the mobile liquid phases, improving separation. Martin and Synge were instrumental in the development of increasingly sophisticated chromatographic techniques during the 1940s and 1950s.
5. In 1942, ion-exchange column chromatography was used to great effect during the Manhattan Project to separate elements such as uranium fission products produced by thermonuclear explosions.

TOP 7 QUESTIONS YOU SHOULD ASK WHEN BUYING HPLC COLUMNS

1. Based on your analyte(s), matrix, separation goals, and instrumentation, what column does the vendor recommend?
2. What benefits does this column offer over your current column? Performance? Lifetime? Reproducibility?
3. How should you clean/prepare your sample prior to injection on the column?
4. How do you care for the column? Conditioning, cleaning, storage, etc.
5. What type of chromatographic media (fully porous, monolithic, core-shell) is going to provide the most benefit for your separation?
6. Do you need a unique selectivity (HILIC, polar-end capped, etc.) to separate any very polar and/or non-polar components in your mixture?
7. What column dimension is going to be most suitable for your loading requirement?

SHIMADZU
Excellence in Science

LC Systems

i-Series

A New Industry-Standard Integrated HPLC

innovative — Realization of Advanced Laboratory

- ICM (Interactive Communication Mode) means you can start an analysis directly from the instrument's touch screen immediately after loading samples
  - Remote monitoring using smart devices means you are never out-of-touch with your analysis progress
  - Optional video camera provides easy needle alignment verification

intuitive — Achieving Easier Operation

- Unified graphical user interface between system and workstation
- Color touch screen panel with intuitive software design
- Easy-to-see status indicator for quick determination of Ready, Pre-treatment, Run, and Error

intelligent — Smart Features Increase Work Efficiency and Reduce Cost of Ownership

- Easily migrate existing methods from either Shimadzu or non-Shimadzu systems
- Automatic ECO mode after non-user interaction reduces power consumption

Learn more about Shimadzu's i-Series.
Call (800) 477-1227 or visit us online at
www.ssi.shimadzu.com/iseries

Order consumables and accessories on-line at http://store.shimadzu.com
Shimadzu Scientific Instruments Inc., 7102 Riverwood Dr., Columbia, MD 21046, USA

RECENTLY RELEASED HPLC COLUMNS

CORTECS 2.7 MICRON HPLC COLUMNS

- Designed for analytical scientists who need to maximize performance on their existing LC systems
- Run at lower pressures while delivering high efficiencies
- Give the scientist the flexibility to use longer column lengths to improve resolution or higher flow rates to speed instrument analysis times and increase throughput
- Available in C18+, C18, and HILIC chemistries

Waters
www.waters.com

GLYCANPAC AXR-1 HPLC/UHPLC COLUMNS FOR GLYCAN ANALYSIS

- Offers extremely high-resolution separations based on charge, isomerism, and size
- Designed to facilitate both high resolution glycan profile characterization and quantification
- Help users achieve greater resolution of glycans using HPLC, providing easier profile characterization
- Also designed for excellent resolution of labeled and unlabeled glycans, and are compatible with fluorescence and mass spectrometry detection methods

Thermo Fisher Scientific
www.thermoscientific.com

KINETEX CORE-SHELL BIPHENYL HPLC/UHPLC COLUMNS

- Give researchers excellent orthogonal selectivity to traditional C18 phases
- Suited for a broad range of complex-mixture analyses in clinical research and forensic toxicology, food and environmental testing, and pharmaceutical, bioanalytical, and DMPK studies
- Deliver all the benefits inherent with Phenomenex's Core-Shell technology including better resolution, higher efficiency, sharper peaks, and greater sensitivity than traditional HPLC/UHPLC media

Phenomenex
www.phenomenex.com

CAPCELL CORE HPLC COLUMNS

- Provide improved analysis of vitamins such as K_3, K_2, D_2, D_3, E, K_1—saving up to 60% of analysis time for higher efficiency
- Allow chromatographers to see increased resolution similar to sub 2 μm porous particles but with considerably lower back pressure
- Allow users to achieve high column resolutions with short analysis times when using conventional HPLC

Shiseido
hplc.shiseido.co.jp/e/

HPLC COLUMNS MANUFACTURERS

Advanced Chromatography Technologies	www.ace-hplc.com
Agela Technologies	www.agela.com
Agilent	www.agilent.com
Applied Biosystems	www.appliedbiosystems.com
Beckman Coulter	www.beckmancoulter.com
Bio-Rad	www.bio-rad.com
Biotage	www.biotage.com
ChiralTech	www.chiraltech.com
Dynamax	www.dynamaxcorp.com
Eksigent	www.eksigent.com
ES Industries	www.esind.com
Grace Discovery Sciences	www.discoverysciences.com
Hamilton	www.hamiltoncompany.com
Imtakt	www.imtaktusa.com
J & K Scientific	www.jkscientific.com
Life Technologies	www.lifetechnologies.com
MAC-MOD	www.mac-mod.com
Peeke Scientific	www.peekescientific.com
PerkinElmer	www.perkinelmer.com
Phenomenex	www.phenomenex.com
Restek	www.restek.com
Shiseido	hplc.shiseido.co.jp/e/
Shodex	www.shodex.com
Sigma-Aldrich	www.sigmaaldrich.com
SiliCycle	www.silicycle.com
Thermo Fisher Scientific	www.thermoscientific.com
Valco	www.vici.com
Waters	www.waters.com
Zirchrom	www.zirchrom.com
Tosoh Bioscience	www.tosohbioscience.com

INFORMATICS
CHROMATOGRAPHY DATA SYSTEMS, ELNS, & LIMS

TOP 4 THINGS YOU MAY NOT KNOW ABOUT LAB INFORMATICS SYSTEMS

1. Labs gained the first opportunity to use automated reporting tools when the first generation of LIMS was introduced in 1982.
2. Second-generation commercial LIMS released in 1988 expanded LIMS into more application-specific fields and the third generation in 1990 used the emerging client/server architecture to give labs better exchanges and data processing.
3. LIMS went global in 1996 as web-enabled versions hit the market, letting scientists manage their operations beyond their labs.
4. The first generation of ELNs came out in the late 1990s and was designed for basic data capture. A second generation offered specific domain functionality such as searchable reaction databases, automated stoichiometry calculations and reaction planning for chemists, and the third generation of ELNs expanded this chemistry functionality and provided generic capabilities that extended ELNs' reach to other disciplines, including biology.

TOP 6 QUESTIONS YOU SHOULD ASK WHEN BUYING A LAB INFORMATICS SYSTEM

1. How local are resources and how available are resources for deployment, training and extensions? What is the timeline for availability and cost?
2. How easy is it to extend the application? Does it require IT or super users? How long does training take to make modifications and how extensive is the API for modifications?
3. What are the key elements you need to have from the data system?
4. What differentiates the vendor's software from others offered, in terms of chromatography data handling, customization and powerful analysis?
5. Why does your organization need a LIMS, ELN, or CDS? You and your staff should come up with a cost-benefit list to help you decide if such a system is worth investing in.
6. What are your current user requirements and how do you expect those to change five to ten years down the road? Make a list. If you expect your needs to change, a flexible informatics system is likely a good choice. Requirements can include labeling, sample registration, etc.

RECENTLY RELEASED INFORMATICS SOFTWARE

TITAN® LAB AUTOMATION & BUSINESS MANAGEMENT PLATFORM

- Configurable, C# (.NET) based solution is adaptable and capable of meeting organizations' specific needs
- Especially suited for organizations comprised of various departments that perform routine testing, or varying and sophisticated workflows
- Leverages workflows to allow users to manage laboratory tasks, track samples, change sample states, trigger alerts, and query any data in the system for presentation in dashboards and reports

Accelerated Technology Laboratories
www.atlab.com

NUGENESIS LAB MANAGEMENT SYSTEM

- Enables deeper insight into scientific challenges, accelerated decision-making, better business results, and compliance with government regulations
- Allows users to set up and run specific point solutions independently, allowing them to achieve productivity gains shortly after the project begins
- Features NuGenesis SampleShare, NuGenesis Stability, NuGenesis Connectors, and Paradigm™ Scientific Search

Waters
www.waters.com

ELEMENTS ACADEMIC RESEARCH PLATFORM

- Provides a cost-efficient solution for safe, secure record-keeping that eliminates the need for investment in digital infrastructure
- Delivers an application framework for deep scientific support through modular apps that can be combined into sophisticated scientific experiments
- Being 100-percent cloud-based also allows users to be up and running in minutes without the need for lengthy deployment and installation steps

PerkinElmer
www.perkinelmer.com

E-WORKBOOK 9.4 ELN

- Single platform solution delivers a flexible suite of applications for data and sample management, analysis, reporting and IP retention
- Speeds up data capture and improves compliance by using template libraries that provide workflow control
- Reduces change management costs by supporting existing documents and templates
- Pushes content in real time to configurable dashboards

IDBS
www.idbs.com

LAB INFORMATICS PROVIDERS

Accelerated Technology Laboratories	www.atlab.com
AJ Blomesystem	www.blomesystem.com
Ambidata	www.ambidata.pt
Arxspan	www.arxspan.com
AgileBio	www.agilebio.com
Agilent	www.agilent.com
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Axiope	www.axiope.com
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FDA 21 CFR Parts 11, 21, 58, 210, 211, 820
cGLP/cGMP (Good Laboratory Practice and Good Manufacturing Practice)
Section 508 Accessibility Guidelines
HIPAA Accountability Act of 1996
HIPAA Patient Safety and Quality Improvement Act of 2005 (Patient Safety Act)

Compatibility:

- PC/MAC
- Tablet
- Smartphone
- Web-based

LAB INFORMATICS PROVIDERS

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BIOVIA/Accelrys	www.accelrys.com
Bruker	www.bruker.com
ChemWare	www.chemware.com
Computing Solutions	www.labsoftlims.com
DataApex	www.dataapex.com
GenoLogics Life Sciences Software	www.genologics.com
H&A Scientific	www.hascientific.com
Hach	www.hach.com
Hitachi High Technologies	www.hitachi-hta.com
IDBS	www.idbs.com
Information Management Services (IMS)	www.imsweb.com
iPad ELN	www.ipadeln.com
Jasco	www.jascoinc.com
KineMatik	www.kinematik.com
LabArchives	www.labarchives.com
LabLite	www.lablite.com
LabLogic Systems	www.lablogic.com
LABLynx	www.lablynx.com
LabVantage	www.labvantage.com
LabWare	www.labware.com
Micronic	www.micronic.com
Modul-Bio	www.modul-bio.com
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Promium	www.promium.com
Ruro	www.ruro.com
ReTiSoft	www.retisoft.ca
Sapio Sciences	www.sapiosciences.com
Shimadzu	www.ssi.shimadzu.com
SRI Instruments	www.srigc.com
STARLIMS	www.starlims.com
Systat Software	www.systat.com
Thermo Fisher Scientific	www.thermoscientific.com
Two Fold Software	www.twofold-software.com
Waters	www.waters.com

LAB FURNITURE

TOP 5 THINGS YOU MAY NOT KNOW ABOUT LAB FURNITURE

1. The most significant trend in modern lab furniture is the move away from fixed casework and lab benches toward modular benches, tables, and worktops.
2. In the past, a laboratory might have been re-tasked once every 30 years, if ever, according to one expert. Then the time frame shortened to every five years. Recently, manufacturers have been seeing some labs whose missions change more than once a year and a good number of construction projects where the lab's anticipated use changes before the furniture arrives
3. Reducing costs when establishing a new lab or redesigning an old facility is another significant issue in the lab furniture world.
4. Lab designers have moved to less expensive furniture materials, away from epoxy to phenolic materials for benchtops. Phenolics are two-thirds the cost and two-thirds the weight of epoxy but retain 80 percent of epoxy's chemical stability.
5. The drivers behind lab retasking are changing workflows, the need for layout flexibility, and the changing nature of laboratory science. Thanks to advances in instrumentation and knowledge, scientific projects that several decades ago took years are now completed in a few weeks. Instrumentation has become more compact as well.

TOP 7 QUESTIONS TO ASK WHEN BUYING LAB FURNITURE

1. How often will your lab be reconfigured?
2. Do your work surfaces need to be height adjustable?
3. What weight capacity does your system need to support?
4. What are your storage requirements?
5. What processes are you doing in the lab?
6. How will the mechanical services be connected to the system?
7. Will form or function be the priority in design?

LAB FURNITURE MANUFACTURERS

BEVCO	www.bevco.com
BioFit	www.biofit.com
Clean Air Products	www.cleanairproducts.com
Hamilton Scientific	www.hamiltonscientific.com
Hatfield Laboratory Furniture	www.hatfieldlabfurniture.com
HEMCO	www.hemcocorp.com
IAC Industries	www.furnitureforlabs.com
Kewaunee Scientific	www.kewaunee.com
Lista International	www.listaintl.com
Mott	www.mott.ca
Pro-Line	www.1proline.com
RDM Industrial	www.rdm-ind.com
Salesmaker Carts	www.salesmakercarts.com
Sovella USA	www.sovella.us
Terra Universal	www.terrauniversal.com
Unilab	www.unilabfurniture.com

RECENTLY RELEASED LAB FURNITURE

RESOLUTION UPRIGHT SYSTEM

- Provides easy accessibility to power, gas or data ports
- Easily connects to overhead service carriers
- Allows accessory attachment to all sides of upright
- Chase size provides ample space for utilities without wasting table top space
- Makes utility management easy

Sovella USA
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TECH DRAWER PULL

- Available in three attractive finishes and are rugged, easy to clean, and dependable
- Has been carefully designed to stand up to even the roughest working environments
- Improves safety and appearance by eliminating protruding edges which could snag on clothing
- A secure fit to the drawer front ensures that the handles remain firmly in place

Lista
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PANORAMA CONFIGURABLE LABORATORY CASEWORK PLATFORM

- Available in wall, peninsula, island and table selections with the option of inset and overlay drawer and door combinations, wood or steel fronts and fixed, suspended or mobile configurations
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Hamilton Scientific
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- Uniline Casework Groupings are designed to incorporate HEMCO's most popular casework styles in a complete package
- Services can also include a complete turnkey installation

HEMCO
www.hemcocorp.com

TOP 3 THINGS YOU MAY NOT KNOW ABOUT LABORATORY SAFETY

1 In 2010, at Texas Tech University, two graduate students were conducting research for the Department of Homeland Security on explosive compounds. They were given the task of synthesizing and testing a new compound, a nickel hydrazine perchlorate (NHP) derivative. Though the compound was initially made in batches of 300 milligrams, the two students decided to scale up the production to 10 grams to make one batch of material for all their testing. That error led to the material exploding as the lead graduate student attempted to break up the clumps. The student lost three fingers of his left hand, had his eye perforated, and sustained cuts and burns on the rest of his body

2 In another 2010 incident, a valve for the hydrogen cylinder was inadvertently left open during an experiment at a biochemistry lab at the University of Missouri. Hydrogen introduced into the chamber reached an explosive level and was ignited by a source in the chamber, according to investigators. Four researchers were injured, and the lab was destroyed. Luckily, none of the injuries in this incident were serious. One student who was admitted to the hospital was released the following day after treatment for burns. The lab was a total loss, but the building's sprinkler system put out the resulting fire, limiting damage to adjacent areas.

3 A widely publicized accident that occurred in December 2008 at the University of California, Los Angeles involved a research associate who was planning to scale up a reaction using tert-butyllithium (t-BuLi), a pyrophoric material. For reasons unknown, the research associate was using a plastic syringe with a two-inch needle, requiring tipping the reagent bottle up in order to fill the syringe. In addition, she was wearing only nitrile gloves, safety glasses, and street clothes, including a synthetic sweater. No lab coat was used. The syringe and plunger separated during the first attempt at filling the syringe, and the t-BuLi and pentane spilled on her hands and sweater, immediately bursting into flames. She later died in hospital due to the burns she sustained.

LAB WASHERS

TOP 3 THINGS YOU MAY NOT KNOW ABOUT LAB WASHERS

1. In 1901, Miele began production of the first tub washing machine and began manufacturing the first electrically powered dishwashers in 1929, though it was a number of years before the first lab-specific machines came on the scene.
2. In Toulouse, France, LANCER Industrie SA was founded in 1970 as the first company to primarily manufacture laboratory glassware washers.
3. The first lab glassware washer with integrated drying and a thermal disinfecting cycle was the LS-76, built by the manufacturer HAMO, which was later acquired by Steris. This model became the first lab-specific washer to include a microcomputer control system when it was upgraded in 1985. That feature enabled the control of cycle lengths, temperature and uptake of cleaning chemicals.

TOP 6 QUESTIONS YOU SHOULD ASK WHEN BUYING A LAB WASHER

1. How is the product manufactured? Ask about the quality of the materials used and the product life expectation based on manufacturing testing. Also find out about the product's warranty.
2. What differentiates the lab washer from others offered in terms of performance?
3. Does the company offer application support and technical phone support before and after product installation?
4. How sustainable is the product? Ask the company to provide details on energy and water consumption as well as the recycle ability of the product.
5. If the product is discontinued, for how many years does the company provide accessories and parts for the washer?
6. Finally, ask about the cost of the purchase—not just the price of the product being installed but the total cost of ownership, which includes price, service expectations, warranty, etc.

RECENTLY RELEASED LAB WASHERS

FLASKSCRUBBER® AND STEAMSCRUBBER® 33

- Come in a new overall height of 33 inches rather than the standard 34.1 — 36.1 inches, to accommodate lower countertops in the laboratory
- SteamScrubbers have top and bottom racks that accommodate accessory inserts for a wide variety of glassware shapes and sizes
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- PG 8535: Handles 37 narrow necked flasks, 96 pipettes, 1600 test tubes
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Miele
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1400 LXP

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- Includes microprocessor with 40 user defined programs and jet racks interchangeable between all levels
- Ergonomic loading height and top-loading chemical storage compartment
- Achieves life cycle cost savings through water conservation, lower chemical and power usage

LANCER
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RELIANCE 100 SERIES

- Includes three different models
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- Reliance 100LS: Designed to clean and dry narrow neck glassware such as volumetric and Erlenmeyer flasks and pipettes
- Reliance 100XLS: Designed for cleaning and drying of narrow neck glassware in contamination sensitive or critical applications

STERIS
www.steris.com

LAB WASHER MANUFACTURERS

Getinge	www.getingeusa.com
Labconco	www.labconco.com
LANCER	www.lancer.com
Miele	www.labwashers.com
Scientek	www.scientek.net
SP Scientific	www.spscientific.com
SteelCo	www.steelco-usa.com
STERIS	www.steris.com
Thermo Fisher Scientific	www.thermoscientific.com

LC SYSTEMS

TOP 5 THINGS YOU MAY NOT KNOW ABOUT LC SYSTEMS

1. The Russian botanist Mikhail Tsvet is considered to have 'invented' the chromatographic technique in 1903 when he reported separations of different plant pigments into a series of colored bands on a packed column. He called this technique 'chromatography.'
2. In the 1940s, Martin and Synge developed the theory of partition chromatography and used mathematics to describe the separation process resulting from the use of a liquid-coated solid phase and a moving liquid phase.
3. The technique of paper chromatography was developed by Consden, Gordon and Martin in 1944. This technique was originally used for the identification of amino acids.
4. J.C. Moore of the Dow Chemical Company was the first to investigate the technique of gel permeation chromatography, doing so in 1964.
5. The first commercial HPLC was manufactured by Waters Corporation in 1969, and was known as the ALC100 HPLC. The company also unveiled a new category of LC technology known as Ultra Performance LC (UPLC) in 2004.

TOP 6 QUESTIONS YOU SHOULD ASK WHEN BUYING AN LC SYSTEM

1. How flexible is the system? Ask about whether the system can be optimized to meet your laboratory requirements.
2. What tubes, vessels, vials can it accommodate? Can components (such as additional detectors, valves, etc.) be upgraded in the future?
3. Is the software easy to use and operate? Can a demo version be put in place to get a feel for how the software functions for your laboratory's workflow?
4. How is the system (not just its components) qualified during installation as to meeting manufacturer performance expectations?
5. Who provides the support and service for the product? Is it the manufacturer or a third party service group? If it is a third party service group, are they factory-trained?
6. Finally, ask about cost of the purchase, installation charges, and warranty extension costs.

RECENTLY RELEASED LC SYSTEMS & ACCESSORIES

NEXERA METHOD SCOUTING SYSTEM

- Capable of automatically investigating up to 96 combinations of mobile phases, gradients and columns
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- Offers a short injection cycle time, low carryover, and best-in-class cooling performance
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Agilent
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HPLC SOLVENT RESERVOIR KITS

- Available in four sizes: 1000ml, 2L, 500 ml, and 5000 ml
- 1000 ml comes with a 1L solvent reservoir, cap and Teflon insert for 1/8″ OD tubing, 1 meter 1/8″ OD PTFE tubing and 10 μm 316 stainless steel frit
- 2L comes with 2L bottle, cap and Teflon insert for 1/8″ OD tubing, 1 meter PTFE tubing and 10μm 316 stainless steel solvent frit—visit website for more info on other sizes

JM Science
www.jmscience.com

LC SYSTEM MANUFACTURERS

Agilent	www.agilent.com
Beckman Coulter	www.beckmancoulter.com
Bio-Rad	www.bio-rad.com
Buck Scientific	www.bucksci.com
Cecil Instruments	www.cecilinstruments.com
Eksigent	www.eksigent.com
Gilson	www.gilson.com
Hitachi High Technologies	www.hitachi-hta.com
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Shimadzu	www.shimadzu.com
SSI LabAlliance	www.laballiance.com
Thermo Fisher Scientific	www.thermoscientific.com
Waters	www.waters.com

LIQUID HANDLING

TOP 5 THINGS YOU MAY NOT KNOW ABOUT LIQUID HANDLING SYSTEMS

1. Demand for automated liquid-handling systems parallels the larger automation marketplace. Generally, the need for automation is based on speed or throughput, consistency of results, and the value of a lab worker's time.
2. A current trend is that users continue to specify high-end liquid-handling systems that serve "workflow automation" needs rather than single-liquid dispensing operations.
3. Another recent development is that though full-blown robotic liquid handling systems are formidable, integrated systems with steep learning curves, that complexity is somewhat mitigated through improved interfaces.
4. The liquid handling market is now addressing users who lack the automation and coding experience demanded by larger automation systems.
5. The original, big-money driver for lab automation was high-throughput screening of drug candidates. While that market still exists, the "numbers game" has reduced from millions or hundreds of thousands of compounds to just hundreds or thousands.

TOP 6 QUESTIONS YOU SHOULD ASK WHEN BUYING A LIQUID HANDLING SYSTEM

1. What kind(s) of dispensing technology is (are) used?
2. Is the liquid handler automatable?
3. Can the liquid handler accommodate magnetic or plastic bead-based assays?
4. What is the volume range, and how many different sample vessel types may be used?
5. Ask about the software—is it integrated and user-friendly? Does it allow for pre-programmed and custom protocols?
6. What is the flow rate spectrum?

Experiencing Arm or Shoulder Fatigue When Pipetting Under a Hood?

The Ergonomic Design of the Drummond Pipet-Aid® *XL* is Proven to Reduce Neck and Upper Arm Strain

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Pipetting under a hood doesn't need to be a pain in the neck. The longer handle of the Drummond Portable Pipet-Aid® *XL* reduces the amount of arm lift required to perform the same operation as with a conventional pipettor. The ergonomic design includes an adjustable sliding hand rest and a removable stand which enables the unit to be set down without contaminating the pipet.

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BIOMEK LIQUID HANDLING SOLUTIONS

Some of the most critical factors for automated liquid handling include ease of use, standardization, flexibility, throughput and walk-away time. Beckman Coulter has been a long-time leader in meeting these requirements and setting the pace for ongoing innovation. In addition to enabling next generation sequencing, cellular analysis and proteomics research, the Biomek family of liquid handling solutions provides a complete portfolio of nucleic acid sample preparation solutions with patented Solid Phase Reversible Immobilization (SPRI) paramagnetic bead-based technology.

We offer a wide range of liquid handling systems designed to optimize the performance of the routine to most complex assays for greater productivity and confidence. Count on Biomek to simplify the handing of your most precious samples, augment throughput, streamline your workflow and deliver more precise and reproducible results.

Biomek 4000

Simple, flexible and intuitive, the Biomek 4000 features powerful yet easy-to-use software combined with ready-to-use genomic and cellular application methods designed to automate everyday laboratory processes and streamline your workflow. The Biomek 4000 is integration-friendly and easily adapts to evolving research requirements.

Biomek NXP

Rich with advanced features and a small footprint design, the Biomek NXP puts virtually every aspect of liquid handling—from basic pipetting with a Span-8 or multichannel head to device integrations including incubators and plate readers for more complete assay automation–the NXP is as powerful and flexible as it is efficient and economical.

Biomek FXP

Built with flexibility in mind, the Biomek FXp is a workhorse designed for even the busiest lab environments. With icon-driven software and a modular deck design, this workstation streamlines many of today's most demanding workflows with superior pipetting accuracy and proven throughput capabilities. Incorporate a wide variety of labware and seamlessly integrate robotic transfer systems with the FXp to meet a wide variety of demands across the spectrum of life sciences research.

Biomek Assay Workstation

This progressive assay workstation combines productivity and innovation with the flexibility and capacity needed to process assays without user intervention. The Biomek assay workstation (available in both FXP and NXP platforms) uses the power of SAMI Workstation EX scheduling software to optimize plate processing for greater productivity and confidence.

Integrated Solutions

Scientific research often requires the need for custom systems to ensure optimum outcomes. Beckman Coulter brings deep competencies to automating custom applications and can respond to virtually every need—from hardware and software accessories for your Biomek liquid handling workstation to fully integrated robotic systems.

- Detailed application workflow analysis
- Defined/documented application and system requirements
- System design and throughput analysis
- Custom product development
- Third-party product evaluation and integration
- System testing traceable to requirements
- Defined acceptance-testing procedures

Beckman Coulter Life Sciences is dedicated to empowering discovery and scientific breakthroughs. The company's global leadership and world-class service and support delivers sophisticated instrument systems, reagents and services to life science researchers in academic and commercial laboratories, enabling new discoveries in biology-based research and development. A leader in centrifugation and flow cytometry, Beckman Coulter has long been an innovator in capillary electrophoresis, particle characterization and laboratory automation, and its products are used at the forefront of important areas of investigation, including genomics and proteomics.

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BECKMAN COULTER

Life Sciences

THE PORTABLE PIPET-AID® XL REDUCES FATIGUE WHEN PIPETTING UNDER A HOOD

Researchers are often required to perform many bioassays which involve a great deal of pipetting. Much of this type of work needs to be performed under a biological safety hood which requires the user to pipet using tedious arm positions and motions. Using pipet controllers over extended periods, many people have reported nerve damage and carpal tunnel syndrome. The design of the Drummond Pipet-Aid XL was developed to alter the required pipetting motion that seemed to be causing the problem. The longer, lightweight handle enables the user to rest his or her elbow on the front edge of the hood counter and shortens the motion required to perform the same pipetting operation as with a pipet controller. The result is substantially reduced strain on the user's shoulder, arm, and hand. Drummond has received numerous testimonials from actual users reporting the benefits of the ergonomic design of the Pipet-Aid XL. Some of these testimonials can be reviewed at www.drummondsci.com/xl.

DRUMMOND SCIENTIFIC COMPANY

www.drummondsci.com

Maximizing Reproducible Biological Sample Prep

Routine pipetting tasks across a larger number of samples can often be inefficient, complex, time consuming, and expensive. These hurdles can lead to increased training requirements, preparation time, procedural errors and ultimately hold back the pace of your experiments. When preparing biological samples, you need an assistant you can trust and PIPETMAX™ is the ultimate lab assistant – focused on consistency.

Maximize qPCR assay reproducibility using PIPETMAX

Download the full application note: http://www.pipetmax.com/pcrqpcr/

PURPOSE:

- Maximize qPCR sample prep accuracy and eliminate inherent variability
- Enhance sample purity

RESULTS:

- Gene expression of CAB was greater in PVY infected plants than in healthy/mock-inoculated plant leaves
- PVY viral RNA levels increased >15-fold in 3 days demonstrating a rapid spreading of the viral infection
- No PVY expression was detected in mock-inoculated plants (no contamination)
- Enhance sample purity

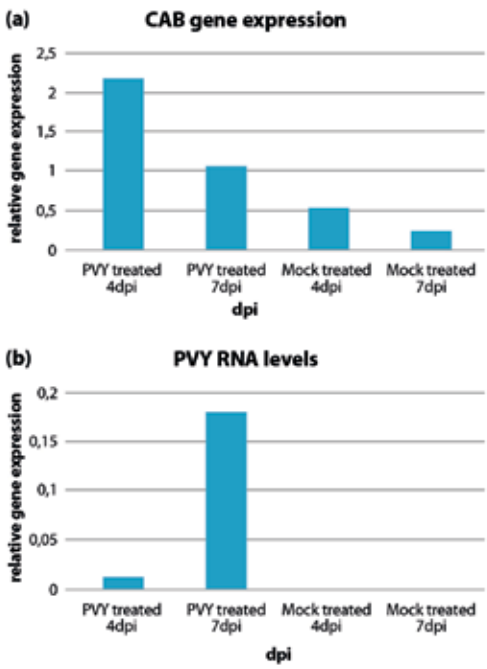
Though it's a fundamental process that enables most life science research, the pipetting operations required to setup PCR can be quite monotonous for technicians conducting the process manually. This can lead to procedural errors and inconsistencies, not to mention decreased time and energy for researchers to make valuable and intellectual contributions to their research labs.

Automating your qPCR sample preparations, and other processes, can happen right out of the box. The intuitive qPCR assistant operates directly from the PIPETMAX touchscreen interface, allowing researchers to import sample information, configure reaction proportions, set up single or multiplex assays, and even export plate files for common thermocyclers. PIPETMAX does the rest by generating pipetting protocols based on your configurations and performs them quickly and efficiently.

Once you've automated your qPCR sample preparation, you can add additional kits that allow PIPETMAX to perform other processes, such as Next Generation Sequencing, ELISA, nucleic acid cleanup and cell-based assays.

You can also add the PIPETMAX protocol builder software to create completely custom protocols and import them into PIPETMAX for solutions that are unique to your needs.

With PIPETMAX, the possibilities are endless.



▲ *Sample Analysis with qPCR (a) Expression of CAB gene normalized to COX and EF1 in infected compared to non-infected (mock-inoculated plants) (b) levels of PVY RNA in samples.*

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RECENTLY RELEASED LIQUID HANDLING SYSTEMS

LABELITE™ I.D. CAPPER™ AUTOMATED DECAPPING/CAPPING & BARCODE READING DEVICE

- Enables labs to combine decapping/capping and high-speed 2-D barcode reading in one device without any additional user interaction
- Specifically designed to eliminate sample contamination and assist with sample tracking during end-to-end automated liquid handling processing
- Can quickly process all common labware types, providing a simple solution for optimizing workflows
- Also available without barcode reading as the LabElite DeCapper

Hamilton Storage Technologies
www.hamilton-storage.com

VERSETTE AUTOMATED LIQUID HANDLER

- Features user-friendly programming, reliable performance and a choice of 96- or 384-channel pipetting heads
- Supports 96/384 plate replication, plate stamping and serial dilution procedures
- Designed to perform a variety of liquid handling tasks for a wide range of applications, including plate stamping, plate reformatting, serial dilution and many other applications in low- to high-throughput laboratories

Thermo Fisher Scientific
www.thermoscientific.com

QPREP AUTOMATED WORKSTATION

- Designed to perform multiple dilution, transfer and dispensing with 0.01 ml of accuracy in handling reagents
- Accommodates 6 standard autosampler racks with option of customized racks to hold QC standards and option of HEPA filter
- Allows user-specified methodology through integrated PC software
- Features spike sample with internal standards, performs multiple dilution, and prepares auto sampler racks

Questron Technologies
www.qtechcorp.com

PDS-100 PROGRAMMABLE DISPENSING SYSTEM

- Uses precision stepper motors to control a variety of FMI's patented valveless piston pumps
- Features a range from 500 nanoliters per dispense to 2 liters per minute continuous flow
- Accommodates all FMI pump sizes in both fixed and adjustable displacement configurations
- Front face of the enclosure has an LED readout used to display menu driven programming, as well as membrane switches

Fluid Metering
www.fmipump.com

LIQUID HANDLING SYSTEM MANUFACTURERS

3D Biomatrix	www.3DBiomatrix.com	Hudson Robotics	www.hudsoncontrol.com
Agilent	www.agilent.com	INTEGRA	www.integra-biosciences.com
Apricot Designs	www.apricotdesigns.com	Labcyte	www.labcyte.com
Aurora Biomed	www.aurorabiomed.com	Labnet International	www.labnetlink.com
Beckman Coulter	www.beckmancoulter.com	METTLER TOLEDO	www.mt.com
BioMicroLab	www.biomicrolab.com	Molecular Devices	www.moleculardevices.com
Biosero	www.bioseroinc.com	PerkinElmer	www.perkinelmer.com
Biotage	www.biotage.com	Questron Technologies	www.qtechcorp.com
BioTek Instruments	www.biotek.com	Sartorius	www.sartorius.com
BioTX Instruments	www.biotxautomation.com	Staubli	www.staubli.com
CapitalBio	www.capitalbio.com	Tecan Trading AG	www.tecan.com
CETAC	www.cetac.com	Thermo Fisher Scientific	www.thermoscientific.com
Douglas Scientific	www.douglasscientific.com	Tomtec	www.tomtec.com
Drummond Scientific	www.drummondsci.com	TriContinent Scientific	www.tricontinent.com
Eppendorf	www.eppendorfna.com	TTP LabTech	www.ttplabtech.com
Fluid Metering	www.fmipump.com	VACUUBRAND	www.vacuubrand.com
Gilson	www.gilson.com	Zinsser North America	www.zinsserna.com
Hamilton Robotics	www.hamiltonrobotics.com		

MASS SPECTROMETRY

TOP 5 THINGS YOU MAY NOT KNOW ABOUT MASS SPECTROMETRY

1. The instrument that many consider the first mass spectrometer was called a "parabola spectrograph" and was constructed in 1921 by J.J. Thompson, the renowned British physicist who had some years earlier discovered the electron.
2. It was during the 1940s that MS began to move away from its academic origins to find use in more practical applications such as nuclear isotope enrichment and the study of the composition of petroleum.
3. In 1941, John Hipple designed the first portable mass spectrometer which was marketed by Westinghouse Electric. However, this model did not seem to catch the imagination of scientists, and was not a commercial success.
4. In 1946, the first time-of-flight (TOF) mass analyzer was developed by W. Stephens of Pennsylvania. TOF MS involves acceleration of ions through an electric field of known strength, which confers the same kinetic energy to all ions of equal charge. By measuring the time taken for a particle to reach the detector, the mass/charge ratio of particles can be calculated.
5. In 1948, the first mass spectrometer to use electron ionization (EI), the MS-2, was launched by Vickers in Manchester, England. Also that year, the first ion cyclotron mass spectrometer, known as the Omegatron, was developed at the University of Minnesota.

TOP 6 QUESTIONS YOU SHOULD ASK WHEN BUYING A MASS SPECTROMETER

1. What factors come into play when determining the MS specifications you require in terms of throughput, sensitivity, robustness, software control, ease of use, and ease of maintenance?
2. What differentiates the vendor's MS from others offered, in terms of performance and how easy it would be to upgrade?
3. How do you validate the specification claims presented by the vendor?
4. Has the data processing software been designed for enhanced analytics, with lab workflow in mind and does it support critical compliance requirements?
5. What are important price points to keep in mind when selecting an MS?
6. Laboratories need fast and effective services, including an effective distribution of spare parts, instruments, service personnel and education/training. How does the company serve these needs globally?

RECENTLY RELEASED MASS SPECTROMETRY SYSTEMS

IONKEY/MS™ SYSTEM MS INTEGRATION SOLUTION

- A new approach for getting exceptional sensitivity, robustness and ease-of-use out of mass spectrometry
- Integrates UPLC separation into the source of the mass spectrometer
- Provides a simplified user experience and the power to perform multiple analyses on limited sample volumes
- Gives users the ability to analyze smaller sample sizes and features reduced solvent consumption

Waters
www.waters.com

PTR-QITOF PTR-TOFMS INSTRUMENT

- Features a quadrupole ion guide (Qi)
- Achieves a mass resolution of more than 6000 (up to 10,000 m/△m FWHM), a limit of detection well below 1 pptv (in 30 sec), and an unmatched sensitivity of more than 1500 (up to 4500 cps/ppbv)
- Uses a specially crafted high-resolution time of flight (TOF) mass spectrometer

IONICON
www.ionicon.com

TRIPLE QUAD™ 3500 SYSTEM

- Developed based on customer and industry feedback, resulting in a modernized system that delivers quantitative performance at a price point affordable by labs with limited budget or those new to mass spectrometry
- Incorporates the AB SCIEX proprietary TurboV™ Ion Source and Curtain Gas™ interface to give labs consistent data quality over long runs with minimal downtime

AB SCIEX
www.absciex.com

DART®-QS SOURCE FOR DART MS

- Provides a protective environment for Direct Analysis in Real Time (DART) mass spectrometry of a range of materials
- Allows both qualitative and quantitative results to be obtained in as little as 10 seconds per sample, providing rapid feedback, and alleviating backlogs
- Allows automated direct sample analysis of up to 12 samples with disposable QuickStrip™ Sample Cards

IonSense
www.ionsense.com

MASS SPECTROMETER MANUFACTURERS

AB Sciex	www.absciex.com
Agilent	www.agilent.com
Applied Biosystems	www.appliedbiosystems.com
Bruker	www.bruker.com
GenTech Scientific	www.gentechscientific.com
Hitachi High Technologies	www.hitachi-hta.com
IONICON	www.ionicon.com
JEOL	www.jeol.com
LECO	www.leco.com
PerkinElmer	www.perkinelmer.com
Shimadzu	www.shimadzu.com
Thermo Fisher Scientific	www.thermoscientific.com
Waters	www.waters.com

MICROPLATE HANDLERS & READERS

TOP 4 THINGS YOU MAY NOT KNOW ABOUT MICROPLATE TECHNOLOGY

1. In 1951, Dr. Gyula Takátsy created the first microplate by constructing 6 rows of 12 wells into a block of acrylic, which were used in place of test tubes. During the same timeframe, Dr. Takátsy also developed the first form of a microplate automation tool, a loop that mixed and transferred a pre-defined volume from one well to another. This was used in serial dilution testing.

2. While working at NIH (National Institutes of Health) Dr. John Sever saw the need to mechanize the loop system being used for serial dilution in order to keep up with the demands of the Rubella vaccine program being launched by NIH. He teamed up with Cooke Engineering to begin manufacturing a more automated loop system. With the help of Frank Cooke, they introduced the first manufactured screw machines loops and droppers called the Microtiter®. Lab technicians held between 8 and 12 loops in their hands while twirling them and moving them from row to row in a plate. While this was still a manual process, it provided a vast improvement in throughput and accuracy.

3. Perhaps one of the most common applications for microplates started to take form when the Centers for Disease Control (CDC) in London began using microplates for ELISA (Enzyme-Linked Immunosorbent Assay) diagnostics and quality control techniques in 1974.

4. One of the most important evolutions of the microplate was led by the SBS (Society for Bimolecular Screening) and a key group of manufacturers who set out to establish standards that all microplates would meet going forward. The standardization in 1998 led to an increased ability to develop automation equipment to move, sort and wash plates in future instruments. All microplate manufacturers at this time modified their production equipment to the exact specifications of the new microplate standards.

TOP 6 QUESTIONS YOU SHOULD ASK WHEN BUYING A MICROPLATE HANDLER

1. How many plates and plate types can the handler accommodate? An ANSI-compatible handler provides increased flexibility for those using multiple plate densities (ex. 96-, 384-, 1536-well) or low-volume plates, and interchangeable plate stacks accommodate varying throughput requirements.

2. What is the transfer speed? Transfer speed is especially important for increased throughput. Adding a dual plate carrier keeps two plates in process, thus further increasing assay efficiency.

3. Can the handler operate in portrait and landscape configurations? A rotational gripper option optimizes positioning of the microplate handler with its mating instrument, thus improving flexibility and efficient operation.

Continues on page...

A COMBINED METHOD FOR QUANTITATIVE AND QUALITATIVE CELL-BASED RESEARCH

Biochemical and cell based assays using a microplate reader provide quantitative data on ex vivo cell behavior, while viewing cells with a microscope allows researchers to see cellular and intra-cellular processes via fixed cells or with live cell imaging. Both methods are equally important to life science research and the drug discovery process. Together, these methods provide valuable, content rich data that otherwise requires the expense of multiple instrumentation. The Cytation™3 Cell Imaging Multi-Mode Reader from BioTek Instruments, Inc., combines both methods in one compact, affordable instrument. With this unique combination, BioTek brings microplate detection analysis and automated digital microscopy to researchers without the need for separate, expensive and complex imaging systems. Additionally, cells may be grown directly in Cytation3 to reduce environmental variation due to manual intervention. Now, researchers can culture cells and subsequently glean almost simultaneous quantitative and qualitative data. Cytation3's combination of technologies also helps to streamline cell biology research for improved lab efficiency and increased throughput.

Cytation3 is modular, so labs can select only the modes that they need, and can upgrade at any time as their needs evolve. Microplates from 6 to 384 wells, and microscope slides may be used, for a variety of throughput needs. Optional dual reagent dispensers may be used for inject-and-read assays, and the optional BioStack3™ Microplate Stacker has a plate transfer time of about 8 seconds per microplate, for increased throughput and walk-away automation of up to 50 microplates.

CELL-BASED ASSAYS

Patented Hybrid Technology™, incorporated in Cytation3 or available as an upgradeable option, combines filter- and monochromator-based fluorescence optics in one compact unit for power and flexibility in assay choice. The filter optics use direct, fiber-free light paths to maximize light delivery to the sample and detector, and dedicated filter optics are optimized for live cell assays. Monochromator optics use quadruple diffraction gratings to concentrate and purify the selected wavelength, thus optimizing spectral discrimination. User-selectable monochromator optics also allow for wavelength scanning and kinetic measurements. Multiple parallel detectors decrease measuring time, and both optical systems may be read from the top or bottom of a microplate for increased assay versatility.

CELL MICROSCOPY

Cytation3 automates cell microscopy throughput compared to manual fluorescence microscopy, and also allows simple assay validation before moving to high-content screening. An inverted fluorescence microscope with brightfield capability and autofocus is integrated in Cytation3 or available as an upgradeable option. Fluorescence microscopy and color switching are available through red (Texas red), green (GFP) and blue (DAPI) LED filter cubes, and brightfield images are taken with a simple white light. Additionally, 2.5x and 4x objectives allow researchers to view and read entire microplate wells, while 10x and 20x objectives allow viewing and reading of intracellular details.

CELL PROPAGATION

Cytation3 offers uniform temperature control up to 45°C across the culture chamber, and variable orbital shaking to keep cells in suspension, even during long experiments. An optional gas control module regulates CO2 and O2 concentrations for optimal physiological conditions and pH buffering. Adding these environmental variables directly to the reading and imaging chamber reduces cell culture exposure to unregulated lab atmospheres and fluctuating temperatures that may adversely impact results.

The combination of multi-detection reading and microscopy, along with integrated cell incubation, allows for endpoint, time-lapse and montage information to simplify research and assay development, and increase throughput in cell biology research.

BioTek®
Get a Better Reaction.
www.biotek.com

EPOCH 2
microplate reader

Touch. Run. Done.

Epoch™ 2 | Discover the power. Love the price.

No tiny screen and limited onboard UV-Vis protocols here! Epoch 2 provides a 10" color touch screen, full-featured Gen5™ Data Analysis Software and precision optics at a smart price. This new workstation is ideal for reading microplates, cuvettes, BioCells and micro-volumes. Easily view data, and export via WiFi, Bluetooth or flash drive. Epoch 2 keeps it simple. **Visit www.biotek.com/epoch2**

- Nucleic acid and protein quantification
- Spectral scanning
- Cell proliferation
- ELISA

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BioTek®

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TECAN'S INFINITE® 200 PRO MICROPLATE READER WITH GAS CONTROL MODULE (GCM™) OFFERS PRECISE, INDEPENDENT REGULATION OF OXYGEN AND CARBON DIOXIDE

Tecan has combined its powerful Infinite 200 PRO reader with the patent pending Gas Control Module (GCM), offering a comprehensive solution for a wide range of cell-based applications. The combination of the GCM and the Infinite 200 PRO creates the first multimode reader offering simultaneous, independent control of CO2 and O2 concentrations, providing consistent physiological conditions for predictable culture growth.

The Infinite 200 PRO is a user-friendly, affordable multimode reader available with a choice of Quad4 Monochromators™- or filter-based technologies, offering excellent sensitivity, multiplexing capabilities and high format flexibility, including 6- to 384-well microplates, PCR plates, cuvettes and Tecan's patented NanoQuant Plate™ for sample volumes as low as 2 µl. With advanced optics and high performance detectors, optimized for the requirements of fluorescence, luminescence and absorbance reading, this easy-to-use modular instrument offers outstanding sensitivity and unparalleled performance in a wide range of detection modes, including fluorescence intensity (FI) top and bottom reading, FRET, TR-FRET, TRF, fluorescence polarization, flash and glow luminescence, dual-color luminescence (including BRET1™ and BRET2 applications), absorbance, and AlphaScreen® and AlphaLISA® technology.

The Infinite M200 PRO's enhanced FI bottom reading with Optimal Read (OR) function and temperature-controlled linear and orbital shaking offer superior performance for enhanced enzymatic, bacterial and cell-based measurements. Condensation in lidded assay plates is avoided by top heating, and the excellent intra- and inter-well reproducibility provides increased sensitivity for adherent cells. Automated z-focusing with background correction offers automatic optimization of the signal-to-noise ratio, which is ideal for cell-based applications using autofluorescent growth media.

The innovative GCM ensures rigorous environmental control within the detection chamber, with simultaneous, independent control of CO2 and O2 to help maintain stable culture conditions during prolonged experiments, extending the experimental window while ensuring consistent and biologically relevant data. It also allows assays to be performed under anaerobic or physiological conditions, enabling oxygen levels to be reduced to <1% for applications such as hypoxia-induced factor (HIF) analysis. The unique altitude correction, plus acoustic and visible warnings that alert the user in the event of a problem guarantee precise and stable regulation of gas concentration inside the reader chamber.

For increased walkaway times and secure overnight operation, the Infinite 200 PRO reader with GCM can be remotely monitored by Tecan's Common Notification System (CNS) through any networked computer or mobile device. This true walkaway operation eliminates the gaps in data that potentially occur during overnight experiments or studies carried out over an extended period of time, minimizing the number of repeat assays for improved productivity and even more cost-effective operation.

For more information please contact

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Tel +41 (0)44 922 81 11,
Fax +41 (0)44 922 81 12
www.tecan.com

TECAN.

www.tecan.com

4 Does the handler fit into a hood or biosafety cabinet? Placing a microplate handler within a hood or biosafety cabinet allows users to maintain personal safety and protect samples.

5 Is the handler compatible with a wide variety of other instruments?

6 Does it come with a barcode reader for easy microplate identification? Barcode scanning is especially useful for increased throughput.

Visit www.labmanager.com/reader-questions to get a list of questions you should ask when buying a microplate reader.

RECENTLY RELEASED MICROPLATE HANDLERS & READERS

MULTISKAN™ GO UV/V MICROPLATE SPECTROPHOTOMETER

- Reads microplates, cuvettes and Thermo Scientific µDrop™ plates in microliter-scale measurements
- Can easily be connected to automated systems
- A broad wavelength range including UV as well as pathlength correction and fast reading speed make it suited for any photometric research application, including DNA/RNA and protein analysis
- Can be controlled as a stand-alone instrument

Thermo Fisher Scientific
www.thermoscientific.com

LABELITE™ I.D. READER™ BARCODE READING DEVICE

- Offers users a reliable device for tracking samples in the laboratory
- Automatically decodes 2-D barcoded tubes on all common tube racks, including honeycomb-shaped racks, providing complete sample tracking during sample processing
- Features automated rack type detection and integrated 1-D barcode reading
- Provides efficiency, flexibility and ease-of-use for the user

Hamilton Storage Technologies
www.hamilton-storage.com

EMAX® PLUS MICROPLATE READER

- Designed for labs just starting up or looking to extend capabilities with affordable, yet reliable instrumentation
- Measures 96-well plates and comes with eight standard filter modes to cover the entire visible range
- Includes multiple licenses to the SoftMax® Pro software for endpoint and kinetic analysis of microplate data

Molecular Devices
www.moleculardevices.com

MULTIFLO™ FX MULTI-MODE DISPENSER

- Now available with optional RAD™ (Random Access Dispense) technology to further extend its application range and flexibility
- RAD technology offers single-channel dispensing to random individual microplate wells along with rapid reagent dispensing into large volume wells of 6- to 24- well microplates
- Can also be separately configured with an optional wash module for 6- to 384-well plates

BioTek
www.biotek.com

MICROPLATE HANDLER & READER MANUFACTURERS

Agilent	www.agilent.com	Douglas Scientific	www.douglasscientific.com
Applied Biosystems	www.appliedbiosystems.com	Hamilton Storage Technologies	www.hamilton-storage.com
Beckman Coulter	www.beckmancoulter.com	Hudson Robotics	www.hudsonrobotics.com
Berthold Technologies	www.berthold.com	Molecular Devices	www.moleculardevices.com
Biochrom	www.biochrom-us.com	PerkinElmer	www.perkinelmer.com
Bio-Rad	www.bio-rad.com	Phenix Research Products	www.phenixresearch.com
Biotage	www.biotage.com	Tecan Trading AG	www.tecan.com
BioTek	www.biotek.com	Thermo Fisher Scientific	www.thermoscientific.com
BMG LABTECH	www.bmglabtech.com	Tomtec	www.tomtec.com

MICROSCOPY & IMAGING

TOP 6 QUESTIONS YOU SHOULD ASK WHEN BUYING AN OPTICAL MICROSCOPE

1. What type of specimens will you be looking at? This will help you determine whether or not an upright or inverted frame type is best for you. For example, inverted frame types are best for thick specimens.
2. What applications are you using your microscope for? Answering this question is important when deciding whether a polarizing or non-polarizing microscope is required. That information will also be useful in deciding on a basic or advanced model.
3. Are accuracy and ease of use critical for your applications? If they are, you will want to check out the motorized options of the microscope brand you decide to select.
4. Of course, asking about cost is also important. If your budget is limited, going with the basic model is usually the cheapest option.
5. What service and support options are available?
6. How long will staff be working at the microscope? If lab workers will be using the instrument for extended periods, selecting the most ergonomic microscope you can is important.

There are a few different considerations if you are in the market for an SEM microscope:

TOP 7 QUESTIONS YOU SHOULD ASK WHEN BUYING AN SEM MICROSCOPE

1. What type of samples will you be looking at? This needs to be asked of the technical experts who can guide the user to the appropriate type of SEM, X-ray spectrometer and accessories.
2. What are the sizes of the features you want to image or, expressed differently, what is the maximum magnification you want to view the samples at; and at what accelerating voltages do you want to use? This will be the deciding factor between: a) table top SEM b) W SEM, or c) Field Emission SEM.
3. Who will be using the instrument the most? Experts or non-experts?
4. What is the budget? #1, 2 above may be moot if the budget is not sufficient. What is the expected total cost of ownership?

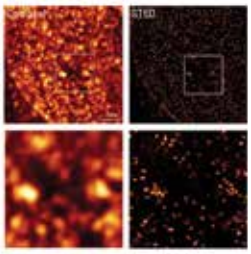
5 How many of the SEM you are considering (or similar models) are in use, in the field? Get a *complete*, not hand-picked, users' list.

6 Will you receive application support/instrument training? How many service engineers are in your area and what is their average response time to be "on site" for repairs?

7 What is the experience of the applications/training support staff, and can they be contacted directly for help?

RECENTLY RELEASED MICROSCOPY & IMAGING SYSTEMS

TCS SP8 STED 3X SUPER-RESOLUTION MICROSCOPE SYSTEM



- A pulsed 775 nm STED laser option is now available, along with a range of multiple STED lasers of different wavelengths
- Achieves sub 30 nm resolution through pulsed stimulated emission depletion technology
- Allows researchers to tune resolution in the lateral as well as the axial direction
- New pulsed laser leads to a further increase in resolution capacity

Leica Microsystems
www.leica-microsystems.com

SKYSCAN™ 2211 HIGH-RESOLUTION X-RAY NANOTOMOGRAPH

- Capable of non-destructive scanning and 3D reconstruction of internal microstructures of large objects, as well as providing submicron resolution for small samples
- Opens unique possibilities for 3D imaging and exact modeling of materials in a number of applications, such as oil and gas exploration, composite materials, fuel cells, and electronic assemblies
- Allows for the scanning of larger objects up to 200mm in diameter

Bruker
www.bruker.com

IDRAMAN MICRO RAMAN MICROSCOPE

- Designed for Raman measurements in research, quality control and quality assurance environments
- Versatile, high-performance analytical tool for applications where sampling requires careful focus and high spatial resolution to optimize the Raman signal
- OneFocus feature optimizes the instrument for Raman sampling using the same focal plane for collecting images and Raman signals

Ocean Optics
www.oceanoptics.com

NANOEX™-I/V SAMPLE HOLDER FOR IN SITU TEM

- For atomic-resolution imaging at elevated temperatures and applied electrical bias
- New solution can be integrated with FEI's transmission electron microscopes (TEMs) to observe the effects of heating and electrical bias on nanostructured materials during in situ experiments
- Optimized to accept a variety of sample geometries, from nanoparticles to thin FIB-prepared lamellae

FEI
www.fei.com

MICROSCOPY & IMAGING MANUFACTURERS

Bruker Optics	www.brukeroptics.com	Leica Microsystems	www.leica.com
Carl Zeiss	www.zeiss.com	Meiji Techno America	www.meijitechno.com
CRAIC	www.microspectra.com	MilesCo Scientific	www.professionalmicroscopes.com
Edmund Optics	www.edmundoptics.com	Motic Instruments	www.motic.com
FEI	www.fei.com	Nikon Instruments	www.nikoninstruments.com
Hamamatsu	www.sales.hamamatsu.com	Ocean Optics	www.oceanoptics.com
Hirox-USA	www.hirox-usa.com	Olympus	www.olympusamerica.com
Hitachi High Technologies	www.hitachi-hta.com	OPTIKA Microscopes	www.optikamicroscopes.com
JEOL	www.jeol.com	Phenom-World	www.phenom-world.com
Keyence	www.keyence.com	Prior Scientific	www.prior.com
Kramer	www.kramerscientific.com	Warner	www.warneronline.com

MICROWAVE SAMPLE PREP

TOP 6 THINGS YOU MAY NOT KNOW ABOUT MICROWAVE SAMPLE PREP

1. Laboratory microwave digestion systems were first introduced in 1986 at the Pittsburgh Conference in Atlantic City, NJ.
2. US Customs and Border Protection uses microwave digestion to prepare pistachios for analysis to determine their geographic origin.
3. Microwave digestion systems are used routinely for preparing consumer products, including children's toys and jewelry, for metals analysis, such as lead and cadmium, to ensure kids' safety.
4. The first commercial microwave sample preparation systems only used power and time parameters to control digestion conditions. Temperature and pressure control were introduced later.
5. The vent and reseal design of the first microwave digestion vessels only held pressures of 100 psi compared to the 1000 or more psi that many vessels today can withstand.
6. It took six years for the US Environmental Protection Agency to promulgate Method 3051 (digestion of sediments, soils, and sludges for metals analysis), which is the most popular microwave-assisted USEPA method.
7. Microwave-assisted extraction can be used to determine the presence of polycyclic aromatic hydrocarbons (PAHs) in catfish.

TOP 5 QUESTIONS YOU SHOULD ASK WHEN BUYING A MICROWAVE SAMPLE PREP SYSTEM

1. What is the system's maximum microwave power output? Microwave energy heats substances quickly to high temperatures. The higher the temperature, the faster and more completely substances are digested. Extractions also need sufficient power, as some solvents can act as a heat sink and are difficult to heat.
2. Can the system monitor and control every vessel? Temperature and pressure monitoring and control are extremely important. Inadequate safeguards can result in damaged vessels and equipment, and a lack of temperature and pressure control can pose a safety hazard to lab personnel.

3 How many samples can be processed per run? Though the number of samples processed is dependent upon your laboratory's needs, planning for growth is always a good idea.

4 Does the company offer free applications support? Do they offer dedicated, direct service support and local factory-trained field service technicians? Dependable applications and service support are essential since you never know what may go wrong.

5 How user-friendly is the system? As with many instruments, if a system is very complicated to operate, it generally becomes either a glorified shelf to store things on or a headache to those having to operate it. The easier a microwave system is to use, the better off you will be. Also make sure the vessels are easy to handle and set up.

RECENTLY RELEASED MICROWAVE SAMPLE PREP SYSTEMS

QLABPRO CLOSED VESSEL MICROWAVE DIGESTION SYSTEM

- Designed to provide versatility, safety, and productivity in closed vessel digestions
- Digests samples with precise dual temperature controls
- Especially suited for developing digestion methods for sensitive environmental and high organic content samples
- Includes multi-layered safety features, such as Q-Sens™ temperature and pressure sensor module and OPGuard™ pressure protection mechanism

Questron Technologies
www.qtechcorp.com

DISCOVER® SP-X SEQUENTIAL MICROWAVE SYSTEM

- Can help reduce your solvent usage by up to 95% and decrease extraction times from hours to minutes
- Quickly and efficiently performs solid-liquid solvent extractions on a wide variety of matrices including polymers, foods, and textiles
- Offers full temperature and pressure control of every sample and works with all solvents including polar and non-polar

CEM
www.cem.com

MONOWAVE 300 MICROWAVE REACTOR

- Includes an intuitive software interface and features such as 850W power, in-situ temperature measurement, and robust re-usable vials and caps
- Offers a capable platform for microwave synthesis that enables you to focus on the chemistry, not the instrument
- Easy to use

Anton Paar
www.anton-paar.com

ULTRAWAVE MICROWAVE DIGESTION SYSTEM

- Features Milestone's unique SRC technology in a fully automated benchtop package
- Brings greater efficiency to microwave digestion, using disposable glass vials instead of traditional digestion vessels
- Reduces digestion acid volume, lowering digestion blanks
- Results in more complete digestions, and better analytical data quality for ICP-MS analysis
- Digests up to 15 samples—of any matrix—simultaneously

Milestone
www.milestonesci.com

MICROWAVE SAMPLE PREP PRODUCT MANUFACTURERS

Anton Paar	www.anton-paar.com
Biotage	www.biotage.com
Buck Scientific	www.bucksci.com
CEM	www.cem.com
Milestone	www.milestonesci.com
PreeKem	www.preekem.com/en
Questron Technologies	www.qtechcorp.com
SCP Science	www.scpscience.com

MILLS & GRINDERS

TOP 6 THINGS YOU MAY NOT KNOW ABOUT MILLS AND GRINDERS

1. The process of grinding and milling has its origins in prehistoric times, when early humans pounded grains and nuts with stones to free the kernel from the hard protective shell. The earliest dedicated tools for this task are the mortar and pestle, which were developed during the Stone Age and have remained essentially unchanged throughout history.

2. Millstones, including the saddlestone—developed in 2000 BC—were the predominant grinding tools used until about 2500 BC, when the rotary quern was invented. The quern required a circular motion, which was much easier to maintain than the back-and-forth motion of the saddlestone. Although the particles produced from the quern were not as fine as could be achieved with the saddlestone, the quern became very popular because of its increased ease of use.

3. Around 1500 AD, the grinding of minerals was revolutionized when high demand for metals led to the development of water-driven stamp mills for grinding large volumes of pebbles into small particles. At this time, stamp mills were developed in which the pebbles were shattered by impact from a pounding hammer.

4. It was during the second half of the nineteenth century that jaw crushers, ball mills and air classifiers were developed. At the same time, high-capacity machines for ores and cement were introduced, with Schranz inventing the roller mill for grains in Germany in 1870. A patent for a beater cross mill with hinged hammers was granted to H. Currier in Great Britain in 1875.

5. The first two decades of the twentieth century saw the invention of vertical roller mills, as well as autogenous pebble mills in which rocks are thrown into a rotating drum, causing impact breakage of larger rocks and compressive grinding of finer particles. Rake classifiers were also introduced during this time to separate the fine particles from the coarse.

6. In 1909, the first patent for cryogenic breakage was granted to Gaston Galy. Cryogenic breakage employed liquid air to cool the sample before crushing to make it more brittle and increase the crushing efficiency.

TOP 5 QUESTIONS YOU SHOULD ASK WHEN BUYING A MILL OR GRINDER

1. Will the mill/grinder be used for wet or dry milling?

2. For dry milling, ask how finely the material needs to be ground and what are the properties of the material. Rotor beater, disc, and mortar mills, for example, are best for mid-range grinding (final fineness of ~0.01-0.1 mm).

Continues on page 108

HIGH ENERGY BALL MILLING EQUIPMENT

The aim to achieve ultrafine and nano-sized materials is becoming of great importance as effort in nanotechnology is a key driver in the development of innovative products. To attain particles in this region, many techniques can be used such as synthesizing such materials as well as high energy milling.

Retsch offers a full complement of high energy ball milling equipment.

The planetary ball mill offering from Retsch continues to be a key research tool in many labs that are in need of achieving finely ground sample particles in addition to submicron materials and mechanical alloying. The planetary ball mill has been the historical "go-to" instrument for fine grinding applications.

For customers with small samples that require finely ground material, the Retsch mixer mills are an optimal choice. With the ability to process small sample quantities to a fine powder in a relatively short time, these units are used in many research facilities for these homogenizing requirements. Also, the Retsch mixer mills are often used in the area of mechanochemistry research as sample size and grinding energy are ideal for such applications.

In addition to high energy planetary ball mills and mixer mills, the Retsch Cryomill is specially designed for cryogenic grinding with an integrated liquid nitrogen cooling system. It is an ideal solution for customers that need to keep material at -196°C to avert degradation of sample and/or to bring material to its glass transition state for efficient grinding.

The EMAX is a newly designed and released high energy ball mill that brings a new technology/technique to the sample preparation laboratory. The EMAX is designed specifically for high energy ball milling as it features a variable speed drive up to 2000rpm, and considering the high rpm levels also features an internal water cooling system that can also be adapted to an external chiller, thus eliminating down time from overheating. With these functional performance features, the EMAX also has a special grinding jar and motion that optimizes the grinding energy and force in order to attain ultrafine and nano-sized materials.

As an industry leader in sample preparation, Retsch prides itself on maintaining and continually developing its product portfolio to meet the requirements and demands of our customers. With a full team of trained application specialists, Retsch is always looking forward to addressing customer's applications and requirements.

3 For wet milling, ask what capacity of grinder you will need. Bead mills are usually best for small capacity applications while rotor-stator homogenizers should be considered for larger scale applications. For very large scale applications, industrial-scale mills are probably the best fit.

4 How important is preventing cross-contamination? Bead mills are likely a good choice if you don't want any risk of contamination.

5 Based on the materials you will be milling, how long does the miller or grinder typically last? How much do replacement parts cost and how easy are they to get? What level of support/warranties does the company offer?

RECENTLY RELEASED MILLS & GRINDERS

E_{MAX} HIGH ENERGY BALL MILL

- Unique combination of high friction and impact results in extremely fine particles within the shortest amount of time
- Features a speed of 2000 min^{-1} and the optimized jar design
- Thanks to the mill's cooling system with water, the high energy input is effectively used for the grinding process without overheating the sample

Retsch
www.retsch.com

6870D FREEZER/MILL® CRYOGENIC GRINDER

- High-throughput, dual chamber, cryogenic grinder includes a self-contained liquid nitrogen tub and insulated case
- Chills samples in liquid nitrogen then pulverizes them with a magnetically driven impactor
- Dual grinding chambers hold a total of 200 grams of sample (100 grams per chamber)
- Touch screen control panel stores up to 10 grinding protocols
- Features maintenance-free design with only one moving part

SPEX SamplePrep
www.spexsampleprep.com

PULVERISETTE 13 *PREMIUM* DISK MILL

- Provides efficient fine grinding of hard-brittle to medium-hard solids
- Safe to operate due to the automatic locking of the collecting vessel and grinding chamber, and is easier to operate due to the convenient motor-driven grinding gap adjustment with digital gap display
- Well-designed display shows all of the parameters

FRITSCH
www.fritsch.de

TUBE MILL

- Batch mill with single-use milling vessels enables serial testing to be carried out under reproducible conditions
- Single-use milling vessels save on cleaning, time and energy; they also prevent cross-contamination
- 40 ml capacity milling vessels and hood are made from transparent material, allowing the milling process to be observed at any time

IKA
www.ika.com

MILL AND GRINDER MANUFACTURERS

BioSpec Products	www.biospec.com	Lab Synergy	www.labsynergy.com
Buehler	www.buehler.com	McCrone	www.mccronemicroscopes.com
Buhler	www.buhlergroup.com	MP Biomedical	www.mpbio.com
C.W. Brabender Instruments	www.cwbrabender.com	Retsch	www.retsch.com
Extec	www.extec.com	SCP Science	www.scpscience.com
Fritsch	www.fritsch.de	SPEX SamplePrep	www.spexcsp.com
Glen Creston	www.glencreston.co.uk	Sturtevant	www.sturtevantinc.com
Glen Mills	www.glenmills.com	The Fitzpatrick Co	www.fitzmill.com
Hosokawa	www.hmicronpowder.com	The Jet Pulverizer Co	www.jetpul.com
IKA	www.ika.com	Union Process	www.unionprocess.com

OVENS

TOP 3 THINGS YOU MAY NOT KNOW ABOUT LAB OVENS

1. A recent trend is that the market for high-temperature ovens, operating between around 400°C and 600°C, is heating up. High-tech materials manufacturers use large ovens in this temperature range to produce high-tech materials and coatings. The R&D labs supporting new materials development employ much smaller units, with volumes of 30 to 60 liters, to test product ideas and troubleshoot manufacturing.
2. Energy efficiency in high-temperature ovens is a must, as insulation drives the unit's ability to support the heat it generates and to reduce the energy needed for maintaining temperature.
3. Most laboratory technicians know that proper safety procedures must be followed when operating lab ovens. However, accidents unfortunately still happen, as shown by a recent incident at UCLA in April 2014 when a student's lab oven exploded during an experiment. The student's face and neck were burned and he received chest injuries, but luckily recovered.

TOP 5 QUESTIONS YOU SHOULD ASK WHEN BUYING A LAB OVEN

1. What temperature range do you require? (Does the product have reserve temperature capacity?)
2. What accuracy and uniformity does the product have? (Will my sample be damaged or will my experiment only function in one "sweet spot"?)
3. Are interior chamber space / weight of my sample and floor space in the lab a match to application and lab?
4. Do I need any computer interfaces, alarms or safety devices on my oven?
5. Are accessories like data loggers, viewing windows and modifications like access ports available from the manufacturer to suit my specific needs?

RECENTLY RELEASED OVENS

ED, FD AND FED SERIES LAB OVENS

- Provide excellent temperature uniformity and fluctuation for fast and even heating
- Offer a large temperature range for a wide range of applications
- Insulated chamber inhibits heat loss for eco-friendly operation
- Size options from 0.7 to 25 cu.ft available
- Features Ergonomic design for optimized productivity and stainless steel construction makes for easy cleaning
- Accessories available to customize units

BINDER
www.binder-world.com

QASH1800 EXPRESS MICROWAVE ASHING SYSTEM

- Achieves a fast ashing time by combining effect of microwave and in-situ air flow
- Features a large floor area to accommodate a large quantity of samples like polymers, oils, food, pulp, sludge, etc.
- Software includes easy-to-build ashing recipe option with multiple heating steps and air control
- Displays ashing process time and thermal changes graphically

Questron Technologies
www.qtechcorp.com

VACUTHERM VACUUM OVENS

- Provide excellent heat transfer and fast heating up to minimize operation time
- Front window with double-paned safety glass provide unique implosion protection and modular system allows application-specific configurations through a wide range of equipment options
- Available in jacket-heated models that range to 200C and shelf-heated versions up to 400C, sizes range from 25 - 128L capacity

Thermo Fisher Scientific
www.thermoscientific.com

FI-STREEM VACUUM OVEN

- Suitable for a variety of laboratory applications such as heating and drying, temperature related experiments, curing, vacuum embedding and plating applications
- Oven features a compact footprint with a spacious 31 liter capacity rectangular chamber
- Durable outer case is constructed of painted steel and the interior chamber is a robust light alloy aluminum casting

LabStrong
www.labstrong.com

LAB OVEN MANUFACTURERS

Binder	www.binder-world.com
BMT USA	www.bmtus.com
Boekel Scientific	www.boekelsci.com
Carbolite	www.carbolite.us
Cascade TEK	www.cascadetek.com
ESCO	escoglobal.com
Jeio Tech	www.jeiotech.com
Labnet International	www.labnetlink.com
LABREPCO	www.labrepco.com
LabStrong	www.labstrong.com
Lucifer Furnaces	www.luciferfurnaces.com
MTI	www.mtixtl.com
Nabertherm	www.nabertherm.com
Questron Technologies	www.qtechcorp.com
SHEL LAB	www.shellab.com
So-Low	www.so-low.com
SP Industries	www.spindustries.com
Stovall Life Science	www.slscience.com
Ted Pella	www.tedpella.com
Terra Universal	www.terrauniversal.com
Thermo Fisher Scientific	www.thermoscientific.com
Yamato Scientific America	www.yamato-usa.com
Z-SC1	www.z-sc1.com

PARTICLE SIZE ANALYZERS

TOP 11 QUESTIONS YOU SHOULD ASK WHEN BUYING A PARTICLE SIZE ANALYZER

1. What is the size range you need to measure? Unfortunately, no one technique can measure all possible particle sizes, so the range needed will narrow the potential systems which can be used.
2. What exactly do you want to measure and why? Particle analyzers use many different techniques to arrive at measurements. In order to figure out what technique will work best for your application, you need to define what you are trying to measure and why.
3. Are you trying to characterize different particle types in a single sample?
4. In what "state" should the measurements be made? In many cases, measurement of the particles in the "native state" may not be possible.
5. Is measuring the count or concentration (two different measurements!) of the particles along with size/shape important? If knowing an absolute particle count, or a particle concentration is important, then some techniques will be eliminated immediately.
6. How easy is it to generate reliable data? Think about your users and ask what, if any, specific expertise is required for system set-up and routine use. Then, ask to make a measurement to assess this during the selection process.
7. Can the instrument comfortably handle all your samples? Check the particle size range and the availability of efficient dispersion units for suspension, emulsion, and dry powder analysis.
8. Are there any features that will boost productivity? Ask about measurement times; check how easy it is to switch between sample types and assess maintenance requirements.
9. How does the safety, health, and environment (SHE) performance of the system compare with others? A good dry dispersion unit will minimize the need for wet measurement, for example, cutting dispersant use. If you need containment, then assess its quality.
10. How easy is it to tailor analysis to your precise needs? Check out the software interface, and the process required to develop methods and present your data how you want it.
11. And finally what type of support is available, now and into the future, if things go wrong, or with a new application? Ask about provisions for online education and training.

RECENTLY RELEASED PARTICLE SIZE ANALYZERS

MASTERSIZER 3000 PARTICLE SIZE ANALYZER SOFTWARE

- New software for Malvern's Mastersizer 3000 laser diffraction particle size analyzer continues to lighten the analytical workload associated with developing robust particle sizing methods for industrial applications
- New operational features, such as an Optical Property Optimizer, simplify and streamline the process of method development
- A new result emulation tool eases the process of transferring methods from other particle sizing techniques

Malvern
www.malvern.com

MULTISIZER 4E COULTER COUNTER PARTICLE SIZING/COUNTING ANALYZER

- Features a new 10-micron aperture that enables users to obtain accurate count, size and mass distribution for particles and cells ranging from 0.2 to 1,600 microns
- Digital Pulse Processing provides high-resolution analysis in as many as 400 channels
- Delivers dynamic size measurements in real time
- Compliant with 21 CFR Part 11

Beckman Coulter
www.beckmancoulter.com

LD PARTICLE SIZE ANALYZER AUTOSAMPLER

- Allows the analysis of liquid and dry samples in the same batch
- Can be programmed to run dry samples in either liquid or dry dispersion, and liquid samples in liquid dispersion
- Works with Cilas 990, 1090 and 1190 laser particle size analyzers and has the capacity to analyze up to 30 samples per batch

Cilas Particle Size
www.particle-size.com

ANALYSETTE 28 IMAGESIZER PARTICLE SIZER

- Suited for analysis of particle shape and size of dry, free-flowing powders and bulk solids in a measuring range from 20 μm to 20 mm
- Identifies damaged particles, contaminates, agglomerates or oversized or undersized particles accurately and quickly, and they can be viewed as single images
- Measuring time, depending on the sample quantity, is below 5 minutes

FRITSCH
www.fritsch.de

PARTICLE SIZE ANALYZER MANUFACTURERS

Agilent	www.agilent.com	Hach	www.hach.com
AimSizer Scientific	www.aimsizer.com	Horiba Instruments	www.horibalab.com
Ankersmid B.V.	www.ankersmid.com	JM Canty	www.jmcanty.com
Beckman Coulter	www.beckmancoulter.com	Malvern Instruments	www.malvern.com
Brightwell	www.brightwelltech.com	Micromeritics	www.micromeritics.com
Brookhaven Instruments	www.bic.com	Microtrac	www.microtrac.com
CILAS Particle Size	www.particle-size.com	NanoSight	www.nanosight.com
Clemex Technologies Inc.	www.clemex.com	New Star Environmental	www.newstarenvironmental.com
Dispersion Technology	www.dispersion.com	Particle Sizing Systems	www.pssnicomp.com
Fluid Imaging	www.fluidimaging.com	Shimadzu	www.shimadzu.com
Formulaction	www.formulaction.com	Sympatec	www.sympatec.com
Fritsch	www.fritsch.de	TSI	www.tsi.com

pH METERS

TOP 4 THINGS YOU MAY NOT KNOW ABOUT pH METERS

1. In 1906, Max Cremer discovered that an electrical potential develops when two liquids of different pH levels come into contact at opposite sides of a thin glass membrane.

2. Shortly after, in 1909, Fritz Haber and Zygmunt Klemensiewicz used the principle described by Cremer in 1906 to create the first glass electrode that measured hydrogen activity. However, technical difficulties, including the large internal resistance of glass electrodes, prevented the large-scale potentiometric measurements of pH. Because of these difficulties, use of a very sensitive, but expensive, galvanoscope was necessary to obtain reliable results. Today, glass electrodes are the most commonly used measuring electrodes.

3. Then, in 1934, Dr. Arnold Orville Beckman proposed that the current obtained through Haber and Klemensiewicz's electrode be amplified, allowing it to be measured using a cheap miliamperometer. He devised a simple, high-gain amplifier using two vacuum tubes for this purpose. This advance represents the development of the first pH meter, known at the time as an "acid-o-meter".

4. Two years later, in 1936, the first commercial pH meters were introduced in the U.S. by Dr. Beckman, the founder of the Beckman Instruments Company (now Beckman Coulter). The Beckman model was known as the Model G acidimeter and later renamed the Model G pH meter. This device was revolutionary because it was the first to combine the whole apparatus (amplifier, electrochemical cell, electrode, calibration dials, batteries and measuring gauge) into one unit. During its first year, Model G sales reached 444 units. The model continued to be sold until the mid-1950s, with an estimated 126,000 sold during its lifetime.

TOP 6 QUESTIONS YOU SHOULD ASK WHEN PURCHASING A pH METER

1. What type of connector does the meter use?
   a. Is it a BNC or DIN?
   b. Is it proprietary or can other manufacturer's probes be used with it?

2. What is the replacement cost for a pH electrode?

3. What accessories are included with the meter?
   a. What is the complete cost of all accessories needed to operate the meter?

4 What type of after sales support is offered?
   a. If something goes wrong with the meter, can it be fixed locally?
   b. What is the general turn-around time for repair?

5 What makes the company different from other companies that manufacture similar products?

6 What additional types of features are offered? (GLP data, PC connectivity (USB vs RS 232), calibration timeout, number of calibration points, ISE concentration readout, incremental methods for ISE and mv readout of concentration during calibration process.)

RECENTLY RELEASED pH METERS

HI 9829 MULTIPARAMETER METER

- Especially suited to environmental field measurements of streams, rivers, lakes and seas
- Can display 12 parameters simultaneously from up to 14 user selectable parameters
- Available sensors include: pH, ORP, conductivity, turbidity, temperature, ammonium, nitrate, chloride, dissolved oxygen, resistivity, TDS, salinity, atmospheric pressure, and seawater sigma
- A variety of additional features also available

Hanna Instruments
hannainst.com

MULTISIZER 4E COULTER COUNTER PARTICLE SIZING/COUNTING ANALYZER

- Features a new 10-micron aperture that enables users to obtain accurate count, size and mass distribution for particles and cells ranging from 0.2 to 1,600 microns
- Digital Pulse Processing provides high-resolution analysis in as many as 400 channels
- Delivers dynamic size measurements in real time
- Compliant with 21 CFR Part 11

Beckman Coulter
www.beckmancoulter.com

POCKET PRO AND PRO+ pH TESTERS

- Engineered to deliver accurate results
- Backed up with built in performance diagnostics, users never have to guess when to clean or calibrate the sensor
- Includes replaceable batteries for convenient field use, and a large, easy-to-read LCD screen
- Easy calibration steps and built-in diagnostics for pH testers take the guesswork out of calibrating the sensor to keep it in optimum condition

Hach
www.hach.com

SAM-1 SMART AQUA METER

- Turns your smart phone or tablet into a powerful and convenient pH, ORP or conductivity meter
- Users simply plug the SAM-1™ into the audio jack of their smart phone or tablet then plug in the smart sensor and they are ready to take accurate readings
- Sensor is auto-recognized and calibration data read from the smart sensor

Sensorex
www.sensorex.com

pH METER MANUFACTURERS

Beckman Coulter	www.beckmancoulter.com
Corning	www.corning.com
Denver	www.denverinstrumentusa.com
Hach	www.hach.com
Hamilton	www.hamiltoncompany.com
Hanna Instruments	www.hannainst.com/usa
Horiba	www.horiba.com
ITT Analytics	www.itt.com
LaMotte	www.lamotte.com
Metrohm	www.metrohmusa.com
Mettler Toledo	www.mt.com
Oakton	www.4oakton.com
Omega	www.omega.ca
Pulse Instrument	www.pulseinstruments.net
Sartorius	www.sartorius.com
Sensorex	www.sensorex.com
Thermo Fisher Scientific	www.thermoscientific.com
Xylem	www.xylemanalytics.com

PIPETTES

TOP 4 THINGS YOU MAY NOT KNOW ABOUT PIPETTES

1. In the 1950s, larger-than-ideal volumes of liquid were transferred using a modified piece of graduated glass tube, which often went by the name of the Carlsberg pipette. Researchers constructed these in the lab by heating a piece of glass tube over a Bunsen burner while pulling at one end; then, by repeating this operation close to the tip of the tube, a capillary could be pulled. This would allow air flow, but enable users to stop the liquid at the desired volume for which they had constructed the pipette.

2. Also during the 1950s, Carlsberg pipettes were being used outside of the lab by milk inspectors who would mouth-pipette raw milk samples onto a microscope slide for analysis. One of these inspectors was G.S. Riggs, who was not fond of this practice for obvious safety and efficiency reasons. Riggs filed a patent for a mechanical device that would suck the milk up into the tube. Riggs' patent was referenced in the filing of Warren Gilson's patent for the modern-day mechanical pipette 24 years later.

3. While developing optical enzyme assays, lab researchers faced accuracy challenges while attempting to dispense microliter liquid volumes as well as handle the large volume of pipetting that was required for this task. One of these researchers was a German medical scientist by the name of Heinrich Schnitger. By adding a spring to the piston of a tuberculin syringe that would stop on cue at a set volume level and replacing the syringe's needle with a plastic tip, Schnitger found he could speed up liquid handling in many of his experiments. This led to the development of the first improvised piston-stroke pipette in 1958, which became known as the Marburg pipette.

4. Lab researchers, although happy with the functionality of the pipette, were still concerned about cross-contamination between samples and bacteria being passed via the pipette. The pipette manufacturer Capp Denmark A/S responded by inventing the first autoclavable multichannel pipette in 1984. About 80 percent of the pipettes on the market today are now autoclavable.

TOP **5** QUESTIONS YOU SHOULD ASK WHEN BUYING A PIPETTE

1. What differentiates the pipette from others offered in terms of performance and ergonomics?
2. Is the product compatible with other manufacturers' consumables (tips)?
3. What types of services are offered for this product? Calibration? Repair?
4. Does the company offer application support and technical phone support before and after product purchase?
5. What is the product life expectation? What is the product's warranty period? If the company discontinues the product, for how many years do they provide accessories and parts for the instrument?

RECENTLY RELEASED PIPETTES & ACCESSORIES

E1-CLIPTIP™ ELECTRONIC ADJUSTABLE TIP SPACING MULTICHANNEL EQUALIZER PIPETTES

- Allows users to feel their pipette tips lock firmly in place and perform sample transfers between virtually any tube, rack, microplate or horizontal gel box quickly and efficiently
- Adjustable tip spacing found in E1-ClipTip Equalizer models allows users to set the distance between tips by simply sliding the scale to expand or contract to the desired labware format

Thermo Fisher Scientific
www.thermofisher.com

VIAFLO ASSIST PIPETTE AUTOMATION DEVICE

- In combination with a VIAFLO II electronic handheld pipette, enables the pipette's protocols to be performed automatically
- Reduces the need for traditional handheld pipetting to a minimum, relieving lab personnel from activities that may cause repetitive stress injuries
- Ensures tip immersion depth and pipetting angle are always the same, resulting in increased reproducibility and thus better results

INTEGRA
www.integra-biosciences.com

pipetman®

You pick. You succeed.

Our pipettor selection is unsurpassed in meeting your needs for a variety of applications and techniques. Put the trust of Gilson quality and reproducibility in your hands.

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instruments • accessories • software • solutions ▶ www.gilson.com

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LIGHTWEIGHT ELECTRONIC PIPETTES

The VIAFLO II multichannel electronic pipette range from INTEGRA combines ultra lightweight design and unsurpassed operation comfort enabling users to improve efficiency in their working environment. VIAFLO II electronic pipettes together with INTEGRA's wide range of GripTip pipette tips form the perfect pipetting system. GripTips snap into place with minimal tip loading effort, providing a secure connection. GripTips never fall off and are always perfectly aligned, resulting in superior accuracy and precision results.

TYPICAL APPLICATIONS

Repeat Dispense

The repeat dispense mode allows dispensing multiple aliquots of the same volume without refilling the tips after each dispense for fast microplate filling and processing.

To increase the accuracy and precision of the dispenses, a first and last dispense can be defined, which are discarded back to the source or waste.

Manual Pipet

The manual pipet mode gives a user full control over the pipetting cycle. Only as long as the RUN button is pressed, the pipette aspirates or dispenses. The speed and a maximal volume can be set.

This mode can be used to:

- Measure the volume in a tube or plate
- Perform titrations
- Carefully aspirate supernatant without disturbing the pellet

Sample Dilute

This mode enables the aspiration of two different liquids separated by an air gap followed by a dispense of the tip content.

Typically this mode is used to dilute a concentrated sample at which the diluent is aspirated first, followed by the air gap and then the sample. This way the diluent chases the concentrated sample, ensuring no residual sample remains in the tips.

Reverse Pipet

Using this mode a larger volume is aspirated than the actual dispense, leaving a last dispense that is discarded. The function of this mode is equal to the reverse pipetting technique conducted with manual pipettes.

The reverse pipetting technique is used to pipette viscous and volatile liquids and can also improve pipetting results at very low volumes.

Variable Dispense

Aspirate once and dispense multiple differing volumes. Variable Dispense mode eliminates the need to adjust volumes between each dispense.

INTEGRA

603.578.5800
www.integra-biosciences.com

Watch a video: http://www.integra-biosciences.com/sites/viaflo_pipettes.html

Download product brochure: http://www.integra-biosciences.com/sites/pdf/flyer/161953_V01_Flyer_VIAFLO_II_Pipettes_EN.pdf

RECENTLY RELEASED PIPETTES & ACCESSORIES

REPEATER M4 HANDHELD SERIAL PIPETTE

- Designed to minimize the time and effort required for precise and highly accurate repeat dispensing tasks
- Works with nine sizes of Eppendorf Combitips advanced® and a built-in sensor detects the Combitips automatically, showing the tip volume
- Can dispense volumes from 1 µL to 10 mL and completes as many as 100 operations without refill

Eppendorf
www.eppendorfna.com

RAININ RFID TAGS FOR AIR DISPLACEMENT PIPETTES

- Helps labs establish advanced calibration schedules through heightened pipette tracking capabilities for significant time savings and lowered lab management costs
- By combining Rainin pipettes with Rainin's RFID reader and LabX™ Direct Pipette-Scan™ software, users can immediately determine an individual pipette's complete profile including: serial number, manufacture date, calibration-due date and any user-assigned attributes

METTLER TOLEDO
www.mt.com

PIPETTE MANUFACTURERS

BrandTech	www.brandtech.com
CAPP	www.capp.dk
Cole-Parmer	www.coleparmer.com
Drummond Scientific	www.drummondsci.com
Eppendorf	www.eppendorf.com
Gelcompany	www.gelcompany.com
Gilson	www.gilson.com
Globe Scientific	www.globescientific.com
Hamilton	www.hamiltoncompany.com
Hirschmann	www.hirschmann-inc.com
INTEGRA Biosciences	www.integra-biosciences.com
Jencons Scientific	www.jenconsusa.com
Labnet International	www.labnetlink.com
METTLER TOLEDO	www.mt.com
Nichiryo America	www.nichiryo.com
Oxford Instruments	www.oxford-instruments.com
Sarstedt	www.sarstedt.com
Sartorius	www.sartorius.com
Thermo Fisher Scientific	www.thermoscientific.com
USA Scientific	www.usascientific.com
VistaLab Technologies	www.vistalab.com
Wheaton Science Products	www.wheatonsci.com

POWER SUPPLIES

TOP 5 THINGS YOU MAY NOT KNOW ABOUT POWER SUPPLIES

1. A main trend in laboratory power supplies today is that, although the primary job of power supplies is making power, scientists want them using less of it. This is because, in many cases, improving power efficiency spurs more funding.
2. Many power supplies power devices scientists build themselves for experiments. Often, those devices are used only once or twice.
3. Power supplies have a huge range of applications which all require different voltages. For example, high voltage is required in equipment for sorting cells or separating compounds or DNA. Many chemical applications also need high voltage.
4. Overall, power supplies don't need much attention. Once a power supply is in the system, unless it's significantly abused, you don't need to take care of it in any way.
5. In student labs, power supplies not only need to be easy to use, but bulletproof current limiting is also important, according to one professor, who recently told *Lab Manager* that, "Students do the weirdest things, like short the 5-volt supply to the 12-volt supply." As an example, he says, "One power supply we used years ago failed in this mode by melting the solder holding the 12-volt regulator on the board!"

TOP 6 QUESTIONS YOU SHOULD ASK WHEN SPECIFYING POWER MANAGEMENT SOLUTIONS

1. What options are available and how will they affect the lab?
2. Will you need to do a complete overhaul each time you add a piece of equipment or are solutions flexible enough to allow for additional equipment?
3. How difficult is it to move or relocate plugs and receptacles if you need to adjust your layout?
4. Does the company's product offer any level of sustainability?
5. What kind of product life can you expect from the company's system? Is it durable enough to handle years of use or will it continually show wear? Can you count on the company's team to provide service throughout the product's life?
6. What kind of cost should you expect from the company's system? Materials? Installation? On-going maintenance? Service? Warranty? Total cost of ownership?

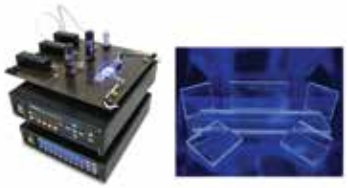
The more you investigate, the better STARLINE Plug-In Raceway looks.

Sure, it may look like other raceway products. But STARLINE® Plug-In Raceway has the unique ability to add or relocate plug-in modules anywhere on the raceway quickly and easily, eliminating panel boards and the associated costs of reconfiguring circuits, receptacles and wiring. To learn how we can meet the power distribution needs of universities, labs and research environments, visit **StarlinePower.com**.

STARLINE®
PLUG-IN RACEWAY

RECENTLY RELEASED POWER SUPPLIES

LABPACKAGE WORKSTATION FOR MICRO- AND NANO- FLUIDICS



- Includes the HVS448 eight channel sequenceable high voltage power supply, the SVM340 synchronized video microscope, uProcess™ automated pumps, valves, and sensors, and CapTite microfluidic microconnectors
- Labsmith technologies combined with Trianja glass and fused silica chips provide a complete capability for lab-on-a-chip R&D —from proof-of-concept to prototype to production
- Gives users an integrated microfluidic solution for precise fluid and voltage control

Labsmith
www.labsmith.com

HVPS SERIES SWITCHING MODE POWER SUPPLY

- Provides precise 1 to 100 kV adjustable output at power levels up to 200 kW
- Featuring < 0.1% ripple and regulation with << 10 joules stored energy, depending upon configuration, this compact unit eliminates the need for connecting multiple smaller units
- Packaged in a 19" W rack that uses tap water for cooling

Diversified
www.divtecs.com

PS600 600 VOLT POWER SUPPLY

- Designed for electrophoresis and blotting techniques including large format and high throughput applications
- Small footprint, large handle, and simple operation make the PS600 easy to set up and use in the lab
- Features a large, easy to read LED
- Offers constant voltage or constant current mode with automatic crossover

Hoefer
www.hoeferinc.com

STARLINE PLUG-IN RACEWAY

- Provide on-demand power in a scalable format to combine reliability with versatility
- Includes the ability to add or relocate plug-in modules anywhere on the raceway
- Features a smooth aluminum finish and compact design that requires minimal space and allows for quick installation
- Accepts standard plugs and datacom channels to help keep ownership costs low

Universal Electric
www.uecorp.com

POWER SUPPLY MANUFACTURERS

AS Research	www.asresearch.com
B&K Precision	www.bkprecision.com
Bio-Rad	www.bio-rad.com
Diversified Technologies	www.divtecs.com
EMCO High Voltage	www.emcohighvoltage.com
Hoefer	www.hoeferinc.com
Spellman High Voltage	www.spellmanhv.com
TDK-Lambda	www.tdk-lambda.com
Tripp Lite	www.tripplite.com
UltraVolt	www.ultravolt.com
Universal Electric	www.uecorp.com

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STARLINE PLUG-IN RACEWAY,
has revolutionized the power distribution industry! Universal Electric Corporation created STARLINE Plug-In Raceway to meet the ever-changing power distribution and datacom needs of research, pharmaceutical, university, hospital and data labs.

It offers a flexibility that no other product has – the ability to add or relocate electrical outlet modules anywhere on the raceway quickly and easily – without shutting down power!

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UNIVERSAL ELECTRIC CORPORATION

168 Georgetown Rd.
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Phone 800-245-6378
www.uecorp.com

SAMPLE PREP FOR CHROMATOGRAPHY

TOP 3 THINGS YOU MAY NOT KNOW ABOUT SAMPLE PREP FOR CHROMATOGRAPHY

1. A recent trend in this area of technology is that users looking to reduce workloads and analysis times, at lower cost, often begin with sample preparation. Users are clearly looking to reduce the amount of sample prep they do.
2. Another development is that lipid depletion is increasingly applied in the analysis of foods and samples outside the life sciences, which has led to various kits for removing this class of interfering species.
3. Also, the proliferation of QuEChERS and similar approaches to sample prep leaves end users with more choices than for, say, columns. As a result, chromatographers need to be more cognizant than ever of sample characteristics and purification capabilities.

TOP 6 QUESTIONS YOU SHOULD ASK WHEN BUYING HPLC SAMPLE PREP PRODUCTS (SOLID PHASE EXTRACTION)

1. What is your sample matrix?
2. What volume of sample do you need to extract?
3. What are your target analyte(s)?
4. What are your sample clean-up goals (high recovery vs. clean-up vs. speed)?
5. What sample preparation format is best for your work?
6. What is your mode of analysis (LC/UV, LC/MS/MS, GC/FID, GC/MS, etc.)?

Automate for Better Results

Automated SPE Improves Your Research: Flexibility • Efficiency • Analysis Results

Horizon Technology provides automated system solutions to increase laboratory workflow - from solid phase extraction (SPE) to drying, evaporation/concentration and solvent recovery systems.

SmartPrep® Extractor for Automated SPE

- Use ***your*** SPE cartridges - 1, 3 or 6-mL
- Run ***your*** SPE methods with 2 modes:
  - Basic 5-step SPE Run
  - Advanced Method Development
- Perform ***your*** chemistry with ***one*** solution for
  - Food safety and packaging migration
  - Oil and biofuels research
  - Environmental and health monitoring
  - Agriculture and animal health

XcelVap™ Evaporation/ Concentration System

- Automated pressure profiling for optimum speed with no splatter or cross contamination
- Nozzles can be individually changed and reconfigured for other racks by the user, simplifying maintenance and reducing operating costs
- Easy water bath management with low water level sensor and front draining for best performance and ease of maintenance

Automate your sample prep work flow and *prepare for better results!*

Horizon technology

PREPARE FOR BETTER RESULTS

For more info contact sales@horizontechinc.com or visit us at www.horizontechinc.com • +1 603.893.3663

TOP **6** QUESTIONS YOU SHOULD ASK WHEN BUYING A SYSTEM FOR CHROMATOGRAPHY ANALYSIS SAMPLE PREP

1. Can this system perform exhaustive extractions in about 10 minutes?
2. Can this extraction system operate unattended overnight?
3. Does the system change solvents and perform rinses automatically between samples?
4. Does the extraction system comply with U.S. EPA methods?
5. How does solvent consumption compare to other systems?

RECENTLY RELEASED CHROMATOGRAPHY SAMPLE PREP PRODUCTS

MICROVAP TRIPLE MICROPLATE CONCENTRATOR

- Concentration of up to three 96 well plates at once allows for high throughput
- Consistent temperature for uniform evaporation rates throughout all three plates provided by solid aluminum heating units
- Easy to use due to digital temperature controller and gas flow meter
- Each 96 needle manifold is equipped with its own toggle switch to shut down gas flow when all three microplates are not in use to conserve nitrogen

Organomation
www.organomation.com

SOLAμ SOLID PHASE EXTRACTION (SPE) MICRO ELUTION PLATES

- Remove variability and optimize high throughput laboratory workflows
- Designed for bioanalytical and clinical research analysts who require cleaner, highly reproducible and robust sample extraction using very low sample and solvent volumes in high throughput workflows

- Deliver robust, reproducible processing at elution volumes as low as 25 μL
- Five different models available

Thermo Fisher Scientific
www.thermoscientific.com

CLEANERT ARRAY MICROPLATES & SLE PLATES

- Cleanert array microplates (part number: WC00501-MW) enable sensitive, robust, and reproducible analyses and help make sample preparation easier and less laborious for lab personnel in DMPK and bioanalytical research
- Cleanert SLE plates (part number: HC4002SQ-9W) help users avoid emulsification, make sample prep simpler and faster, enable high throughput, and are compatible with automatic SPE

Bonna-Agela
www.bonnaagela.com

AC EXTRACTION PLATE™ 96-POSITION, DEEP-WELL MICROPLATE

- Automation-friendly solution designed to streamline sample preparation for LC-MS analysis of small molecules
- Reduces the sample preparation process to a convenient 'pipette and shake' routine
- Inner surface of each well is coated with a highly controlled layer of TICE (Tecan Immobilized Coating Extraction) material

- Coating efficiently extracts low molecular weight analytes from aqueous solutions

Tecan
www.tecan.com

CHROMATOGRAPHY SAMPLE PREP PRODUCT MANUFACTURERS

Agilent	www.agilent.com	Perfinity Biosciences	www.perfinity.com
BDH Chemicals	us.vwr.com	Phenomenex	www.phenomenex.com
Biotage	www.biotage.com	Porvair Sciences	www.porvair-sciences.com
Bonna-Agela	www.bonnaagela.com	Shimadzu	www.shimadzu.com
Fluid Management Systems	www.fms-inc.com	Sigma-Aldrich	www.sigmaaldrich.com
Gilson	www.gilson.com	Tecan	www.tecan.com
Horizon Technology	www.horizontech.com	Thermo Fisher Scientific	www.thermoscientific.com
Metrohm	www.metrohmusa.com	UCT	www.unitedchem.com
Organomation	www.organomation.com	Waters	www.waters.com

SOLID PHASE EXTRACTION

Solid phase extraction (SPE) is usually performed with disks or cartridges. Horizon Technology provides two types of extractors to help in automating the process for better precision. This allows each laboratory to choose the system that is most appropriate for their samples and workload. The following table gives general guidance on the types of applications that would a choose disk or cartridge approach for SPE.

Market Segment	Example Application	Cartridge or Disk?
Environmental	Drinking water	Disk/cartridge
Environmental	Wastewater	Disk
Environmental	Seawater	Disk
Food	Antibiotics	Cartridge
Food	Mycotoxins	Cartridge
Clinical	Drugs of abuse	Cartridge

The SmartPrep® Cartridge Extraction System is an excellent first system for laboratories moving from a manifold to simple automation. The SmartPrep Extractor allows the cartridge used in the manual method to be used in the automated method, so the chemistry does not have to be modified. Virtually any tabbed or tab-less 1, 3 or 6-mL cartridge can be accommodated. The software uses simple language to enter the condition, load, wash and elute steps of the manual method. Precision is improved and the operator can leave the system unattended to run a batch of samples.

The SPE-DEX® 4790 Disk Extraction System can handle a variety of complex samples containing particulate matter, making it especially useful for environmental samples. Several features help to comply with method requirements such as processing the sample from the original collection bottle and then automatically rinsing the bottle. Up to eight modules can be controlled from one system controller and can independently run different sample types and methods, making the coordination of samples simple.

Visit www.horizontechinc.com for educational webcasts, application materials and product information

SHAKERS & STIRRERS

TOP 3 THINGS YOU MAY NOT KNOW ABOUT SHAKERS & STIRRERS

1. The first hot plate stirrer was patented in 1917 by Richard Stringham of Utah and consisted of stationary electromagnets built into a hot-plate base. When a reaction vessel such as a flask or beaker was positioned on the stirrer, a bar magnet placed in the solution rotated as a result of the magnetic field created by the electromagnets.
2. A significant problem of early twentieth century research was the risk of fire from the necessity of heating solutions using a naked flame. This problem was resolved in the 1930s by husband and wife team Glen and Ruth Morey who invented the heating mantle, a reliable and non-flammable heating device with electric resistance wires woven into a fiberglass cloth sheath.
3. The bar magnet used with the first magnetic stirrers was gradually found to be less than ideal, particularly because the iron in the magnet could react with chemicals in the solution and change the course of a reaction. To address this problem, two inventors working independently in the 1940s devised the coated magnetic stirrer bar, which was chemically inert and took no part in the ongoing reaction.

TOP 5 QUESTIONS YOU SHOULD ASK WHEN PURCHASING A SHAKER

1. What is the capacity of the unit (both for total weight and volume)?
2. What accessories are available?
3. What is the RPM range and what increments can it be controlled in?
4. What are the temperature and humidity operating conditions for the unit?
5. What programming functions, if any, does the unit have?

TOP 5 QUESTIONS YOU SHOULD ASK WHEN BUYING AN OVERHEAD STIRRER

When purchasing an overhead stirrer, know the application information and the result that needs to be accomplished as this will help to determine the best stirrer fit for the application.

1. What are the features and specs of the overhead stirrers available?
2. What type of motor is used in the stirrer? A brushless DC motor is very efficient and maintenance-free. A brushed motor contains brushes which wear and over time need replacing.
3. Does the manufacturing company offer application and technical support over the phone?

4 Have you purchased everything you need to start mixing? Sometimes stirrers are sold as kits and sometimes the stirrer motor, stand, clamp and mixing impeller accessories are sold separately.

5 Finally, ask about warranty and delivery to determine how quickly the new purchase will be received.

RECENTLY RELEASED SHAKERS & STIRRERS

COMPACT DIGITAL ROTATOR (CAT NO. 88880025)

- Allows users to achieve maximum flexibility and high quality
- Provides a smooth, quiet orbital mixing/shaking for beakers, flasks, tubes, dishes and more
- PID control ensures consistent and smooth orbital motion, with digital speed control from 50-300 RPM
- Can display both current and set RPM simultaneously
- Timer Range: continuous or one minute to 99 hours 59 minutes

Thermo Fisher Scientific
www.thermoscientific.com

ANALYSETTE 18 HEAVY DUTY ANALYTICAL SIEVE SHAKER

- ANALYSETTE line includes three well-conceived instruments for every application
- Makes the work simpler and faster
- Easy to operate, reliable and long-lasting
- Includes the modified analysis software, AUTOSIEVE
- ANALYSETTE 3 PRO and SPARTAN and the ANALYSETTE 18 are for dry, wet and micro-precision sieving from 0.05 g up to 15 kg

FRITSCH
www.fritsch.de

ECHOTHERM™ MODEL HS65 PROGRAMMABLE DIGITAL STIRRING HOT PLATE

- Includes 5 stirring positions for use in chemical, pharmaceutical, environmental, biochemical, and other laboratories
- Programming is done through the front panel membrane switch and full-functioned custom liquid crystal display
- Can store 10 programs in memory of as many as 10 steps each where each step is a temperature, temperature ramp rate (if wanted), stirring speed and time

Torrey Pines Scientific
www.torreypinesscientific.com

VORTEX BLEND OVERHEAD STIRRER

- Caters to scientists who need to test new formulations and blends in parallel
- Offers scientists an efficient, space saving way of performing 3 blending experiments in parallel
- Benefiting from a 3-way gearbox and integral heating plate—the unit economizes valuable lab space and ensures that parallel experiments have identical stirring rate and heating rate/temperature conditions, thereby improving result reliability

Asynt
www.asynt.com

SHAKER & STIRRER MANUFACTURERS

Asynt	www.asynt.com
Bel-Art Products	www.belart.com
Bibby Scientific	www.bibby-scientific.com
Boekel Scientific	www.boekelsci.com
Caframo	www.caframo.com
Eberbach	www.eberbachlabtools.com
Endecotts USA	www.endecotts.com
Eppendorf	www.eppendorfna.com
Fritsch	www.fritsch.de
Gilson Company	www.globalgilson.com
Grant Instruments	www2.grantinstruments.com
Heidolph USA	www.heidolphUSA.com
IKA Works	www.ika.com
Jeio Tech	www.jeiotech.com
Kinematica	www.kinematica.ch/en.html
Labnet International	www.labnetlink.com
Labnics Equipment	www.labnics.com
LabStrong	www.labstrong.com
Pro Scientific	www.proscientific.com
Retsch	www.retsch.com
Sartorius	www.sartorius.com
Scientific Industries	www.scientificindustries.com
Silverson Machines	www.silverson.com
TECA	www.thermoelectric.com
Thermo Fisher Scientific	www.thermoscientific.com
Torrey Pines Scientific	www.torreypinesscientific.com
Troemner	www.troemner.com
UDY Corporation	www.udyone.com
Yamato Scientific America	www.yamato-usa.com

SPECTROPHOTOMETERS

INCLUDES AA, FTIR, RAMAN, AND UV-VIS

TOP 5 THINGS YOU MAY NOT KNOW ABOUT SPECTROPHOTOMETERS

1. In the 1930s, vitamin research indicated that several vitamins, particularly vitamin A, absorb ultraviolet (UV) light. Spurred by the American government's interest in measuring vitamin content in soldiers' rations using ultraviolet and visible (UV-Vis) light, this research culminated in the commercial launch of UV-Vis spectrophotometers in the early 1940s.
2. Nobel laureate Bruce Merrifield referred to the UV-Vis spectrophotometer as "probably the most important instrument ever developed toward the advancement of bioscience."
3. Raman spectrophotometers were once massive benchtop instruments that required a PhD to operate, while today's instruments are much more portable and easier for non-experts to use.
4. Atomic absorption (AA) has been known since the 19th century, but it was not until the 1950s, thanks to efforts by Alan Walsh at Australia's CSIRO research center, that use of AA spectrometers became routine for metals analysis.
5. Fourier transform infrared (FTIR) spectroscopy, a subset of infrared (IR) spectroscopy, uses a mathematical algorithm, Fourier transform, to translate raw infrared data into a spectrum.

TOP 5 QUESTIONS YOU SHOULD ASK WHEN BUYING A SPECTROPHOTOMETER

1. What applications will you be using the instrument for? This will help you determine the detection range you require. Don't forget to consider future applications that may require a broader range.
2. Ask if it's possible to have a sample run on the instrument you're considering for purchase and how long will it take.
3. What sort of environment will you be working in? If you are out in the field, in a humid area for example, the instrument should be tough enough to handle the conditions.
4. What is my budget and what kind of ROI can I get on a new system purchase?
5. How are customers supported during implementation and post-sale?

For more specific lists visit: www.labmanager.com/aa-questions for AA, www.labmanager.com/FTIR-questions for FTIR, www.labmanager.com/raman-questions for Raman, and www.labmanager.com/uv-vis-questions for UV-Vis

RECENTLY RELEASED SPECTROPHOTOMETERS

MAYA LSL SPECTROMETER

- Combination of a back-thinned CCD array detector and low stray light optical design results in high-sensitivity, high-throughput performance for applications ranging from chemical catalysis to Raman analysis
- Unit's speed, sensitivity and throughput help to reduce measurement errors and ensure accuracy
- Offers very low stray light performance of 0.015 percent at 400 nm

Ocean Optics
www.oceanoptics.com

EPOCH™ 2 MICROPLATE SPECTROPHOTOMETER

- Combines a large touchscreen and full onboard data analysis software for simplified and efficient operation and reporting of absorbance-based detection workflows
- 10-inch color touch screen interface offers an enhanced user experience, with intuitive navigation and a high resolution display
- On-board Gen5™ Data Analysis Software provides quick analysis and flexible export and report options at the touch of a few buttons

BioTek
www.biotek.com

CARY 8454 UV-VIS DIODE ARRAY SPECTROPHOTOMETER

- Includes a new version of UV-Vis ChemStation software that integrates with OpenLAB Enterprise Content Manager (ECM)
- Provides the secure data management needed in pharmaceutical and other highly regulated industries
- Compact, easy-to-maintain system can collect a complete spectrum in less than one second
- Transitioning from existing earlier models to the Cary 8454 UV-Vis is seamless

Agilent
www.agilent.com

IRTRACER-100 FTIR SPECTROPHOTOMETER

- Combines high speed, sensitivity and resolution with enhanced expandability and easy-to-use software
- Enables up to 20 spectra/second acquisitions, offers 60,000:1 S/N ratio, and features resolution of 0.25 cm-1, which provides for highly accurate quantitation and identification
- Features a stable, airtight interferometer that incorporates a built-in automatic dehumidifier, while its Advanced Dynamic Alignment provides enhanced stability and shorter warm-up times

Shimadzu
www.ssi.shimadzu.com

SPECTROPHOTOMETER MANUFACTURERS

ABB	www.abb.com	GE Healthcare	www.gelifesciences.com
Agilent	www.agilent.com	Hach	www.hach.com
Analytik Jena	www.analytik-jena.com	Hamamatsu Photonics	www.hamamatsu.com
Aurora Biomed	www.aurorabiomed.com	Hitachi High Technologies	www.hitachi-hta.com
B&W Tek	www.bwtek.com	HORIBA Scientific	www.horiba.com/scientific
BaySpec	www.bayspec.com	JASCO	www.jascoinc.com
Beckman Coulter	www.beckmancoulter.com	Malvern Instruments	www.malvern.com
Biochrom	www.biochrom.uk	Newport	www.newport.com
BioTek	www.biotek.com	Ocean Optics	www.oceanoptics.com
Bruker	www.bruker.com	PerkinElmer	www.perkinelmer.com
Buck Scientific	www.bucksci.com	Renishaw	www.renishaw.com
Cecil Instruments	www.cecilinstruments.com	Rigaku Raman	www.rigakuraman.com
CRAIC	www.microspectra.com	S.I. Photonics	www.si-photonics.com
DeltaNu	www.deltanu.com	Shimadzu	www.shimadzu.com
Eppendorf	www.eppendorfna.com	Tec5USA	www.tec5usa.com
GBC Scientific	www.gbcscientific.com	Thermo Fisher Scientific	www.thermoscientific.com

THERMAL ANALYZERS

TOP 5 THINGS YOU MAY NOT KNOW ABOUT THERMAL ANALYSIS

1. Thermal analysis is the broad category of at least 20 techniques that measure some fundamental property of matter as a result of adding heat.
2. As with many other lab instruments, thermal analysis is trending toward user-friendly software, smaller and more compact instruments, availability of auto-samplers, and greater value.
3. Thermal analysis used to require an operator with a PhD in calorimetry or rheology.
4. Polymers, which are targets for up to 70 percent of all thermal analyses, are tested not just at the raw plastics processing plant, but in nearly every manufacturing industry, especially packaging.
5. Sample prep is very important to the success of a thermal analysis.

TOP 6 QUESTIONS YOU SHOULD ASK WHEN BUYING A THERMAL ANALYZER

1. If you are going to be analyzing x,y,z, properties, ask if the company has any customers conducting the same type of work and if you can talk to them.
2. Ask if you can submit a sample for a demo using specified conditions and, if so, how long this will take and whether a report will be provided.
3. What type of post-sale application and technical support does the company offer, and how much will it cost you?
4. What features distinguish the company's instrument from their competitors'?
5. What can the company tell you about the quality of the product, i.e., how it was manufactured and tested? This will help you determine the typical lifespan.
6. What can the vendor tell you about the total cost of ownership, including expected consumables, software upgrades, service, and warranty costs?

RECENTLY RELEASED THERMAL ANALYZERS

DISCOVERY SERIES TGA

- Combines innovative technologies for temperature control and mass measurement with an advanced user interface
- Introduces Diffusion-Bonded Sensor technology which improves sensitivity of the temperature measurement while maintaining a very short time constant for excellent signal resolution
- TRIOS software makes it easy for users to manage the sample queue

TA Instruments
www.tainstruments.com

FLASH DSC 1

- Opens up new frontiers in the field of materials characterization
- Ultra-high heating and cooling rates add a new dimension to the study of thermally induced physical transitions and chemical processes
- Enables users to investigate effects that were previously impossible to measure
- Features fast response sensor and wide temperature range

Mettler Toledo
www.mt.com

DTG-60/ DTG-60A

- Improves ease of operation, sensitivity and analytical accuracy of conventional standalone systems
- Basic functions required by simultaneous thermo-gravimetry/differential thermal analysis (TG/DTA) measurements are improved
- Features programmable atmosphere control
- Provides advanced acquisition, analysis and report functions which ensure comfortable simultaneous measurements
- DTG-60A is a new automatic DTG which defines new standards in autosampler technology

Shimadzu
www.ssi.shimadzu.com

TL-9000

- Combines the power of thermal analysis, with the specificity of separation and the sensitivity of detection available in spectroscopic and chromatographic methods
- Offers an accessory that enables hyphenation
- Provides scientists the ability to identify and study low levels of materials in highly complex matrices

PerkinElmer
www.perkinelmer.com

THERMAL ANALYZER MANUFACTURERS

Anasys Instruments	www.anasysinstruments.com
Anton Paar	www.anton-paar.com
GE Healthcare	www3.gehealthcare.com
Mettler Toledo	www.mt.com
Netzsch	www.netzsch-thermal-analysis.com
PerkinElmer	www.perkinelmer.com
Rigaku	www.rigaku.com
Scinco	www.scinco.com
Setaram Instrumentation	www.setaram.com
Shimadzu	www.shimadzu.com
TA Instruments	www.tainstruments.com

TITRATORS

TOP 5 THINGS YOU MAY NOT KNOW ABOUT TITRATION

1. The term "titration" has its origins in the Latin word *titulus*, which means title or inscription.
2. Titration, also known as volumetric analysis, got its start in France in the late 1700s. In 1791, François-Antoine-Henri Descroizilles developed the first burette.
3. Later, in 1824, Joseph Louis Gay-Lussac coined the terms “burette” and “pipette” and created a better version of the burette that had a side arm.
4. Karl Friedrich Mohr tinkered with the burette further, adding a tip and clamp at the bottom, which helped to make titration an even more popular technique in the lab.
5. The first book on volumetric analysis was written by Karl Heinrich Schwartz and published in 1853.

TOP 6 QUESTIONS YOU SHOULD ASK WHEN PURCHASING A TITRATOR

1. How precise is the titrant delivery system?
   a. Is the titrant delivery system certified for accuracy?
2. Can additional titrants be used without having to purge burettes?
3. What information is included in the titrator’s display and reports?
4. Is the titrator limited to proprietary electrodes?
   a. What is the replacement cost for electrodes?
5. Is the software field upgradeable?
6. What is the service and repair policy?
   a. Is on-site support offered?
   b. If something goes wrong with the meter, can it be fixed locally?
   c. What is the general turn-around time for repair?

875 KF GAS ANALYZER: FULLY AUTOMATED WATER ANALYSIS IN PERMANENT AND LIQUEFIED GASES

With its new 875 Karl Fischer Gas Analyzer, Metrohm combines decades of experience in moisture analysis and sample handling. The KF Gas Analyzer is designed to handle nearly any gas sample – compressed, liquefied or native. It is fully equipped to measure the absolute moisture content of LPG, petrochemical intermediates, natural gas or other compressed or liquefied gases.

Metrohm's easy-to-use gas analyzer features a complete and integrated sample introduction and treatment system. The integrated sample heater guarantees uniform temperature and evaporation of a sample regardless of its original state while a precision flow control valve ensures a constant and even flow of the sample. A series of automatically controlled magnetic valves connect the sample to a rugged mass flow controller, which carefully meters the exact amount of gas specified for each analysis. The analyzer's coulometric cell is powered by one of Metrohm's lab favorites - the KF Titrando.

The system's strict separation of gas-carrying system and electronic area ensure safe operation. Gasses are prevented from ever coming into contact with sparks, which eliminates the risk of gas explosion.

These key features and the KF Gas Analyzer's robust design make it an ideal candidate for routine analysis in the laboratory. The system is controlled by Metrohm's easy-to-use tiamo™ software and consists of a control unit and an analysis module.

Highlights:

- Complete system with durable components for high flexibility
- Separation of the gas handling system from the electronics and power supply for added safety
- Sample inlet filter to keep out particulate matter
- Venting bypass to release the pressure when swapping gases
- Built-in evaporator for gasses in all states – native, compressed and liquid
- Oil filter with flushing port to remove residual oil
- Precise gas measurement with a mass flow controller (MFC)
- Automated analysis sequence using magnetic valves
- Predefined analytical methods with gas feed and pre- and post-flushing phase
- All components integrated in one system

The 875 KF Gas Analyzer is supplied with predefined software methods, so measurement can begin immediately after installation.

Analysis of a wide range of liquefied or compressed gases, such as:

- propane, propene, LPG, butane, butene, butadiene
- dimethyl ether, ethylene oxide
- chlorinated hydrocarbons: methyl chloride, ethyl chloride, vinyl chloride
- refrigerants: various CFC, HFC, CFC
- New and contaminated refrigerants containing refrigeration oils
- Analysis of permanent gases, e.g. natural gas

Metrohm
USA Inc.
6555 Pelican Creek Circle
Riverview, FL 33578
866-METROHM (638-7646)
www.metrohmusa.com

RECENTLY RELEASED TITRATORS

AQUACOUNTER® (AQV-2200S) VOLUMETRIC KF TITRATOR

- Suited for working in wide moisture range from 100 ppm to 100% water
- Large touch color screen guides the user from setup to a complete analysis
- Allows users to run two KF channels in parallel, enabling two different measurements at the same time
- Unit is rugged, reliable, long lasting and eco-friendly with small volume titration cells requiring only 20mL of titration solvent for accurate measurements

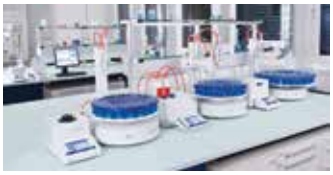
JM Science
www.jmscience.com

OPTRODE OPTICAL SENSOR

- Features eight different wavelengths for a wide measuring range, it is 100% solvent resistant thanks to a glass shaft, and it is very easy to handle
- Can be used on both new and existing Metrohm titration systems as well as on titrators from other manufacturers
- Applications include photometric titrations in accordance with USP and Ph. Eur. (nonaqueous), and more

Metrohm
www.metrohm.com

INMOTION™ AUTOSAMPLERS



- These automated sample changers are designed for titrators, density meters and refractometers
- Offer excellent productivity in minimal space with flexible solutions for analyses
- Only 42 centimeters wide, the Flex and Pro series offer professional automation in minimal bench space
- The Max series can handle more than 300 samples on one 57 centimeter wide sample rack

METTLER TOLEDO
www.mt.com

HI 84500 AND HI 84502

- Designed to measure sulfur dioxide (SO_2) and total acidity, parameters essential in the art of wine making
- Replace HI 84100 and HI 84102 and feature improved accuracy with a high precision piston dosing system and compact, space saving footprint
- Feature automatic stirrer speed control, a graphic mode with exportable data and a Good Laboratory Practices feature

Hanna Instruments
www.hannainst.com

TITRATOR MANUFACTURERS

Crescent Chemical	www.crescentchemical.com
Denver Instrument	www.denverinstrumentusa.com
GR Scientific	www.grscientific.com
Hanna Instruments	www.hannainst.com
HIRANUMA	www.hiranuma.com
Hirschmann	www.hirschmann-inc.com
Man-Tech	www.mantech-inc.com
Metrohm	www.metrohm.com
Mettler Toledo	www.mt.com
Photovolt	www.photovolt.com
Radiometer Analytical	www.radiometer-analytical.com
Sigma-Aldrich	www.sigmaaldrich.com

TOC ANALYZERS

TOP 4 THINGS YOU MAY NOT KNOW ABOUT TOC ANALYSIS

1. The U.S. Environmental Protection Agency's Disinfectant Byproduct Rule was enacted in stages beginning in the late 1990s, as part of the Clean Water Act. The regulation holds water utilities responsible for characterizing their product for levels of disinfection byproducts (DBPs), which form when disinfectants are used to control microbial pathogens. Over 260 million Americans are exposed to DBPs. Specifically, the rule tightens compliance monitoring requirements for trihalomethanes (THMs) and haloacetic acids (HAAs), and has been a boon for TOC monitoring.
2. In recent years, there has also been increased attention to online TOC, or grab-sampling, to get a better handle on levels of such contaminants in drinking water.
3. HAA and THM problems are seasonal, arising mostly during warm months when algal or bacterial blooms are most likely and water companies are more inclined to use disinfectants. TOC is not the only way to quantify these compounds. GC-MS systems and dedicated THM analyzers are two other technologies that can do so.
4. HAAs and THMs aren't the only consequence of bacterial or algal blooms. When microorganisms die, they release compounds that produce disagreeable odors, even in the ppb concentration range, creating a tough environment for water plants to master. TOC is a good indicator of what's coming into those plants.

TOP 5 QUESTIONS YOU SHOULD ASK WHEN BUYING A TOC ANALYZER

1. Is the TOC technology suitable for your specific application or water conditions? Many TOC technologies may be suitable only for waters with a narrow range of organic or inorganic contaminants.
2. Are different models available to meet your current and future sampling needs (i.e. online, portable, laboratory)? Do these models use similar technology to simplify method transfer or data comparability from lab to online?
3. Does the company offer the documentation and support necessary to help meet applicable industry or government regulations?
4. What is the company's level of experience supporting sales of TOC analyzers in your specific industry? Do they understand the unique challenges specific to your application?
5. What type of service, applications, and technical support are available during and after the purchasing process?
6. Finally, ask about the cost of the purchase—not just the price of the product being installed but the total cost of ownership, which includes price, service expectations, warranty, etc.

RECENTLY RELEASED TOC ANALYZERS

SIEVERS M9 TOTAL ORGANIC CARBON ANALYZER

- Designed to measure TOC in a broad range of samples from ultrapure water to process waters
- Enhances productivity by producing TOC results in two minutes, twice as fast as its predecessor
- Offered in three versions: portable, online or laboratory
- Can measure conductivity in grab sample or autosampler modes

GE
www.geinstruments.com

ADI 7010 TOC ANALYZER

- Measures samples ranging from 0 to 500 mg/l; the measurement range can also be extended up to 10,000 mg/l
- Uses the method of UV persulfate oxidation (complying with the DIN, EPA, ASTM, and NAMUR regulations) and has separate compartments for the electronics and wet end
- Operated via menus on a touchscreen

Metrohm
www.metrohm.com

OI ANALYTICAL 9210P ONLINE TOC ANALYZER

- Provides real time data and visibility of natural organic matter that reacts to form harmful disinfection by-products
- Obtains data that is comparable and consistent with grab samples analyzed on a laboratory TOC analyzer
- Allows use of a 5-point calibration, making it fully compliant with USEPA-approved methods 415.3 and SM 5310C

Xylem
www.xylemanalytics.com

450TOC PORTABLE TOTAL ORGANIC CARBON ANALYZER

- Provides real-time, continuous TOC analysis with instant measurements at any point-of-use
- Can reduce sampling time by 75% or more with on-the-spot results that eliminate lab analysis delays
- Meets the stringent requirements of the pharmaceutical, microelectronics, and power industries
- Allows measurements to be taken at any point where short or long term monitoring may be desirable

METTLER TOLEDO
www.mt.com

TOC MANUFACTURERS

Analytik Jena	www.analytik-jena.com
EST Analytical	www.estanalytical.com
GE Analytical Instruments	www.geinstruments.com
Hach	www.hach.com
Metrohm	www.metrohm.com
Mettler Toledo	www.mt.com
OI Analytical (Xylem)	www.oico.com
Parker Balston	www.balstonfilters.com
Shimadzu	www.shimadzu.com
Skalar Analytical	www.skalar.com
Teledyne	www.teledyne.com
Thermo Fisher Scientific	www.thermoscientific.com
TOC Systems	www.tocsystemsinc.com
UIC	www.uicinc.com

TOP 6 THINGS YOU MAY NOT KNOW ABOUT VACUUM PUMPS

1. The suction pump, a predecessor to the vacuum pump, was invented by the Arabic engineer Al-Jazari in 1206. It was not until the fifteenth century that the suction pump first appeared in Europe.
2. The first mercury barometer was invented by Evangelista Torricelli, based upon earlier work by Galileo, in 1643. The first sustained vacuum was achieved later the same year.
3. However, the first true vacuum pump wasn't invented until 1654 by Otto von Guericke, who used it to evacuate the air between two hemispheres in order to demonstrate that they could not then be separated by two teams of horses (the famous "Magdeburg hemispheres experiment").
4. In 1855, Heinrich Geissler invented the mercury displacement pump and used it to achieve an unprecedented vacuum of around 10 Pa (0.1 Torr).
5. Later that century, in 1874, a new style of pump consisting of vanes mounted to a rotor that turned within a cavity was patented by Charles C. Barnes of Sackville, New Brunswick, Canada. This type of pump became known as the rotary vacuum pump, and took depth of vacuum to a new level.
6. Dr. Wolfgang Gaede first reported the principle of the molecular drag pump at a 1911 meeting of the Physical Society in Karlsruhe. The pump was extremely well received and was considered to be the major event of the meeting. After many problems and setbacks, the first 14 pumps were ready for sale by the fall of 1912.

TOP 6 QUESTIONS YOU SHOULD ASK WHEN BUYING A LAB VACUUM PUMP

1. What will you be using the vacuum for? Filtration needs modest vacuum. Evaporation requires deeper vacuum. Molecular distillation requires even more. Match the pump to the use.
2. Can you use a dry (oil-free) vacuum pump? Oil-free vacuum pumps can support most lab applications. For the service advantages, choose a dry pump where possible.
3. What is the pumping capacity at the intended vacuum level? Actual pumping speed declines from the nominal speed as depth of vacuum increases. The rate of decline differs among pumps.
4. Do you work with corrosive media? Standard duty pumps have lower purchase costs, but corrosion-resistant pumps will have lower lifetime costs if working with corrosives.

5 Should you invest in vacuum control? Electronics can improve reproducibility, protect samples and shorten process times when specific vacuum conditions need to be maintained.

6 What is the lifetime cost of operation? Include purchase cost, service intervals, servicing cost, pump protection (e.g., filters, cold traps), and staff time for operation.

RECENTLY RELEASED VACUUM PUMPS

ROCKER 300 LABORATORY VACUUM PUMP

- Piston-powered oil-free pump provides vacuum and pressure in just one unit
- Features precise construction, quality moving parts, and the noise level is only 50 dB
- Almost maintenance-free due to the oil-free design
- Guaranteed operation of two years or 3000 working hours of free service parts (excluding the moisture filter)
- Equipped with a 1/8 hp motor

New Star Environmental
www.newstarenvironmental.com

N 920 KT.29P DIAPHRAGM VACUUM PUMP

- Provides lab technicians with adjustable vacuum performance, without the need for lubricating oil or recirculating water
- Also gives users quiet function with long product life in myriad laboratory applications
- In addition to N 920 KT.29P's adjustable vacuum performance, it delivers deep end vacuum up to 1.5 Torr, and a flow rate of 20 L/min

KNF Neuberger
www.knfusa.com

IDP-15 DRY SCROLL VACUUM PUMP

- Features a hermetic, isolated design
- Provides rapid pump-down with a 60 Hz pumping speed of 15.4 cubic meters per hour
- Quiet and vibration-free, and its single-sided scroll design makes it highly cost-effective, requiring only simple annual maintenance
- Gives users clean, dry vacuum pumping, suitable for all non-corrosive, non-hazardous academic, research, analytical instrumentation and industrial applications

Agilent
www.agilent.com

FOSSA FO 0015 A SCROLL VACUUM PUMP

- Hermetically sealed, completely dry-compressing vacuum pump is suitable for a wide range of specialist applications
- When used in conjunction with a turbomolecular vacuum pump, the Fossa provides a completely dry vacuum for use in high vacuum applications
- Design eliminates contamination or chemical reactions with pump operating fluids
- Optional gas-ballast valve available for the improved pumping of vapors

Busch
www.busch.co.uk

VACUUM PUMP MANUFACTURERS

Agilent	www.agilent.com
BrandTech	www.brandtech.com
Buchi	www.buchi.com
Busch	www.busch.co.uk
Cole Parmer	www.coleparmer.com
Edwards	www.edwardsvacuum.com
KNF Neuberger	www.knf.com
Labconco	www.labconco.com
Myers Vacuum	www.myers-vacuum.com
New Star Environmental	www.newstarenvironmental.com
Oerlikon	www.oerlikon.com
Pfeiffer Vacuum	www.pfeiffer-vacuum.com
Precision Scientific	www.precision-scientific.com
Shimadzu	www.shimadzu.com
VACUUBRAND	www.vacuubrand.com
Vacuum Research	www.vacuumresearch.com
Welch-Ilmvac	www.welchvacuum.com

VISCOMETERS

TOP 4 THINGS YOU MAY NOT KNOW ABOUT VISCOMETERS

1. The ease of adding ketchup from a squeeze bottle to an order of French fries, the trouble that it takes to press toothpaste out of a tube, and many other common needs depend on viscosity. This is what makes viscometers such an important part of many industries.
2. The options for measuring viscosity are just as numerous as the applications, and growing. Temperature is one of the most exciting trends in viscosity measurement today. Those doing the measuring want to see how far they can push temperature—high and low—and still get reliable data. For now, the desirable range starts higher than 100 degrees Celsius and goes down below –20, with some people looking to drop that even more.
3. Another key trend in viscometers is that people want to take traditional methods and make them faster.
4. In many cases, companies can save money by placing a viscometer in a production line and making measurements in real time.

TOP 6 QUESTIONS YOU SHOULD ASK WHEN BUYING A VISCOMETER

1. What kind of temperature control and spindle rotational speed control does the instrument offer? Temperature is critical, since viscosity generally rises as a fluid cools. Spindle rotation may also affect viscosity.
2. What range of accessories (ex. sample holders) does the company offer for the instrument?
3. How easy to use is the viscometer? Since most users nowadays aren't experts, an easy-to-use instrument is probably the best fit for most labs.
4. What are the sizes of the samples you'll be working with? This may be an issue when analyzing very expensive materials such as drugs or proteins and cost of ownership is also important for high-volume applications.
5. What is the instrument's measurement range? If you're analyzing petroleum, from crude oil to gasoline, do you want to change out the capillary for each measurement, or use something that works all the way through?
6. What kind of service and support does the company provide?

RECENTLY RELEASED VISCOMETERS

DV2T™ VISCOMETER

- Touchscreen display provides an easy user interface
- Comes with integrated temperature probe for viscosity vs. temperature profiling tests
- Offers powerful new programming capabilities and results analysis including data averaging and QC limits with alarms
- Also features quick viscosity measurements in standalone mode or comprehensive "flow curve" tests (viscosity vs. shear rate) under PC control with Rheocalc T Software

Brookfield Engineering
www.brookfieldengineering.com

M-VROCI VISCOMETER/RHEOMETER ON A CHIP

- Provides measurement for low viscosity industrial fluids, under conditions that reflect those that apply during end-product use
- Features completely enclosed measurement for safe and reliable analysis of highly volatile or environmentally-sensitive samples
- Generates accurate viscosity data using sample volumes as low as 50 μL
- Also boasts a wide dynamic range, easy sample loading and repeatable, accurate measurement

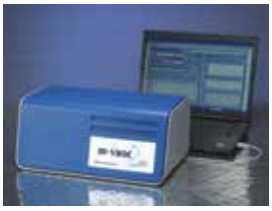
Malvern
www.malvern.com

SPECTROVISC Q3050 PORTABLE KINEMATIC VISCOMETER

- Enables immediate determination of lubricant viscosity in the field
- Measurement range extends from 1cSt-680cSt at 40°C
- Can calculate 100°C viscosity values with the input of the VI index
- Allows measurement of kinematic viscosity using only a few drops (60μL) of oil
- Requires no solvents for cleaning sampling cell surfaces

Spectro
www.spectroinc.com

M-VROC VISCOMETER



- Now equipped with the highest resolution to detect and measure intrinsic viscosity, a capability indispensable for all bio/pharma and polymer applications
- Provides easy and fast intrinsic viscosity measurement, requiring just 20 microliters and takes only a few minutes
- New capability especially suits applications related to polymerization, degradation, interaction, and the stability of molecules

RheoSense
www.rheosense.com

VISCOMETER MANUFACTURERS

A&D Weighing	www.andweighing.com
Anton Paar	www.anton-paar.com
ATS Rheo Systems	www.atsrheosystems.com
Brookfield Engineering	www.brookfieldengineering.com
Cannon Instrument Company	www.cannoninstrument.com
Hydramotion	www.hydramotion.com
Kinematica	www.kinematica-inc.com
Malvern	www.malvern.com
Petrolab Company	www.petrolab.com
RheoSense	www.rheosense.com
Spectro	www.spectroinc.com
Stony Brook Scientific	www.stonybrooksci.com
Wyatt Technologies	www.wyatt.com

WATER PURIFICATION SYSTEMS

TOP 5 THINGS YOU MAY NOT KNOW ABOUT WATER PURIFICATION SYSTEMS

1. The French cleric Jean-Antoine Nollet made the important discovery that water naturally diffuses from a dilute to a concentrated solution in 1748. This phenomenon later became known as osmosis. During the following century, the study of osmosis became of particular interest to practitioners of the biological and medical sciences.
2. Robert Barnstead, a master plumber, developed the first all-metal laboratory distillation unit for Massachusetts General Hospital in 1878.
3. In 1907, Heinrich Bechhold published a paper on the process known today as ultrafiltration. Bechhold described driving solutions at high pressures through a membrane prepared by impregnating filter paper with acetic acid. He used the term ultrafilter to describe a collodion membrane of graded pore size. Ultrafiltration is now commonly understood to mean a process that allows colloidal particles, emulsions and microorganisms to be removed from a solution.
4. The use of ultraviolet (UV) light treatment was first attempted in the United States as a method to purify drinking water in 1916.
5. From 1926 to 1931, key research was performed on the phenomenon of reverse osmosis by various researchers, including Michaels, Manegold and McBain.

TOP 4 QUESTIONS YOU SHOULD ASK WHEN BUYING A LAB WATER PURIFICATION SYSTEM

1. What do you need the water for? What is your application? What type of water is needed? What is the source of your current water? How much water is required per batch/day? Are there special requirements for delivery?
2. What is your budget? The budget will determine the technology. What is the cost of ownership over five years?
3. Where do you need the system in the lab(s)? Consider, top of counter, under counter or wall mounting the unit. What is the overall footprint/real estate of the system(s) and components?
4. What kind of warranty and service is provided? Is the system manufactured to quality standards and which ones? Is this a pharmaceutical application, does it need to be validated?

PARAMOUNT® FILTERED ENCLOSURES OFFER SAFE, ECONOMICAL ALTERNATIVE FOR FUME HOODS.

Labconco's Paramount Carbon Filtered Enclosures were designed as an economic alternative to the standard ducted chemical fume hood, especially for applications where a fully equipped fume hood could be deemed excessive. They incorporate the use of carbon filters and optional HEPA filters, along with an internal motorized impeller, to facilitate containment of chemical applications, both in solution and powder form. With the Paramount Filtered Enclosure, scientists, lab researchers and students can safely carry out their wet and dry chemistry inside the enclosure without incurring the cost of ductwork and installation fees, or the constant HVAC costs experienced with a standard vented fume hood.

Since ducting to the outside is unnecessary, the Paramount ideal in modular lab designs. It can be positioned on a mobile base stand with a work surface and be transported through standard doorways from lab to lab. The Paramount is also applicable where chemical containment is needed, but ducting out is not an option, typically due to building design limitations or where regulations will not allow ducting. It can serve as a bench top model in any location, or be paired with a standard base stand and work surface.

The Paramount offers seven different filter options that enable it to handle a wide assortment of chemical types. Each chemical application is paired with the appropriate filter installation to meet OSHA and NIOSH guidelines for safe chemical handling. Since any two types of filters can be stacked to handle mixed chemical usage, it is compatible for a wide range of applications. To match chemical applications with the appropriate filters, the Chemical Assessment Form program, by Labconco, is a free industry service that is reviewed by a chemical applications specialist.

The Paramount Filtered Enclosure has abundant features designed to provide the enclosure offering minimal maintenance with quality safety for both user and lab. Features include:

1. **Safety-First Organic Vapor Sensor** detects contaminants in the exhaust indicating chemical break-through and notifies the user that it is time to replace the filters by activating an audible and visual alarm.
2. **LCD Message Center** is a large, easy-to-read screen providing continuous status reports for each filter including airflow speed, filter saturation and low airflow alarm messages. It also displays filter life and checks timers with audible/visual elapsed time alerts.
3. **Smart Flow System™** automatically adjusts the motor speed for filter pressure drop, barometric pressure and room temperature—eliminating the need to manually adjust motor speed.
4. **Electronic Security Lock** may be implemented when lab managers looking to limit access or manage how the Paramount is utilized.
5. **Clean-Sweep™ Air Foil** is aerodynamically designed to allow air to flow under and over it— thoroughly sweeping the work surface of heavier than air contaminants.
6. **Side-Entry™ Air Foils** allow air to sweep the interior surfaces to enhance containment. Both help to prevent dead air pockets on the sides or at the back of the work area.
7. **Upper Containment Sash Foil** conducts air through and around it at the end of the sash. Aided by…
8. **Upper Dilution Air Supply** flows clean air to the back of the sash, these two additions direct contaminants away from the user's breathing zone.
9. **Zone-Perforated Rear Baffle** has a unique slot pattern and slot sizes to promote non-turbulent horizontal laminar airflow through the work area. The baffle also pivots downward for ease of cleaning.

All Paramount Ductless Enclosures conform to the SEFA, ASHRAE, and ANSI regulations. The Paramount is offered in varying sizes, depths and height options. Please contact Labconco for help determining which configuration is most appropriate.

WATERPRO® BT™ PRODUCES BOTH TYPE I AND RO-PURIFIED WATER FROM TAP WATER.

The WaterPro BT Water Purification System offers all-in-one versatility in a compact size for your laboratory benchtop. It delivers ultrapure Type I, 18.2 megohm-cm, at a rate of >0.5 liters/minute at inlet water temperatures of 25°C either manually or volumetrically, directly from tap water. It also delivers Reverse Osmosis (RO)-purified Type III water that is stored in the integral six liter tank. The tank outlet valve provides access to RO-purified, Type III water, produced at a rate up to 3 liters per hour. The WaterPro BT is ideal for labs using between 1-10 liters of pure water per day. Applications include instrumental trace element analysis, mixing standardized acid/base solutions, and media solutions. Type III water is ideal for non-critical laboratory applications such as reagent preparation and glassware rinsing. An optional UV lamp further reduces the bacteria and TOC levels necessary for life science applications. The small footprint makes it light enough to be moved from lab to lab when needed.

Labconco Corporation 800.821.5525, Labconco.com

Protecting your laboratory environment
LABCONCO

800.821.5525
www.labconco.com

RECENTLY RELEASED WATER PURIFICATION SYSTEMS

PURELAB® CHORUS WATER PURIFICATION SYSTEM

- Gives you the chance to configure a solution that best suits your needs with the added benefit of flexibility should your future needs change
- A selection of dispense, storage and installation options is available
- Offers users the ability to create their own solution to fit the application, budget and configuration of their laboratory

ELGA
www.elgalabwater.com

WATERPRO® BT™ WATER PURIFICATION SYSTEM

- Delivers ultrapure Type I water, up to 18.2 megohm-cm, at a typical rate of >0.5 liters per minute at inlet water temperatures of 25° C either manually, or volumetrically, directly from tap water
- Features light weight and small footprint of only 16.5" deep x 11.4" wide x 21.3" high
- Easy to install—just plug and play

Labconco
www.labconco.com

RECENTLY RELEASED WATER PURIFICATION SYSTEMS

FI-STREEM WATER PURIFICATION STILLS

- Now certified by the Canadian Standards Association (CSA)
- Independently tested and certified to meet North American industry-recognized standards for safety and performance
- Models that are CE and CSA certified include the A74415LS, A74415-60LS, A74410LS, A74428LS, A74420LS, A56210-857LS, A56218-857LS, A56220-857LS, A56230-857LS, A56228-857LS and A56238-857LS
- Consistently produce high quality ASTM Type II water

LabStrong
www.labstrong.com

BARNSTEAD GENPURE XCAD PLUS WATER PURIFICATION SYSTEM

- Provides ultrapure water from up to three remote dispensers, simultaneously
- Enables flexibility and ease of use for shared laboratory environments
- Exceeds international standards ASTM Type 1, ISO 3696 Grade 1, ASTM D1193 and CLSI-CLRW, delivering ultrapure 18.2 MΩ• cm water with consistent quality
- Comes with leak detection, electronic dispensing for fully automatic volume control, and feed water monitoring

Thermo Fisher Scientific
www.thermoscientific.com

WATER PURIFICATION SYSTEM MANUFACTURERS

Aqua Solutions	www.aquaa.com
Aries Filterworks	www.arieswater.com
Aurora Biomed	www.aurorabiomed.com
ELGA	www.elgalabwater.com
EMD Millipore	www.emdmillipore.com
Evoqua	www.evoqua.com/en
Labconco	www.labconco.com
LabStrong	www.labstrong.com
Malvern	www.malvern.com
Pall Corporation	www.pall.com
Sartorius	www.sartorius.com
Thermo Fisher Scientific	www.thermoscientific.com
Z-Sc1	www.z-sc1.com

MOBILE LABORATORY APPS

AB Sciex - MS iCalc
A collection of handy calculators designed to help you quickly get numbers and information you use every day, like mass and mass/charge, elemental composition, isotope patterns, m/z values, peptide modifications, and much more.

Accelerated Technology Laboratories - Sample Master® iMobile
Allows data to be collected in the field and automatically uploaded to the LIMS in real time, saving companies time and money. Also enables uploading of testing site data as it is collected.

AgileMedicine - AgileSciTools
Calculator set for researchers in the biological sciences. Includes functions to determine molarity dilutions, cell dilutions, MOI calculations, and primer re-suspension volumes.

Agilent - Engineering Calc
This application is intended for engineers and students who are looking for a reference tool for electrical and RF engineering. Easily determine the resistor and capacitor values based on their color codes, or vice versa. Calculate electrical values based on Ohm's Law.

Agilent - GC Calculator
Fast and easy GC pressure and flow calculations at your fingertips. This portable version of the GC pressure/flow calculator can be used to instantly and accurately determine pressures and flows through open tubular capillary columns.

Agilent - LC Calculator
Calculate the possibilities! The LC Calculator quickly calculates flow rate and back pressure under a variety of conditions and column dimensions allowing you to explore "what if" scenarios.

Agilent - Mobile Logger
Connect wirelessly to Agilent's family of handheld digital multimeters to log measurements via Bluetooth® wireless technology. Up to three Agilent handheld digital multimeters can be connected at a single time.

Agilent - Mobile Meter
Connect wirelessly to your Agilent handheld digital multimeter via Bluetooth® technology. View measurements from up to three Agilent handheld digital multimeters. The Agilent Mobile Meter enables you to extend your reach wirelessly to multiple points from a single location.

Agilent - MS Resource
Agilent MS Resource is a comprehensive warehouse of literature, video, and apps for Agilent LC/MS, GC/MS, automation and high throughput solutions, and associated applications.

Agilent - Oscilloscopes Tips and Tricks
The Tips and Tricks app for the Agilent 2000/3000 X-series supplements manuals and quick start guides and provides tips/tricks for basic usage of the scope for beginners, along with more detailed tips/tricks for advanced users.

Bio-Rad - MIQE qPCR
Get help from a special team of experts in qPCR while on the move. MIQE - qPCR helps you in reviewing scientific works and checking your own experiments when qPCR is involved. Check your project's compliancy to MIQE in minutes, have all required references on hand, and follow qPCR events and news.

Bio-Rad - Real-Time PCR
The qPCR Guide is for designing, analyzing, and optimizing real-time PCR experiments. The PCR Doctor is an interactive troubleshooting tool for resolving problems, and the Assay Design section provides guidance for designing, validating, and optimizing qPCR assays.

Bruker - Almanac
Published annually for over three decades, Bruker Almanac Version 2.0 incorporates various Nuclear Magnetic Resonance (NMR) related data; and includes molecular spectroscopy, x-ray diffraction and mass spectrometry-related useful information.

Dionex - Calc
The UltiMate® 3000 HPLC system family offers the widest possible versatility for today's laboratories. Covering flows from 20 nL/min to 10 mL/min and offering a wide range of pumping, sampling, and detection modules—all of which are fully UHPLC compatible.

EMD Millipore - Histone Modifications
Provides access to the biological significance and epigenetic implications of core histone amino acid modifications. Explore published histone modifications to obtain relevant bioinformatic data, supporting references, and available research reagents for histone modification and epigenetics research.

Eppendorf - Mastercycler nexus AR
Augmented Reality (AR) enables you to find out more about the new Eppendorf Mastercycler® nexus in a new dimension on your mobile device. Experience the new Mastercycler® nexus in a 360° 3D view.

Hettich - v1
Your resource for "at the instrument" support. Allows users to calculate RCF and/or RPM while at their centrifuges, determine their annual incubator energy consumption, explore the video library for product demos and how-to videos, and more.

Hue Medscience - My Lab
With My Lab, your iPad is now a lab notebook, protocols organizer, lab inventory and more. This customizable app lets you keep your lab data private and enables sharing of the content you want, enabling full control of your files.

Hue Medscience - Protocolpedia
The Protocolpedia app provides offline access to hundreds of complete protocols and allows users to collect their favorites in one place. Protocolpedia keeps users' lab methods organized for easy access.

Illumina - MyGenome
MyGenome empowers you to explore a real human genome, find out about possible health implications, and view reports about important genetic variations. The MyGenome app provides a simple, intuitive and educational interface for genome exploration and learning.

Illumina - SeqMonitor
Allows you to interactively monitor your sequencing runs from Illumina's HiSeq 2000 sequencers. View important metrics as they are generated, including densities, intensities, phasing/prephasing, alignment rates, error rates, quality scores and images.

LabX Media Group - *Lab Manager*
Lab Manager is a monthly publication that delivers practical business, management, safety and technology insights to today's lab professionals. The *Lab Manager* app lets you access the digital versions of the magazine and its supplements on your iPad.

Lancer USA
The Lancer USA App is a support tool for customers currently using or considering using Lancer glassware washers and cleaning chemicals. It includes customer support features such as operator info, a guide to cleaning agents, maintenance tips, and alarm troubleshooting.

Leica Microsystems - DMshare
Allows you to capture images from your Leica Microsystems ICC50 HD camera using your iPad. You simply tap anywhere inside a large area on the iPad screen. This design makes it possible to capture images on the iPad whilst using the microscope and viewing through the oculars.

Life Technologies - Cell Imaging HD
This mobile app is designed to help you find fluorescent dyes, reagents and protocols for cell-biology-related fluorescence microscopy applications. Available in both HD and regular versions.

Life Technologies - CloningBench
The CloningBench mobile app is designed to provide you with useful and essential tools to help guide your cloning experiments. The app is also available for iPad.

Life Technologies - Cytometry
This mobile app is designed to help you find fluorescent dyes, reagents and protocols for cell-biology-related flow cytometry applications.

Life Technologies - Fluorescence Spectraviewer
Plot and compare spectra, check the spectral compatibility for many fluorophores and email the configuration to yourself or others in the lab in a clear printable format. This mobile SpectraViewer acts as an extension of Life Technologies' online SpectraViewer tool.

Life Technologies – PCR Essentials
The PCR essentials app is a great tool for molecular biology researchers who conduct polymerase chain reaction (PCR). Find product information on Taq polymerases, dNTPs, gels and stains, RT-PCR products, cDNA products, and master mixes.

Life Technologies - Protocols
Provides quick, convenient access to popular Applied Biosystems or Invitrogen product protocols. Each protocol is presented with concise step-by-step instructions, along with easy access to the complete product manual.

Life Technologies - Real-Time PCR
This collection of easy-to-use real-time PCR resources is an excellent learning tool for researchers new to real-time PCR and a comprehensive reference for researchers already experienced with the techniques.

Lumenera - INFINITY ANALYZE
This new offering for INFINITY camera users operating on Apple Macintosh allows users to easily capture and process images with high quality reproducibility and accuracy.

Luminex - Brainstorm en Concept
This multiplexing symposium discusses new developments in clinical diagnostics and life science research. The Planet xMAP European congress addresses a wide range of topics such as pathogens detection, immunology-monitoring, human genetics, protein research and nucleic acid research.

Metrohm- Electrode Finder
This app for iOS guides users to the sensor that is best suited for the task at hand—for pH measurement or titration, users simply specify the sample matrix or target parameters, and the electrode finder suggests which pH, ion selective or other electrode to use. The app also includes information about proper maintenance of each sensor as well as links to demo videos.

Mettler Toledo - pH Lab Sensor Product Guide
Select the right pH, conductivity, or dissolved oxygen sensor. Simply browse through a large selection of InLab sensors or, if you do not know what sensor you are looking for, search for a sensor tailored to your applicative needs via technical search criteria or via the application itself.

Mettler Toledo - Rainin E4 XLS
This app helps you to understand the innovative Rainin E4 XLS electronic pipette concept.

Mettler Toledo - Water Calculator
Thornton's new Water Calculator provides you with the ability to do simple conductivity, resistivity and flow calculations and conversions using your iPhone, iPod touch or iPad.

MOBILE LABORATORY APPS

Minus 80 - Storage Monitoring App
Gives lab managers real-time information on their storage units (lab fridges and freezers, etc.) and the units' current status anywhere, anytime, in a streamlined format.

Mirus Bio - Reagent Agent
Designed to help you determine the best delivery solution for any nucleic acid into any cell type including hard-to-transfect cell lines and primary cells. Reagent Agent® recommendations are based on extensive in-house transfection and electroporation data, customer feedback, and citations that are all continually updated.

Netzsch - Instrument Cockpit App
Allows users to connect to NETZSCH instruments and view the current status from their iPads, iPhones, Android tablets, Android Phones, or Windows PCs connected to the intranet of their companies via network.

Netzsch - The Properties of Elements (TPoE) App
This free app (TPoE) offers all the important parameters of more than 100 elements and even more than that. For each element, a short overview is given.

Netzsch - Thermal Properties of Polymers
Thermal properties of polymer materials at a glance! Knowledge of the thermal properties is especially important in polymer applications.

New England Biolabs - NEB Tools
Use Enzyme Finder to select a restriction enzyme by category or recognition sequence, or search by name to find information on any NEB enzyme. Determine buffer and reaction conditions for experiments requiring two restriction enzymes using the Double Digest Finder.

Panasonic Healthcare - LabAlert
Allows users to watch over their samples from nearby and far away. This app monitors the performance of freezers, incubators, and potentially every unit that is in contact with samples. Receives instrument data through a small, battery-operated wireless sensor attached to the instrument's temperature probe. Account data are transmitted continuously to a secure hosted platform and can be accessed from an iPhone, iPad, Android device, or via the web. Customizable alerts ensure that the user is notified, in real-time, when something goes wrong with their equipment.

PerkinElmer - Atomic Spectroscopy Capabilities
Use this tool to learn about the differences between AA, ICP-OES, and ICP-MS technologies. From atomization through detection, this tool provides information on the design and differences in analytical techniques. The combination of high-resolution images, videos, and white papers make it easy to learn each of these techniques in a fun and interactive environment.

PerkinElmer - ChemDraw® and Chem3D for iPad®
These apps feature PerkinElmer's Flick-to-Share™ technology, a groundbreaking development in scientific collaboration and data sharing that brings molecular education to a new level, allowing scientists to share critical information and spark innovation in real-time both in and out of the laboratory.

PerkinElmer - Gas Chromatography Essentials
Use this tool to learn the basics of how GC and GC-MS work as well as examples of applications of these analytical techniques. Click on the videos to learn about the entire process to analyze a compound in a GC or GC-MS system.

Promega
The Promega app provides reference information and tools for life scientists. It combines quick calculators for use at the bench with video protocols and in-depth reference materials covering key topics in molecular and cell biology.

QIAGEN
The QIAGEN app offers tables of many commonly used lab buffers and solutions as well as a variety of conversion and dilution calculators. Users can watch more than 20 video tutorials on innovative technologies in many application areas such as automation, gene expression analysis, genotyping, and pyrosequencing.

Sartorius Stedim Biotech – Q-Apps
Q-Apps can now be installed on any Cubis balance to guide users quickly and easily in performing any weighing application, such as determination of the minimum sample weight according to the USP, differential weighing, formula or recipe management, etc.

Sartorius Stedim Biotech - Sartobind
Provides mobile users with useful selection and training tools to complement the product portfolio, and provides links to all the literature available in the digital library. The product finder feature enables the beginners and experts to select the appropriate membranes required for capture chromatography that is utilized in binding viruses or large proteins versus flow-through polishing processes.

Sensorex - PH-1 Meter Accessory
Measures pH accurately, presents the data in an easy-to-read format and supports email transmission of critical readings. Users simply plug the PH-1 accessory into an iPhone or iPod and download the free application from the Apple® App Store. The application provides a real-time display of pH, millivolts, ambient temperature and solution temperature.

Shimadzu - UV
SHIMADZU UV is a handy iPhone application tool for users of UV-Vis spectrophotometers, and allows users to check their solvent's chemical and physical characteristics quickly. Unit converter is a convenient application for any laboratory occasion, including sample treatment and other routine laboratory functions.

Sigma-Aldrich - Bioanalytical
Learn how to maximize speed and sensitivity of bioanalytical assays with proven tools for LC-MS analysis of small molecules in biological matrices. The attention of the analyst can now turn to finding significant ways to improve the speed, sensitivity, and accuracy of assays while maintaining the quality of data.

Sigma-Aldrich - HPLC Calculator
This app calculates conditions for transfer of an isocratic or gradient method from one HPLC column to another, recommends flow rates for analytical columns, and more.

Sigma-Aldrich - LabTimers
The LabTimers app includes six timers that can be individually set and run simultaneously.

Sigma-Aldrich - Molarity
The Molarity app from Sigma-Aldrich is a chemistry calculator tool that generates lab-ready directions describing how to prepare an acid or base solution of a specified molarity or normality from a concentrated acid or base solution. A second tab includes a general molarity function that calculates the mass of any reagent needed to prepare a given volume of solution of desired molarity. A third tab features a stock dilution function that calculates how to dilute a stock solution of any known molarity to your desired volume and molarity.

Sigma-Aldrich - The Aldrich Handbook of Fine Chemicals
The Aldrich Handbook dates back to 1951. Sixty years later, Sigma-Aldrich introduced the first iPad version of their catalog, featuring an expanded list of over 47,000 chemical products, extensive chemical and physical data, and nearly 37,000 chemical structures.

SPECTRO Analytical Instruments - MMA
This free readout app for the Apple iPhone, iPod touch and iPad works with the latest version of the high-performance SPECTROTEST mobile metal analyzer. It saves users from having to walk back and forth to the instrument, and more.

Thermo Fisher Scientific - Auto Tips
Simply select the criteria that meet your needs and the app will identify the most suitable automation pipette tip, along with its part number and description.

Thermo Fisher Scientific - Fisher Scientific Catalog
Choose from more than a million brand-name products from hundreds of trusted manufacturers, many of whom are exclusive to Fisher Scientific, Fisher Safety, Fisher HealthCare, Fisher Science Education and Fisher Chemicals.

Thermo Fisher Scientific - Gene News
The Gene News app delivers gene news in an easy-to-read format on the go. You will get the most recent news in gene research with customizable search inquiries. Save the articles to read at a later time, save favorite searches, or share with friends and colleagues via email or social media channels.

Thermo Scientific - Lab Consumables
This interactive resource makes it easy for you to meet your individual applications challenges, including: bioproduction, cell culture, diagnostics, filtration, general labware, IVF, microplates for drug discovery, packaging and sample storage.

Thermo Fisher Scientific - Lab Products Catalogs
This interactive catalog includes the complete portfolio of Thermo Scientific and Molecular BioProducts offerings, including: handheld pipettes and tips, automated liquid handling, microplate instrumentation, nucleic acid purification, PCR instruments and consumables, microcentrifuge tubes and racks, compliance and calibration services, and leasing options.

Thermo Fisher Scientific - Nalgene Bottles
The Nalgene Container Selection Guide is an easy way to find the best products for your application. Select the key criteria that meet your needs and the app will identify the most suitable containers, along with their part number and specifications. Choose from over 650 Nalgene® bottles, carboys or vials.

Thermo Fisher Scientific - NanoDrop
Enables users to take NanoDrop 2000/2000C sample data on the go, allowing an easy and portable way to interact with data anywhere, any time.

Thermo Fisher Scientific - Nicolet iS50
The Nicolet iS50 FT-IR spectrometer is the ultimate materials analysis workstation with a built-in ATR, automatic beamsplitter exchange, FT-Raman and time-saving Mercury TGA-IR and GC-IR software.

Thermo Fisher Scientific - Periodic Table of Ion Analysis
This app is a quick and handy reference of optimal methods for separating and detecting the most commonly determined ions on the periodic table.

VICAM - Global Mycotoxin Regulations Tool™
Enables instant searchable results for mycotoxin limits by geography and commodity or food type in seconds. Allows food manufacturers and exporters to obtain critical regulatory data without general web searches, saving both time and resources.

Waters - Part Selector
A suite of easy-to-use product finders for Waters consumables in a convenient selector format. This version features an Interactive Selectivity Chart to help streamline your column selection process. In just a few easy steps, this app identifies the best product for you, along with alternative options.

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Chiron Scientific, Inc.	www.chironsci.com
Cole-Parmer	www.coleparmer.com
Core Life Sciences	www.corelifesciences.com
Daigger	www.daigger.com
Delta Scientific Laboratory Products	www.delta-sci.com
Enviropore, Inc.	www.laboratorysupply.co
Equilab	www.equilabcanada.com
Fisher Scientific	www.fishersci.com
General Lab & Cleanroom Supply	www.genlabdirect.com
General Laboratory Supply	www.gogenlab.com
Grainger	www.grainger.com
ISC Bioexpress	www.bioexpress.com
Jade Scientific	www.jadesci.com
J & H Berge, Inc.	www.jhberge.com
JM Science, Inc.	www.jmscience.com
Krackeler Scientific, Inc.	www.krackeler.com
Laboratory Supply Distributors	www.lsdcorp.com
LABREPCO	www.labrepco.com
ManSci Inc.	www.mansci.com
Midland Scientific	www.midlandsci.com
MIDSCI	www.midsci.com
Nova-Tech International, Inc.	www.novatech-usa.com
Nurnberg Scientific, LLC	www.nurnberg.com
Preiser Scientific	www.preiser.com
Qorpak	www.qorpak.com
Sano Scientific	www.sanoscientific.com
Spectrecology	www.spectrecology.com
Spectrum Chemicals & Laboratory Products	www.spectrumchemical.com
Sterlitech Corp.	www.sterlitech.com
The Lab Depot	www.labdepotinc.com
Thomas Scientific	www.thomassci.com
Tritech	www.tritechinc.com
Utech Products Inc.	www.utechproducts.com
Vee-Gee Scientific	www.veegee.com
VWR	https://us.vwr.com
Wiklens-Anderson Co. (WACO)	www.wacolab.com
World Precision Instruments, Inc.	www.wpiinc.co

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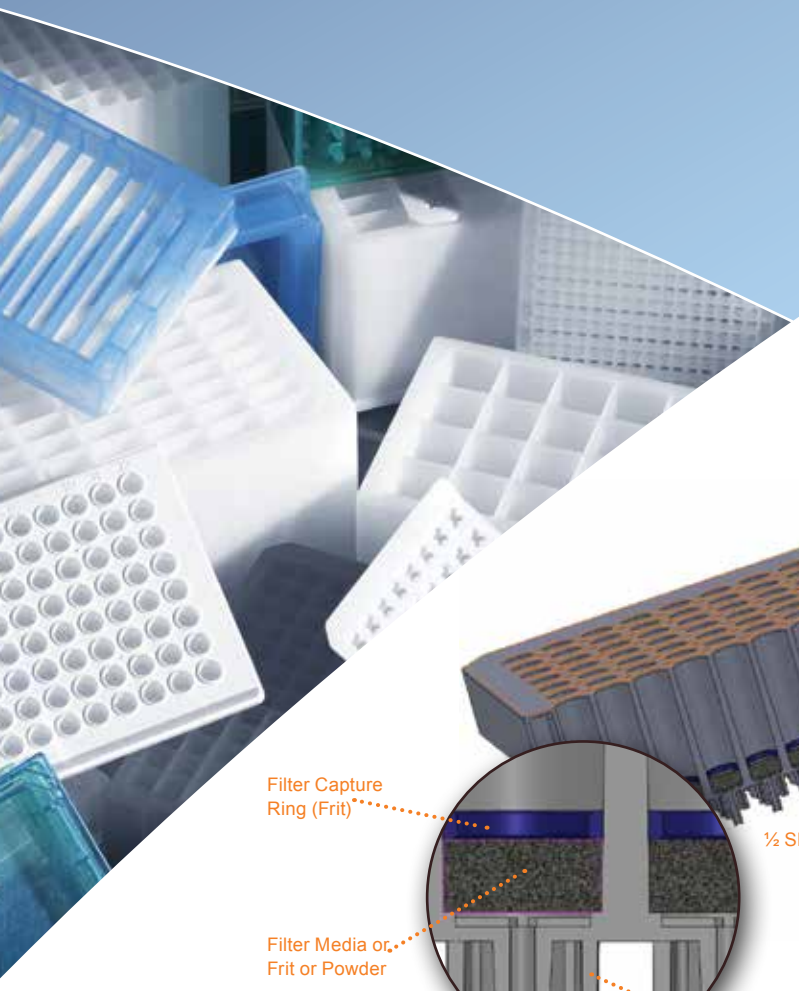
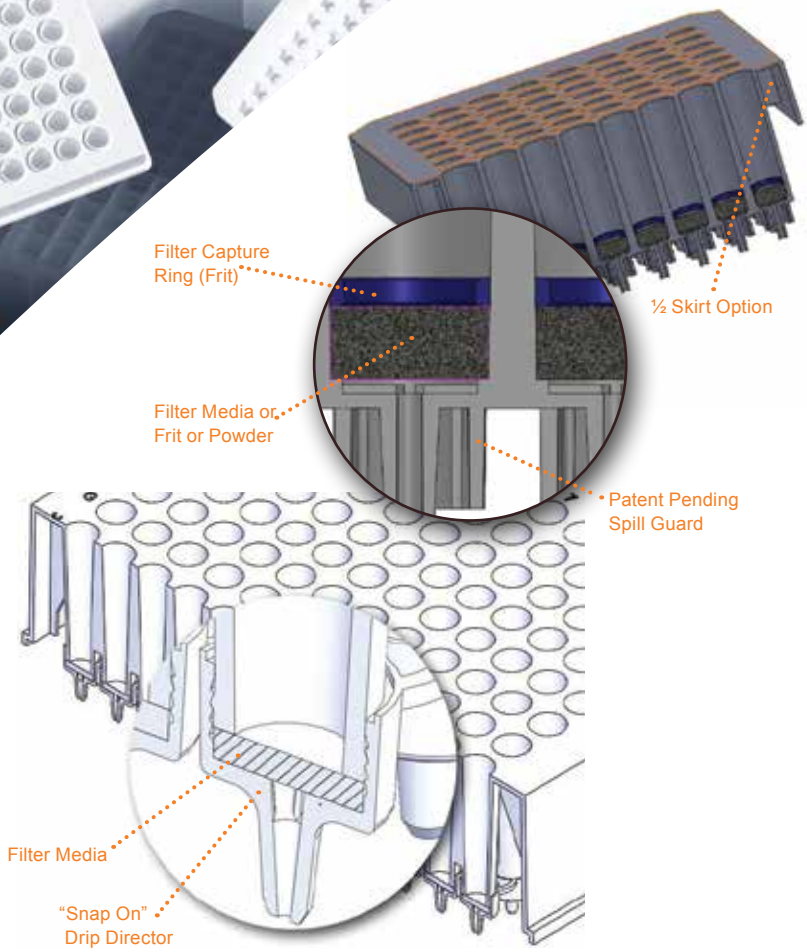


New Product:

Protein Precipitation Plate

A unique 96-well protein crash filtration microplate.



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