

Lab Manager[®]

January | February 2015

Volume 10 • Number 1

Run Your Lab Like a Business

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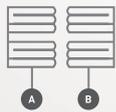
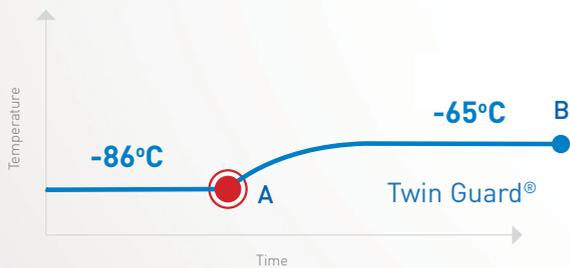
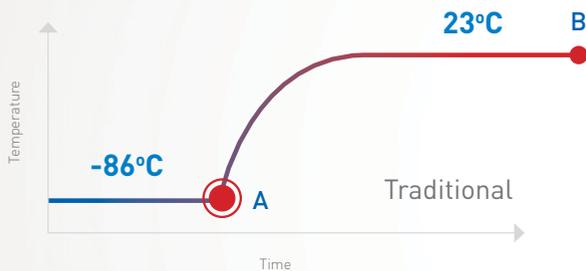
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It's late January here in northern New Jersey. From Boston to Cape May, everyone is bracing for "the monster storm of 2015." I'm having flashbacks to the winter of 2010 and 2012's Hurricane Sandy, weather events similarly filled with drama, uncertainty, and hype—some real, some overblown. But we survived that and we will, I'm fairly certain, survive this. Which brings me to this month's note.

Running a laboratory has, by all accounts, become a much more challenging proposition over the past decade. Notwithstanding the science, ever-greater demands and skills required for business and operational success have expanded the job description for most laboratory managers. But, similar to the preparations required for surviving difficult weather events, running a lab requires staying abreast of changes, anticipating unforeseen occurrences, and adopting a proactive rather than wait-and-see attitude.

This issue of *Lab Manager*, with its new cover design and layout, aligns our efforts with yours. We recognize your business challenges and address them with more business and leadership articles. We recognize your need for timely information concerning scientific tools and techniques and address that with greater and more in-depth technology feature articles. And, as you can see in this premier issue, we organize that information into three separate sections—analytical, life science, and general lab—making it easier to

find what matters most to you. Similar to what is required of today's lab managers—as well as those waiting out "the monster storm"—taking proactive steps to prepare for what's ahead is key to surviving. *Lab Manager* remains a committed ally in that effort.

This month's articles range from the very troubling and headline-grabbing topic of hacking (page 22), to the analytical challenges surrounding food fraud (page 56), to the packaging, safety, and operational considerations involved in transporting samples (page 38). Technology articles include those focusing on laboratory rocker shakers, particle sizing equipment, refractometers, and sample preparation. In addition, we preview the technologies to be presented at Pittcon 2015 in New Orleans next month (page 88).

From the entire *Lab Manager* team, we hope you find the changes we've made to the magazine beneficial, the information we provide valuable, and that in 2015 we can continue to be a trusted partner in not only your survival, but your success.

Happy New Year.

Best,

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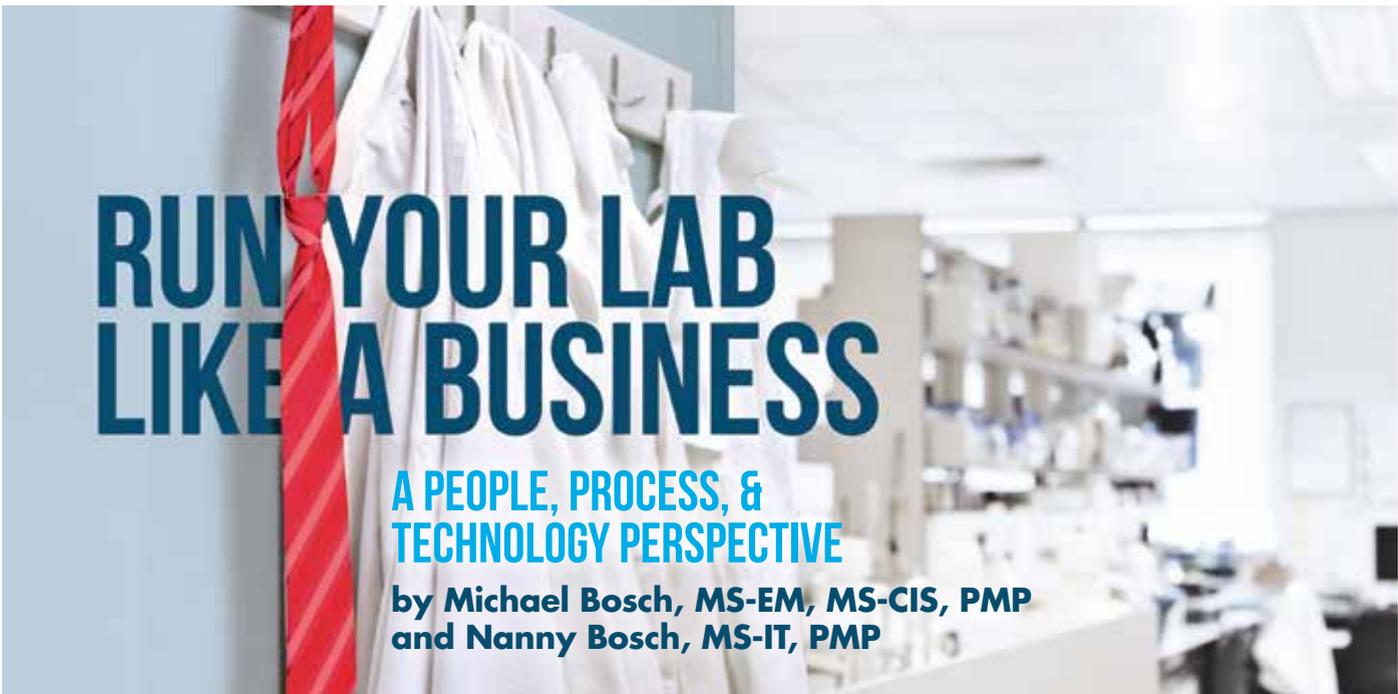
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RUN YOUR LAB LIKE A BUSINESS

A PEOPLE, PROCESS, & TECHNOLOGY PERSPECTIVE

by Michael Bosch, MS-EM, MS-CIS, PMP
and Nanny Bosch, MS-IT, PMP

When looking at best practices for running a lab, things as seemingly diverse as staff development and retention, inventory management, procurement, and efficient use of training spends, need to be looked at together. After all, equipment is only as good as the staff who uses it and your staff is only as good as their training.

Conceptualizing ideal state conditions

Looking at your lab, you see what it currently is. But a savvy manager also sees what it could be. This desire to improve operations exists whether you're managing a production lab cranking out samples at a high rate, or a research lab creating protocols and results within tight timeframes. Both situations require an examination of each laboratory's operations in as comprehensive a way as practical. How does a lab manager do that? Start with your future ideal state in mind, enhance that with an honest assessment of current conditions, unaddressed and new business needs, and high-level improvement opportunities, and then build a framework around that.

Notice we said a "framework" for the ideal state. If you alone conceptualize an ideal state, you miss the opportunity to engage your team in the process. If *they* flesh out the framework, you not only gain fresh perspectives, but also team ownership of the changes that will happen. Your most important job as lab manager in this paradigm is coordination and communication.

But as lab manager, you are also a vision manager, which requires that you look at your business goals from the end backwards as well as from a macro perspective. If you begin at the micro level, it's very difficult to build up to the macro level. Thus, you're not going to ask point-level questions

such as "what is the next instrument we should purchase?" or "how many people do we need in extractions?" Instead, imagine what the ideal state looks like for procurement and staffing, and then think about how to find the dollars to make it happen. Looking at end deliverables at the beginning makes other, more discrete, questions easier to answer.

Broad stakeholder inclusion

In addition to being a lab manager, you're also managing people—individuals and groups with various and interdependent skillsets. To borrow a term from project management, you have now become a "stakeholder manager." As soon as you start thinking of these distinct sets of people—staff, training specialists, vendors, human resource directors, lab owners, and customers—as different categories of stakeholders—they can help you attain your lab's ideal state in ways you may not have realized. They can be included as steering and governance committees, as vision champions, and as implementers, quantifiers, and improvers of the conditions you wish to create and foster.

Next, organize those stakeholders (or at least a representative subset of each of them) into a steering team that will help you make those ideal-state goals a reality. Wherever possible, look at business improvement campaigns from a people-process-technology perspective, as shown in Figure 1 on page 12.

Note that the order in which the process steps appear is from left to right. Your people are always going to be much more valuable than the process and technology. This is often overlooked in technology-driven laboratories. But very often what costs most are people: the procurement of talent, payroll, insurance, training spend, and so on. You want to manage and



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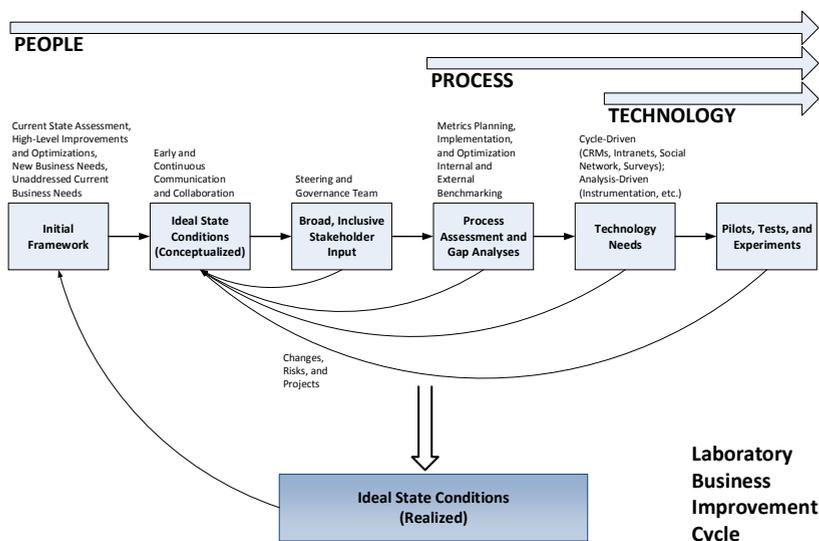
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utilize your people in a way that retains them and that such retention has value to your lab. Think of your people in terms of your goals.

Similarly, don't look for individual pieces of equipment and vendors to provide them, look for partnerships. Vendors are one of your stakeholder groups, so you're going to want to partner with them. Unfortunately, a common modality in the client-vendor relationship can be epitomized as, "I wonder how this person will put the screws to me, and how can I best protect my interests?" If you think, when negotiating contracts, that you're the only one thinking that, you're wrong. Vendors are thinking the same thing, which is another reason why you need to include them in your lab business improvement initiatives often and early.

The same thing can be said for laboratory support groups: Human resources, legal and compliance, logistics and support. If these people are given ownership of the overall

▲ Figure 1: This framework allows for a cyclical and step-wise process that can be tailored to the needs of individual labs, but also provides structure so that roles can be assigned, steps not missed, and other components addressed.



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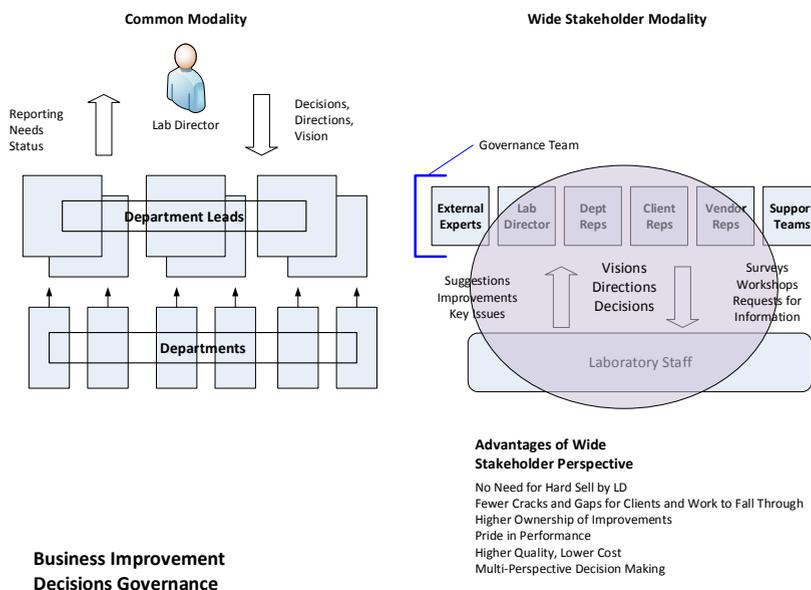


improvement process, they will start to act like owners, and the whole endeavor will be more manageable.

By incorporating a governance team approach, and keeping a broad stakeholder perspective, a number of benefits can be realized. As seen in Figure 2, improvements include ownership and performance responsibility for vision, directions, and decisions that make the lab manager's job easier, and makes potential success more achievable.

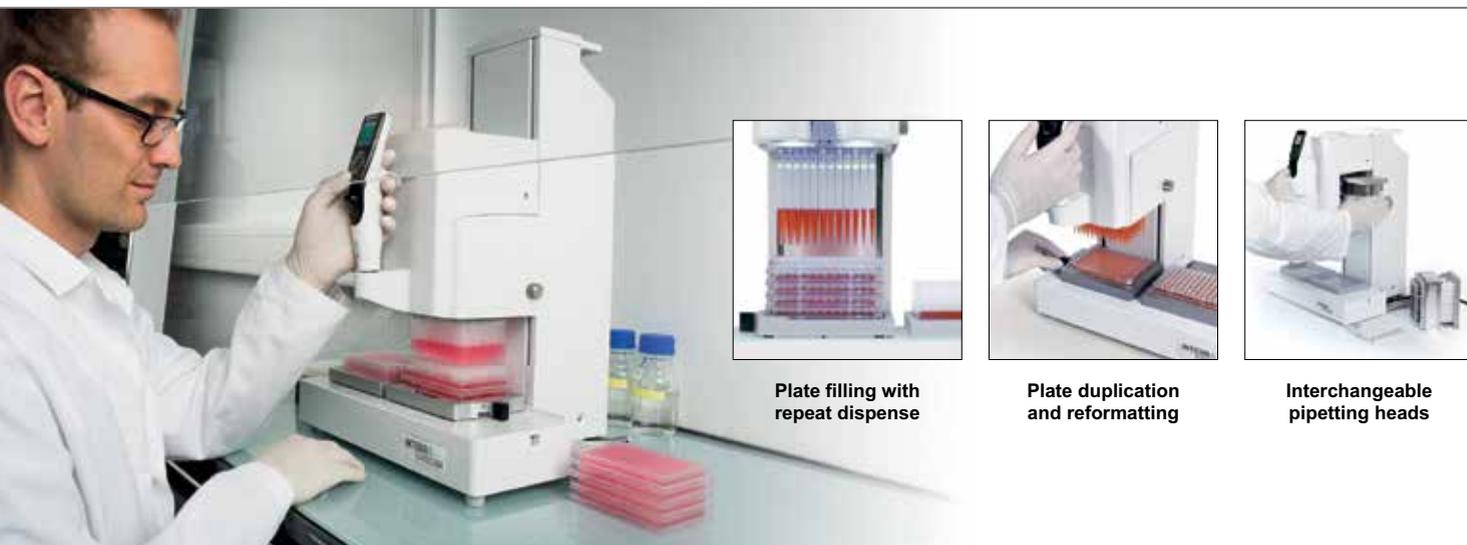
Process assessment, gap analysis, and metrics

When talking about process—tools and techniques—we're not merely talking about analytical protocols or methodologies, we're talking about business process development as well. Don't think sample receiving and report production, but instead think overall improved staffing, training, process, deliverables,



▲ *Figure 2: Most labs have a top-down, siloed approach towards information exchange, in particular when it comes to business improvement initiatives. A new modality, and the one discussed in this article, improves the chances that those improvements succeed.*

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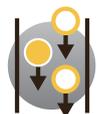
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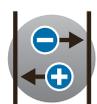
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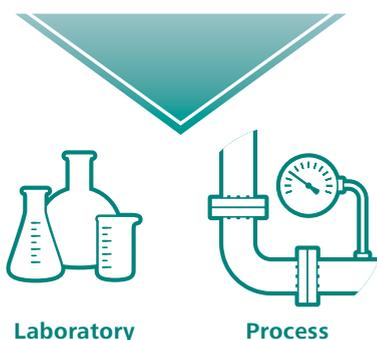
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One of the best ways to navigate process management is with the use of metrics. Business process evaluation and improvement cannot happen without them. A realistically measured process is a better governed process, and a governed process has a much higher probability of success.

How do you measure a process? By coordinating and communicating with your stakeholders. An example would be: Given what we're trying to accomplish, we need to see X% increase in throughput; or, we would like to see this particular analysis conducted X many times per time period using Y number of analysts. Remember, these metrics are not "failure indicators," they are merely indicators. Not hitting them doesn't mean the idea was "wrong." But also listen to your metrics. Metrics not doing what you want are cautions, while others are indicators of a flaw in direction. Only you and your stakeholders will be able to tell which is which.

Technology should support your people and business processes, not supplant them or dominate. We are not talking only about the technology of your lab operations, but also technology that supports your people and business processes (intranets, real CRMs, social networking, survey apps, etc.).

Pilot testing and experimentation

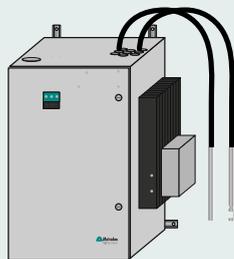
Heuristic: adjective. "Proceeding to a solution by trial and error or by rules that are only loosely defined."

A heuristic approach is about getting to a better place by recognizing that you're not going to get there in one hop. Big things happen in small steps. This idea needs to be a component of your overall mindset. You cannot just be willing, but must be an active champion of demonstration, pilot tests, and experimentation. Get used to saying, "We're going to try this." But remember your metrics. If you're going to enlist a trial and error approach, imbue that approach with measurable indicators.

Changes, risk, and projects

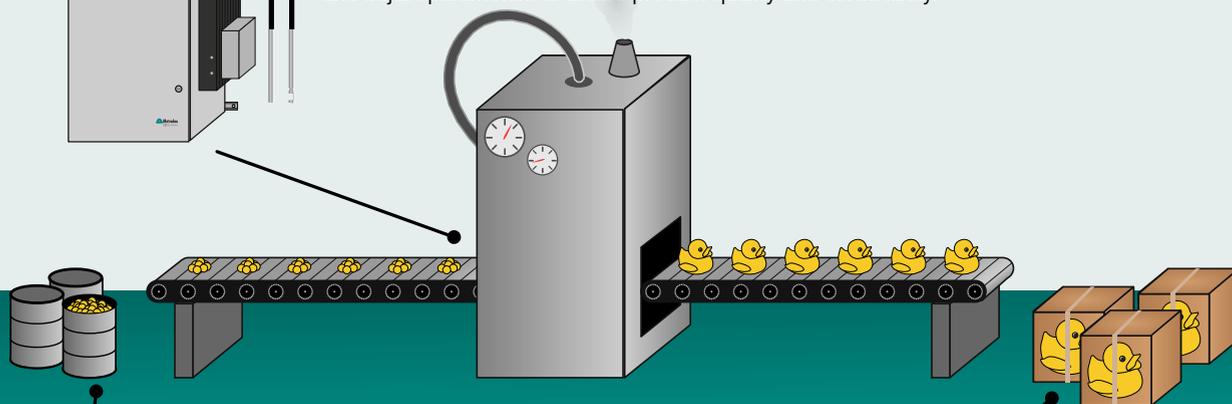
Change is a big part of what a manager has to deal with when looking to improve processes. Built into the communication with your stakeholders needs to be the fact that change is coming and it should not be feared. You need to embody a healthy respect for change so that you can engender it in others.

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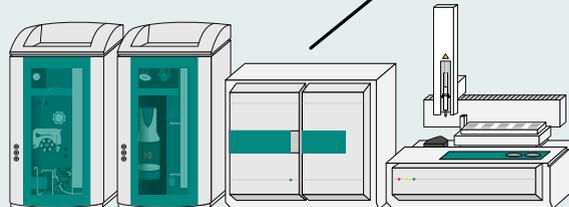
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This is one of the first instances where you can appoint someone to be responsible for change. Call them the “change champion,” because it empowers that person and helps the rest of your lab realize how important change is to overall success.

Risk management is another area you must steward, and one best executed by the whole team in an integrated way. At the very least, put someone in charge of identifying observed risks that are encountered in the group’s discussion of the ideal state and the path to it. This is yet another way to allow end deliverables to become a reality—by enumerating and accounting for foreseeable risks. Such risk identification and management, by the way, is easier when you use the end-state perspective we recommend.

Similarly, other required projects often present themselves naturally when you use an end-state perspective. It also helps you understand

where the hard work is going to be, which allows for more effective planning. When you map processes this way, you will see where new people and skills are needed, which will feed into your training plans and help identify the gaps that specific instrumentation, equipment, and services can fill.

Laboratory operational improvement is going to involve tasks that are not the most enviable to undertake. Make sure that the people who are doing the rubber-meets-the-road work do not go unrecognized. We’re not talking about vacations in Aruba, but maybe something as simple as a Starbucks gift card. When everyone comes together in meetings, let the team give a clap to your change champion, or the person who transcribes the meeting minutes. Give them their time in the sun for what are often unrecognized contributions.

Ideal state realization

When you follow this approach, your lab’s needs surface in a discoverable way. And when you engage your people in regular communication, these needs will be vetted from a number of different perspectives, which will lead to improved processes. Notice, though, in Figure 1, that each step feeds back to the conceptualization of the ideal state. The reason for this is simple: there will always be a need for additional optimization because real world conditions change, and our end-state conditions need to change with them.

We realize that labs are full of people who stare at their shoes as they walk down the hall, and you might be one of them. But you’re a lab manager—and that means you’re running a business! As such, you must also be a people person. Once you begin to manifest the qualities of a manager who puts people first, you’ll begin to see those same qualities in others.

This process will not be as insurmountable as it may have once seemed. Success happens when big dreams are turned into reality in small steps. Which is why we strongly recommend looking at your lab as a business, with a wide stakeholder base that can share the load, and an ideal state of conducting business. If it was easy, anyone could do it. But it is possible, if an engaged and dedicated person is leading the charge. And that’s you.

Michael and Nanny Bosch are senior managing consultants of The Bosch Group, Inc. They have spent the last 20 years helping companies evolve their way of doing business, and have both worked in multiple labs at the bench and management levels. They also teach a course in Laboratory Leadership Management hosted through UC Davis Extension (UCDE). They can be reached at request@boschgroupinc.com.

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FOUR STRATEGIES TO DEAL WITH ABRASIVE LEADERS

By **Bonnie Artman Fox**

When you walk into the lab, you can feel the tension building. Even though you enjoy your work, interacting with your boss is affecting your overall job satisfaction. You are facing a dilemma: start looking for another job or endure the conflict.

The understandable reaction

When faced with bosses who are disrespectful and derogatory, it is not uncommon to feel a fight or flight response. In a split second, you react. You either defend yourself or flee to avoid a confrontation. Either reaction is understandable.

There is another way: work through it.

An important distinction: abrasive, not bully

The word bully implies the intent to cause harm. In working with leaders who have an overly aggressive management style, I've discovered they do not intend to cause harm. Even though behaviors such as over-reaction and public humiliation are highly disrespectful, when informed of the negative perceptions their staff have of them, the majority show remorse. The source

of the abrasive behavior is the fear of appearing incompetent.

Four strategies you can implement to deal with abrasive leaders:

- 1. Keep a calm composure**—Showing any sense of fear or tentativeness will discredit you.
- 2. Give the facts**—Without specific, objective examples, the abrasive leader is likely to rationalize or make his problem seem like your problem. *"When I asked about the rollout of the second phase of the project, I was yelled at for asking a question."*
- 3. Focus on strengths, avoid judgments**—Acknowledge the pressure they are under and ways you respect them. Give reassurance of their competence and skill in handling their responsibilities and that you want to help wherever you can.
- 4. State a non-threatening request**—Demonstrate ways you want to interact without being attacked. Privately and after tempers have calmed down, request to talk for a few minutes. Review what happened using the above three strategies and state your request. *"When I asked about the rollout of the second phase, I needed more details to have items prepared for my department. I know you've got things handled and like you, I want to help make this project successful."*

Know your limits

Implementing the above strategies will start a shift in the way you view and interact with an abrasive leader. Most people are defensive when attention is brought to their blind spots and most abrasive leaders do not view themselves as abrasive.

If, after time and consistency, you do not see demonstrable change, the next step is bringing your concerns to management using the same approach. Even with management intervening, a professional program for abrasive leaders might be needed. If you do decide to leave the lab, leave knowing you did what you could to help the abrasive leader turn around. And secondly, you attempted to work through conflict and reduce workplace suffering. Both are courageous efforts to conflict management that inspires through encouragement instead of retaliation.

Bonnie Artman Fox is a conflict management specialist and CEO of A Conscious Choice, a company offering specialized coaching for leaders to turn around behaviors perceived to be abrasive and replace them with respectful workplace conduct. She can be reached at Info@AConscious.com or visit www.AConscious.com for more information.

LABCAST

Be sure to attend Bonnie Artman Fox's Lab Manager Academy webinar, "Dealing with Abrasive Leaders" on Wednesday, March 4th, or afterward at www.labmanager.com/abrasiveleaders to watch the archived video.

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LATEST TRENDS SHAPING THE SCIENTIFIC WORKFORCE

WORKING TOGETHER MAKES CHANGE WORK

By Mark A. Lanfear

Screenwriters know there is a magic formula called “structure” that must be adhered to when writing a successful script. A key element is what occurs at the nine-minute mark in a film. That’s when the hero’s life undergoes a change that forces them to take action and regain their footing, which catalyzes the triumphant conclusion.

This change sets up the rest of the story. Wanting to see how the protagonist handles it is the hook designed to keep viewers on the edge of their seats.

Movie heroes often have to go it alone as they try to solve their dilemmas. In real life, especially today, managers who try to lead transformational change on their own probably won’t like the way their story ends.

Why? Because, while the essential need to take action in the form of change can be communicated to an organization by individuals at the top, implementing it successfully at ground level means making sure stakeholder employees wholeheartedly buy into the new direction. Additionally, if action is needed, it’s not common that a single leader can handle the number of fronts that need to be addressed. The collective strengths of many leaders in the organization must address the challenges of implementing a new organizational direction. And the best way to do this is to create an atmosphere of collaboration driven by a common goal that is supported by cooperative leadership. In fact, collaboration

may just be the single most important “superpower” when it comes to introducing and leading change in an organization—and getting it to stick.

I’ve heard countless stories of companies that, driven by a decade of economic pressures, have rolled out expensive, well-designed programs to reinvent the culture, systems, or methodologies of their workforces

“Managers who try to lead transformational change on their own probably won’t like the way their story ends.”

only to see those programs quickly fade away. Huge amounts of time and capital are expended to update employees on a new direction, but within a week or two, they’ve shrugged it off and gone back to business as usual. It’s a safe bet management didn’t take the necessary time to collaborate with the people most affected by change, to get them invested in the reasons for making the change in order to ensure that it takes hold.

Recently, the world of research and development (R&D) has witnessed a transformation made possible directly by the power of collaboration. Several well-known pharmaceutical companies, independents that ordinarily face the challenges of the development and clinical trial process alone, decided to join forces. They put their collective heads, brainpow-

er, and workforces together—think of X-Men United—and worked in sync on promising new therapies for the good of all. The resulting shift in mind-set made possible by embracing collaboration has been dramatic where outcomes have been groundbreaking and transformed a once highly insular industry to meet the needs of the new marketplace.

By combining resources and splitting responsibilities for the early steps of research and testing, these companies have been able to significantly shorten the process of bringing new drugs to market. The efficiencies made possible by this unique partnership ultimately benefit everyone, from the manufacturers and scientists creating them to the doctors and patients who can’t wait for them to be approved. The status quo has been upended, and the world of pharmaceutical R&D may never be the same.

As professionals in the life sciences field, you are likely faced with leading change more and more every day. As fast as technological advances are coming, organizations’ structures shifting, and workforce planning evolving, leaders must keep pace at a rate that’s equally fast, if

not faster, to stay competitive, drive profitability, and honestly, just to ensure corporate survival.

Although it's not the end of the world as we have seen at the cinema, when change becomes necessary in your company, it's important to understand and communicate that it's really an opportunity. With collaboration comes the chance for fresh thinking to emerge and disparate skills to be utilized, which can improve the way your company does business, often in unexpected ways and from unexpected sources. That's why a reliable talent supply chain is so important. It can help ensure that you maintain a consistent business footprint, which is especially critical when you are

faced with unexpected challenges that require cost-effective solutions.

A collaborative workforce is a must for those who lead change. Having the right people in place is without question a prerequisite. When it comes to identifying the high-performing talent you need for your labs and R&D facilities, predictive workforce analytics, a key part of labor market intelligence, can give you an accurate and all-inclusive view of the talent that can help reach your goals and objectives.

Leading change within life sciences, similar to filmmaking, requires collaboration. When meeting the challenges of 2015, known and unknown, having the right people—superheroes—in

place also makes available their wealth of potential insights and opinions, which can be invaluable to anyone who is leading change and hoping to see it take hold. Going it alone may work for some Hollywood heroes. But collaboration is your most powerful tool and what's most likely to guarantee a happy ending.

Mark Lanfear is a global practice leader for the life science vertical at Kelly Services, a leader in providing workforce solutions. He has operated clinical trials around the world for almost two decades. In addition, Mark is a featured speaker at many life science industry conferences and a writer for life science periodicals. He can be reached at MARL773@kellyservices.com or 248-244-4361.

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HALTING HACKERS

INCREASED CYBER SECURITY NEEDED TO THWART EVER MORE DEVIUS CYBERCRIMINALS

by **Bernard Tulsi**



With headlines screaming about hacking, of the latest James Bond movie *Skyfall* most recently, of national and nuclear weapons laboratories not so long ago, and of businesses and individuals almost on a daily basis, it's no surprise that worldwide information technology (IT) security spending is set to hit \$77 billion in 2015—almost 8 percent more than this year's \$71 billion, according to IT researcher Gartner, Inc. The increases are attributed to escalating mobile technology, cloud-based systems, and social media, among others, rather than regulations, which drove growth during the past few years.

Ryan Olson, director of Threat Intelligence at Palo Alto Networks, says cyber security is a massive issue confronting the entire world. Within the past five years it has become much clearer that the issue is less about mischievous or malicious intent than about stealing assets for economic gain. This was made even more evident by the recent increases in cyber espionage attacks in which organizations potentially sponsored by nation states infiltrate company networks to steal their data.

Sumedh Thakar, chief product officer at Qualys, says that bad actors have moved on from merely seeking some degree of fame. "They are now organized to attack companies and research laboratories for financial gain," he says.

Olson says that the motivations of adversaries, such as cyber crime (to steal money), espionage (to steal information), terrorism (to invoke fear through an attack), war (nation states trying to harm each other in the cyber world), and hacktivism (launching attacks to draw attention to particular causes), are helpful to intelligence analysts who are trying to decipher the objectives and likely tactics of specific adversaries. "Ultimately, the goal on our side is to apply effective tools to help prevent their attacks," he says.

In business, scientific enterprises, and laboratory settings, risk analysts are most concerned with three types of attackers, according to Amichai Shulman, chief technology officer at Imperva. Criminal hackers, the largest category, are simply after profit, and are of greatest concern to most organizations. State actors are complex and have defined agendas. Hacktivists believe they are sure about what they are after but are not always right, says Shulman.

To underscore the role of cybercriminals, Rich Barger, chief technology officer at ThreatConnect, noted recent reports of large biomed companies being targeted for nonpublic information aimed at gaining unfair advantage in stock market transactions. Barger says that because of the widespread use of convergent devices and the increasingly mobile nature of work, risks may carry over beyond the more protected laboratory or enterprise network.

Web-facing applications and vulnerable machines in a network are the most common cyber attack pathways, says Shulman. Compromised machines usually result from common end-user mistakes such as opening email with malicious attachments or clicking on a link that delivers malware.

Shulman believes that the first step in building cyber defenses is to figure out the risks, starting with potential attackers. While the biggest concern is usually with criminal organizations, because of the nature of their work, some labs could also be targeted by hacktivists. He notes that some research organizations could also be targets of state-sponsored espionage.

The next step is figuring out what could attract attackers. In addition to their scientific and technical data, research organizations may have large human resources (HR) databases of scientists and researchers that could be targeted, he says.

Knowing what the hackers may be after could help organizations fine-tune their investments and cyber defenses, he says. Entities with a large web-facing presence should

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start there because that is the easiest way for intruders to gain access. He does not see the answer, however, in merely writing better codes and applications but instead in overlaying web services with firewalls.

Shulman says organizations have latitude around if and how to secure sensitive data, but some types of information, which may not necessarily be business critical, such as HR and private health data, must be secured because of regulatory requirements. To comply, organizations can monitor all their servers or they can apply security overlays. In addition to improving security, overlays could enhance efficiencies around the management of permissions and access.

One critical issue for organizations is the timely detection of network intrusion. "It is a very reasonable assumption today that your network will be breached at some point," says Shulman. Organizations commonly respond by using anti-virus software to prevent the initial intrusion. "We have seen repeated failures of anti-virus software to prevent network intrusion and compromise in the past five years. So, we need to assume that there was a compromise, and we need other technology to detect someone inside the network," says Shulman.

Different approaches to this problem are essentially built around monitoring activities within the network such as communications between computers, system calls within computers, access to specific resources within end points, and network traffic, among others. Shulman favors solutions that monitor differences in data access patterns in organizations. "Attackers are after large amounts of data, and will eventually have to access the organization's data source," he says. "They will gain access in an efficient way that is distinguishable from users within the organization—the ability to detect that is the kind of solution that I'd be looking for."

Barger says that heads of labs or other organizations must assume that they will be targeted, that there is an actor operating on their network. "They must operate in a paranoid state that would increase their openness to look for threats or problems but without adopting a victim mind-set. They have to actively take mitigating steps that will protect their information and users, and not wait until they are told that they have a problem," he says.

One positive development is that more mature labs that have been attacked or are familiar with these threats are collaborating with other labs around common threats while sharing best practices, he says. "One

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of the ways we are supporting that is through a closed, invite only, vetted, sharing environment so that some of the largest biomedical companies can discuss what worked and what didn't, and better understand the types of threats targeting them along with the technical details on how to mitigate them," says Barger.

Matthew McKnew, consultant for cyber security at Thermo Fisher, says his company works with a number of vendors, including ThreatConnect, to track intelligence internally. He says that the tool facilitates the uploading, coordination, and sharing of threat indicators with other groups and health care organizations, and within the ThreatConnect community to develop a better threat picture.

"We have all the block and tackle, including firewalls and intrusion detection systems," says Chris Hart, director of cyber security at Thermo Fisher. He says that his company has invested increasingly in threat intelligence capabilities over the past few years "to get a better understanding not only of what signatures are being hit but what is happening in our network, who's doing reconnaissance, and to better monitor the external facing environment."

When selecting cyber security services, Barger says that laboratories should seek vendors with the ability to help them aggregate information on different types of threats of interest, and are capable of providing solutions to analyze data generated in

their own enterprise as well as threat information provided by external sources. They should also have the ability to act on this information and to help implement the solutions for the labs, such as firewalls, monitors, and platforms that provide actionable information, he says.

Turning to the academic, research, and laboratory environments in general, Olson notes that adversaries today are almost always interested in gathering data that might be valuable to a rival organization or agents of a country competing to reach a certain goal, among others. In the case of a research lab, he says, researchers' data, their papers, patentable processes and designs, intellectual property, technological breakthroughs, and product innovations could all be incredibly valuable to an attacker. University laboratories and their collaborating networks are unique compared with commercial entities. They operate pretty much in the "bring your own device" theater, he says. Numerous researchers, students, faculty members, and others log on to their networks with their own computers, but the institutions do not have any control over whether the computers have up-to-date anti-virus software or other protections. He says that they can't lock their networks down because they will get pushback from the users.

"The first advice I would give to administrators operating those networks is to ensure that they have visibility of all the traffic into and out of their networks—so they can identify what normal traffic looks like and compare that to any anomalies," says Olson.

"Second, ensure that when they want to make modifications to the network, they should limit access to certain locations or users in a flexible way," he says.

One of Palo Alto Network's products, Next Generation Firewall, tracks the flow of traffic out of a network by applications, making it possible to monitor and control the traffic at a granular level. Olson says this tool can provide value for an organization that requires a lot of flexibility for its users.

There is need for ongoing cyber security programs, not just occasional assessments because the bad actors are constantly looking for

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vulnerabilities to attack, says Thakar. He says that lots of tools are available from cyber security companies, including Qualys, “which help defenders to automate auditing and even remediation.”

Cloud technology helps bring down the cost of security by sidestepping the need to deploy, manage, and maintain security software in laboratory and other enterprise environments, says Thakar. Qualys’ offers a cloud-based platform that offers deployability and reach benefits while incorporating multiple security solutions.

For many organizations, the data center and the data source are not in a single location and not necessarily under the physical control of the organization; they could be cloud-based, says Shulman. Imperva’s solutions include a security overlay for web applications, the Web Application Firewall. It also provides security as an overlay inside the network with a database activity monitoring system, file security monitoring system, and distributed denial of service (DDoS) protection.

“Some research organizations could also be targets of state-sponsored espionage.”

Barger says his company’s flagship product, ThreatConnect, is a threat intelligence platform that orchestrates information and knowledge management to assess knowledge from internal and external sources such as threats identified by agencies like the Federal Bureau of Investigation. “ThreatConnect, which can be tied in with the rest of the security infrastructure, provides the tools that analysts need to automate and simplify complex security analytics, which are usually done manually, so that they can do more at scale.” This helps organizations make smarter and more effective security investments, he says.

Olson says that over the next few years, the types of tactics deployed by the most sophisticated actors of the caliber of nation states will trickle down to less sophisticated groups and create a broader base of cybercriminal actors with highly capable tools. This means that from the defensive side, much higher levels of protective capabilities would be required.

“That is the scary part,” says Shulman. “State-sponsored actors targeted specific high-end, high-value organizations, usually with a lot of manual hacking. It was a concern but it was confined. Once criminal organizations figure out more ways to monetize hacked information, we will see explosive growth of these breaches.”

Bernard Tulsi is a freelance writer based in Newark, DE. He may be contacted at btulsi@comcast.net or by phone at 302-266-6420.

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SPEAKING OF TRUST

A LEADER'S PERSONAL COURAGE AND HONEST COMMUNICATION ARE ESSENTIAL By Rick Parmely



"Trust me." What sort of image do those words conjure up? Do you picture a parent teaching a child to ride a bike? A used car salesman talking with a customer? Or does your mind perhaps turn to the workplace, thinking of the promise for a future salary increase? In each case, a high degree of trust will likely be necessary for those involved to benefit.

Yet today we observe a crisis in trust—a crisis that results largely from the breakdown of effective communication. From family relationships to academic and business settings, rashly developed and poorly delivered communication fuels a growing lack of trust.

There is, however, a bright side. Two Chinese characters represent the word for "crisis": the first, "wei," describes "danger"; the second, "ji," means "opportunity." So the combination of these two Chinese characters suggests that any

crisis provides both danger and opportunity. The crisis in trust that has resulted from poor or ineffective communications provides an opportunity to improve those communications, thus increasing "trust conductivity."

What is "trust conductivity," and why is it essential to building a high-trust organization?

Whereas electrical conductivity is the ease with which a current passes through a wire (conductor) to produce power, "trust conductivity" describes the ease with which trust passes through an organization, providing the power to meet projections and reach goals. With electricity, the better the conductor, the larger the current; with trust, the better the communication, the greater the flow of trust. Electrical current is driven by

a source of electricity, which is generally accessed by flipping a switch. But how is trust driven, and what is its energy source?

A leader must provide the energy needed to drive the flow of trust through his communications. However, to access this energy, that leader must first "flip the switch," turning on personal courage. That courage enables him to take advantage of the opportunity to increase trust by communicating clearly.

So trust conductivity is highly dependent on good communication, but everything starts with courage. Why? As Maya Angelou said, "Without courage, we cannot practice any other virtue with consistency."

She then enumerated some of those "other virtues" by adding, "We cannot be kind, true, merciful, generous, or honest without courage."¹

Yes, courage taps the potential for displaying such fine qualities as kindness, generosity, and honesty

in our dealings with others, thereby increasing trust.

On the other hand, resistance to the free flow of communication lowers trust conductivity within an organization. Much as resistance in an electrical circuit inhibits the flow of current and produces a quantum "friction" that manifests itself as heat, communication that inhibits the free flow of trust acts as a resistor that produces a friction of its own. That friction, too, can manifest itself as "heat," perhaps in the form of heated arguments and flaring tempers in response to poorly communicated messages. As a result, it takes more energy, more pressure, or more effort to overcome resistance and provide the clear direction that ensures the flow of trust.

"Rashly developed and poorly delivered communication fuels a growing lack of trust."



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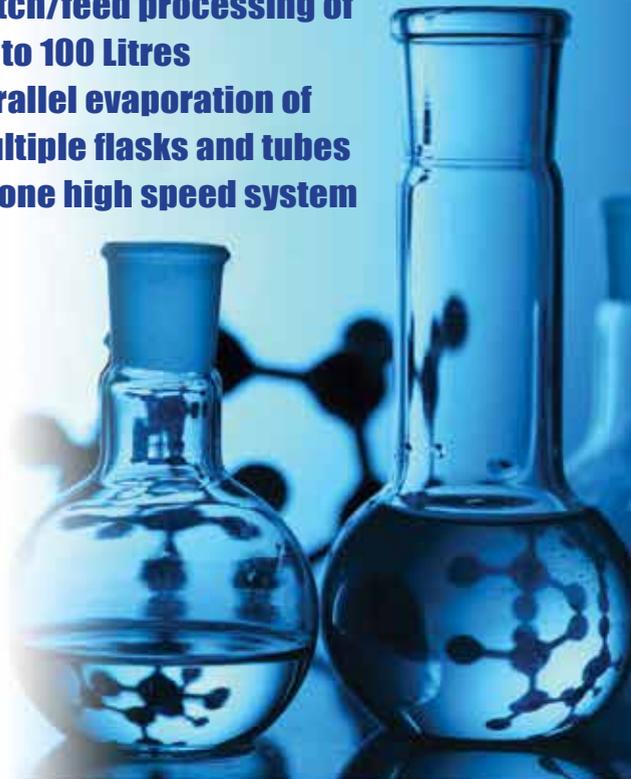
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To understand more specifically how communication affects the flow of trust, we will first examine three types of communication that resist trust, and then we will consider five ways to increase the flow of trust in an organization.

Trust resister #1: Dishonest communication

Dishonest communication results primarily from a lack of courage. It presents primarily in two forms: hiding the truth and not accepting the truth.

While hiding the truth might involve an outright lie concerning facts or pertinent information, avoiding the truth often reveals an unwillingness to face reality. To illustrate, imagine a company launching a revolutionary product that does not perform as well as marketing suggests. Executives and leaders know it is not performing but lack the courage to delay its release until all the “bugs” are worked out. When multiple performance issues begin to surface, customers become frustrated and trust rapidly erodes.

A leader must courageously demonstrate a grasp of reality; even in the most challenging situations, we can communicate honestly and still express faith that difficulties will be overcome.

Trust resister #2: Complex and deceptive communication

Communications must be clear, without underlying motives or hidden agendas. If the explanation offered is designed simply to mislead, confuse, or give credit where credit is not due, trust will surely falter. For example, communicating that a worker has left your organization because she found a better job when in fact she was fired is deceptive.

Trust resister #3: Unsupportable conviction or a lack of conviction

Friedrich Nietzsche said, “Convictions are more dangerous enemies of truth than lies.” If we have a conviction on a particular topic and it happens to be wrong, it quickly becomes an unfounded assumption. To stubbornly hold to that assumption will certainly impede the flow of trust.

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On the other hand, having *no* conviction can cause us to flip-flop on issues. Trust is not built on the backs of leaders who lack the courage to commit to a course of action and communicate it effectively.

Not being committed to the vision of an organization, or simply not understanding it, will destroy trust. Effective leaders who do their homework seldom suffer from a lack of conviction and the loss of trust that engenders.

What positive action can we take to build and maintain trust? Consider these five ways to increase trust conductivity:

Trust conductor #1: Tell the truth, always

The truth can be hard to face and hard to communicate when a lot is at stake.

However, consider the alternative offered by twentieth-century American writer Ti-Grace Atkinson: “There is at least one thing more brutal than the truth, and that is the consequence of speaking less than the truth.”

Why is this so? Because, as the popular saying goes, “One lie destroys a thousand truths.” Unfair as it may seem, we know this to be true. Trust is intimately tied to how truthful a person is.

We can greatly increase the flow of trust across an organization if we *always* tell the truth. Once acquired, such trust must be maintained. Just as a strong electrical current requires a grounding wire, a high level of trust must stay grounded in

continued honesty. We might be tempted to reason, “This is a small thing, so no one needs to know the truth...” Don’t be fooled—people on your team can easily discern when your lack of courage results in communication crafted to protect yourself, elevate yourself, or absolve yourself of responsibility.

Another form of dishonesty presents itself in the form of hypocrisy. The Greek word for “hypocrite” refers to a stage actor, meaning one who pretends to be what he is not. Others notice when we advocate one course and do the opposite; failing to practice what we preach short-circuits trust.

Closely related to dishonesty is “spin”: intentionally trying to shape the understanding or perception of facts. For example, to say that our leadership improved their performance by 11 percent hides the truth that very little improvement has resulted. Computer giant Dell notes in its Code of Conduct, “What we say is true and forthcoming—not just technically correct.”²

Ask yourself: “Am I telling the full truth, or am I “spinning” it to make a situation appear different from how it really is? What do I believe? Am I telling it that way—am I communicating it clearly?” Avoid spin, as it will surely choke the flow of trust.

Finally, Mark Twain summarized one additional reason we should always speak honestly: “If you tell the truth, you don’t have to remember anything.” If we are honest with those around us, we won’t need to try to remember what we last said in a meeting.

Trust conductor #2: Build and maintain respect for the dignity of others

At times, building respect for others can prove challenging. Yet when we respect the dignity of others—for example, by bringing them into our office and sincerely reassuring them that they are doing a good job—we are helping create a deep and abiding trust within our team.

Leaders in any organization do well to remember another insightful observation offered by Maya Angelou: “I’ve learned that people will forget what you said, people will forget what you did, but people will never forget how you made them feel.”

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Maintain a two-way dialogue in team discussions and within the organization; be inclusive in your speech, and share the blame when appropriate. Provide a sense of safety, assuring team members they will never be punished for telling the truth or giving an honest opinion. Be generous with praise, and limit criticism. Look for the good things your team does and commend them warmly. The mutual respect that results will provide a steady flow of trust that will benefit everyone.

Trust conductor #3: Address past sins—real or perceived

We all make mistakes, and overlooking or hiding those mistakes is one of the worst things a leader can do.

If your mistake causes hard feelings, humbly offer a sincere apology: not saying, “Well, I am sorry you feel that way” (which, in reality, skirts personal responsibility) or “I’m sorry you got your feelings hurt (which subtly

puts the responsibility back on the offended), but rather accepting personal responsibility and perhaps simply saying, “I’m sorry I hurt your feelings. I was wrong.”

But suppose you learn that some time ago you unknowingly offended someone. What steps can you take? First, lose the ego; don’t stubbornly stick to your position. Be quick to apologize, with a view to restoring peace and moving on. Keep in mind that a poor or forced apology is generally regarded as a second insult, and your level of sincerity will either build trust or destroy it.

Finally, a leader creates the path forward following any crisis in communications. By personal example, show others how to get past the issue. It may require humility, expressing in a kind and mild way a keen desire to let go of any negative feelings yourself and move forward. As Napoleon Bonaparte said, “Leaders are dealers in hope.” So paint a positive picture for moving forward, and be firmly resolved not to hold or hide a grudge.

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Try using the three “Cs”: Calm, Commend, and Contain. When meeting a difficult challenge, lower the stress level by remaining Calm in speech and action. Begin any discussion by first Commending the individual(s) involved—this will relieve tension, making everyone more receptive to a productive outcome. Finally, Contain your emotions. Even if something unexpected happens, perhaps an insult or an unkind remark, control your desire to lash out or retaliate.

Trust conductor #5: Communicate your trust in others

We need to be sincere and specific in communicating the trust we have in others. As Bill Walsh, the legendary NFL coach of the San Francisco 49ers, said, “Nothing is more effective than sincere, accurate praise, and nothing is more lame than a cookie-cutter compliment.”

Trust can also be subtly communicated by listening well. Discipline yourself to listen more than you speak. As Stephen R. Covey so accurately observed, “Most people do not listen with the intent to understand. They listen with the intent to reply.”³ Listen to what others express, and then pause to formulate a reply based on what was said. This will surely increase the flow of trust.

What will it take on our part to build trust in the organization? Courage and action. It all begins with personal courage: courage to communicate when it is easier to remain silent. Courage to make honesty nonnegotiable. Courage to address issues early on and not let problems fester. Courage to be human and communicate how you feel. John Wayne said, “Courage is being scared to death and saddling up anyway.” So, saddle up, managers, and communicate!

References

1. Interview in *USA Today*, March 5, 1988.
2. Dell, Inc., “Our Ethical Principles.”
3. “*The 7 Habits of Highly Effective People: Powerful Lessons in Personal Change*.” Stephen R. Covey, Habit 5, p. 251.

Rick Parmely, founder of Polished and Professional LLC, a training company that specializes in improving personal and professional communications, can be reached at rick@polishednprofessional.com or by phone at 814-470-0598.



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TRANSPORTING SAMPLES

MANAGERS NEED TO CONSIDER PACKAGING, MODE OF TRANSFER, RECEIVING PROCEDURES, AND MORE

By Sara Goudarzi

When we think of labs and how they operate, we're mostly focused on testing and subsequent results—the technicians' abilities and conditions inside the facility where sample research and measurements take place. It's less often that we focus on how the samples arrive at the facility. However, sample transport is an important part of a successful laboratory operation. A healthy and timely sample is vital to accurate analysis.

Delivery services are a key part of sample transport, and each lab relies on these carriers to help run their operations smoothly.

"Reliability directly contributes to fast turnaround times," says Megan Evans, quality assurance manager at Polymer Solutions Inc. (Blacksburg, VA).

Polymer Solutions is an independent materials testing lab that focuses on testing polymers, plastics, metals, rubber, and gases to help their clients solve and prevent material challenges. They serve the medical, pharmaceutical, packaging, aerospace, defense, and manufacturing industries.

"If our clients ship us samples and we cannot depend on their delivery, delays to the project could happen," adds Evans. "For example, the storage conditions could be compromised, which results in the need to send additional samples and, ultimately, in a longer turnaround time because testing cannot commence until new samples are received."

For Evans and those in a similar position, several key factors come into play when transporting samples: packaging, mode of transfer, receiving procedures, safety, and turnaround time, to name a few.

Packaging

For the most part, labs are on the receiving end of samples, and packaging is often at the discretion of the client. However, lab officials and technicians tend to guide clients in how to package their samples to protect both the sample

and those who might be handling the parcels. Otherwise, it's possible that the procedure would need to be repeated, increasing labor efforts and cost and resulting in project delays.

"We [once] had very acidic samples from a mine site in Wyoming—they had a pH of 1 or 2—and the person who sent the samples put them in paper bags," says James Self, lab manager of the Soil, Water, and Plant Testing Laboratory at Colorado State University (CSU). "By the time we got to them, the acidity of the soil had decomposed the bags, and all the samples got cross-contaminated because they were all packed in the same box. So we had to go back and tell them to re-sample and put these samples in plastic or glass."

David Prince, president of Gibraltar Laboratories (Fairfield, NJ), also believes in guiding the client on how to package the samples. This is especially important because the contract testing lab processes some 300,000 samples per year with clients that work in areas such as pharmaceutical, medical device, tissue, compounding pharmacies, specialty chemical, and nutraceutical.

"Gibraltar receives many different types of samples," he says. "Each individual sample is treated differently. The sales department or study director will explain how we request to receive samples—ambient, refrigerated, or frozen—and if we request shipment to be sent overnight."

Like both Self and Prince, as part of the testing protocol, Evans of Polymer Solutions Incorporated will inform clients of any special packaging required for specific samples.

"We work hard to partner with our clients and make sure they are aware of all considerations related to their project, to include special packaging considerations that will ensure accurate results," Evans says. "For example, when we are providing gas chromatography analysis, we ask our clients to package their samples in Teflon-sealed glass vials to avoid contamination."

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To help clients, some labs even go as far as providing kits for proper packaging.

“For homeowners and farmers and so forth, we have a soil sampling kit where they put the sample into the bottle, which goes into a USPS box that they send to us,” Self of CSU says. “They’re available at nurseries and extension offices, and we can also send those [kits] out.”

Most clients are diligent about following these instructions and will package accordingly. At times, however, the packaging isn’t very sophisticated and lab staff might be surprised at what they’ll find waiting in the mailbox.

“Sometimes people will put a mailing label on a jar and will just throw it in the mail box and we get them that way too,” Self says. “I’ve actually gotten a sample from somebody who sent us a rock and wrote their address on the rock.”

Mode of transfer

Similar to packaging, the mode of sample transfer is at the discretion of a lab’s clients. Generally, the transfer is one-way—from the client to the lab—and the bits of material are often disposed of by the lab staff.

“Typically, not many items are shipped out of Gibraltar, as our testing is destructive in nature,” says Prince.

To send packages, clients generally utilize any of the common carriers most people employ, as well as private couriers.

“Our clients regularly use methods like FedEx, UPS, USPS, and DHL,” says Evans. “When a project is completed, our clients have the option to have their samples disposed of by us or returned to their facility. The method of return is at the discretion of our clients.”

Self, who has clients in both the private and the public sector, has a similar take on the mode his clients use for transporting samples.

“I would say for our basic samples from the general public—farmers, ranchers, homeowners—packages are usually sent through the post office,” he says. “Environmental consultants, people who have large projects—such as researchers on campus, for example—will usually use an overnight service, UPS or FedEx or sometimes DHL. Not a lot of overnight USPS services [are used] among environmental consultants and government agencies.”



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Location is also a determining factor for the carrier a client chooses. There are sites where clients might not have access to UPS or the USPS, for example.

“For samples arriving from overseas, we get a lot of stuff from DHL,” Self says. “They’re usually more accessible to people overseas, and people are used to using them a lot.”

Some clients choose to drop the packages themselves, often driving miles to ensure a sample is properly delivered. “We’ve had people deliver them personally, driving for hours and hours to get here,” Self adds.

At times, the laboratory staff might lend the client a helping hand.

“Our sales department sometimes, as a courtesy, picks up nearby samples,” Prince says. “Gibraltar also has a company van that can offer pickup of large loads or items.”

Receiving procedures

The method of receiving samples at the laboratory is also an important aspect of their transfer. In most labs, every sample received is noted and marked for traceability.

“Our clients complete a mandatory sample submission form, which includes information about how their samples need to be stored,” Evans says. “It also includes information about whether the samples should be disposed of or returned after testing is complete. Our internal procedure is a guide-

line for how to use the information provided by the client to ensure proper identification, storage, and handling.”

Lab officials also often coordinate with clients to ensure they are receiving samples on weekdays when the lab is operational.

“Sample transport is an important part of a successful laboratory operation.”

“We prefer to have samples sent on a Saturday, Monday, Tuesday, or Wednesday so samples get sent to us and we receive them Monday through Friday,” says Self. “If they send them on a Thursday, there’s a chance that samples can sit in our central receiving area over the weekend. We don’t want that to happen, especially during the summer, because some types of analyses—like pH and alkalinity for water, moisture for soils, and dry matter for plants—have to be done as soon as we get them here, so we want to make sure that we get those as soon as they get to the university.”

Safety

Safety is a vital aspect of sample transfer. If labs receive samples that are leaking or compromised, the employees who have handled those samples must be notified to ensure they take proper precautions.

“Our clients are required to submit Safety Data Sheets (SDS) for liquid-, powder-, and drug-containing samples,” Evans says. “There are two main reasons for this. First, so that we are aware of the materials we work with during testing and can take the proper safety precautions. It also gives us the information we need in order to safely handle samples should they become damaged or leak.”

“Safety is the top priority in all we do at Polymer Solutions. Therefore, if our clients do not include SDS with samples, this will impact the time it takes to get samples checked into our system and, ultimately, the testing turnaround time,” she adds. “That being said, it is extremely rare that we request an SDS and do not get a quick response from the client.”



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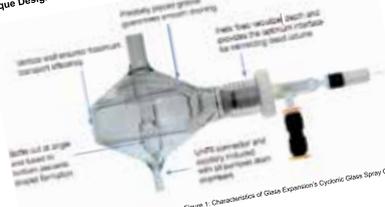
Glass Expansion Newsletter | October 2014 | Issue 35

APPLICATION SPOTLIGHT ICP Spray Chamber Update

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Figure 2. Agilent Techno ICP-OES.

Manufacturers rely on their standard spray chamber design in a pending beam. This type of design can lead to a spray chamber that is sensitive to temperature and an uneven spray chamber. The importance of a stable spray chamber is demonstrated by Figure 2, which shows that a temperature change of 1°C can result in a sensitivity change of 2% in order to ensure an accurate and consistent temperature, the weather Programmable Temperature Chamber is preferable.

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Turnaround time

For some samples, tests need to be conducted within a certain time period—anything exceeding that time could render the results invalid. For such reasons, clients need to depend on carriers to make sure the samples are delivered in a timely manner. Otherwise, they need to make other arrangements.

For water samples, there are tests, such as those for alkalinity and nitrates, that have to be conducted within 48 hours to adhere to US Environmental Protection Agency (EPA) protocols for turnaround time, explains Self. “Usually in those cases [the client] will physically transport those samples to us if it’s not too far away. I’ve heard of people driving 250 miles to get the samples to us so that we can do the analysis that day.”

In addition to a carrier’s on-schedule delivery, the timely handling of the samples could be vital to the accuracy of the results.

“For soil, once the sample is dried out, it can be analyzed for weeks, months, sometimes even years to get data, and we don’t worry about the things changing too much,” Self says. “If it’s wet, then we have to analyze it pretty quickly for, say, ammonium. The reliability of that data depends on the handling of it, so we have to analyze it as soon as we get it.”

Hazardous material

There are times when clients need tests conducted on hazardous substances. Transporting such samples is controlled by federal and state regulations. However, clients and labs rarely deal directly with these regulations and rely instead on carriers, such as UPS or FedEx, to comply with the necessary transport laws. It is up to the carriers’ discretion to decide whether they wish to handle a specific type of hazardous material.

“The timely handling of the samples could be vital to the accuracy of the results.”

“A group of people wanted to send some samples to us from the Fukushima power plant in Japan,” says Self. “They determined the samples were below dangerous levels of radioactivity, but FedEx declined to send the sample so they had to find somebody else. I think they got DHL to send the samples through, but they had to be specially packaged so that they wouldn’t break open [and let radiation] escape from the box.”

Labs can also refuse to receive or send hazardous samples through carriers and on occasion will ask clients to arrange pickup and drop-off. It then becomes the client’s responsibility to comply with regulatory agencies.

Additionally, at times, labs could receive test samples that contain proprietary ingredients whose makeup data the staff doesn’t have full access to.

“We oftentimes don’t have all the information to make decisions regarding transport of our clients’ materials,” says Evans. “They have the most in-depth understanding of their material or samples and also the ultimate responsibility to know the laws and requirements for how to transport their materials. Therefore, we rely on our clients to meet requirements, such as those enforced by the EPA and the United States Department of Transportation (DOT).”

Sara Goudarzi is a freelance writer based in New York City. Her website is www.saragoudarzi.com

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SIT UP STRAIGHT

LABORATORY ERGONOMICS - PART 2
by Vince McLeod



In the last issue of *Lab Manager*, we began to explore the ergonomic risk factors associated with the use of computers. To recap briefly, three of the fundamental ergonomic risk factors are: position/posture, repetition/duration, and force. These can all be influenced by the work area setup and the activities being performed. The good news is, these risk conditions that may cause pain and potential injury can often be easily controlled if one understands basic ergonomic concepts and how to apply them.

In our first part of this series, the take-home message was “balanced” and “neutral.” In a nutshell, our basic rules are summarized as follows:

- Your monitor should be directly in front of you with the upper edge of the screen at eye-level or slightly below.
- Any hardcopy you work from should be placed in front of you on a document stand (not on the desk at your side) either between the keyboard and monitor or immediately to the side of the monitor.
- The keyboard and mouse should be in front of you and generally as close as is practical to prevent overreaching.
- Your wrists should be straight in both the vertical and lateral axes.

In this issue we will discuss repetition/duration and force as they apply to ergonomic risk in the office setting, as well as some possible solutions to get you through the day pain-free.

Repetitive motion

Repetition by definition involves doing things over and over again. In repetitive work, these same types of motions are performed using the same parts of the body in the same fashion, time and time again. In activities such as typing, using a mouse, or referencing paper source documents, the affected muscles, tendons, and joints can be used thousands of times a day, week after week, year after year. The risk of injury is even greater when repetitive jobs involve awkward posture (e.g., bent or

flexed wrists) or forceful exertions such as repetitive overreaching for the mouse (shoulder and neck pain).

Now, in conjunction with a posture that is neutral and balanced

“The risk of injury is even greater when repetitive jobs involve awkward posture.”

as discussed in Part 1, our goals from an ergonomic standpoint are to reduce the number of repetitions experienced by each set of muscles, tendons, and joints throughout the workday and to allow time for recovery. The body has great capacity to repair itself. Problems arise, however, when the amount of damage or stress accumulated over the course of time outpaces the body’s ability to repair. This is when we experience pain, and if the cumulative damage continues, there is the potential for serious injury.

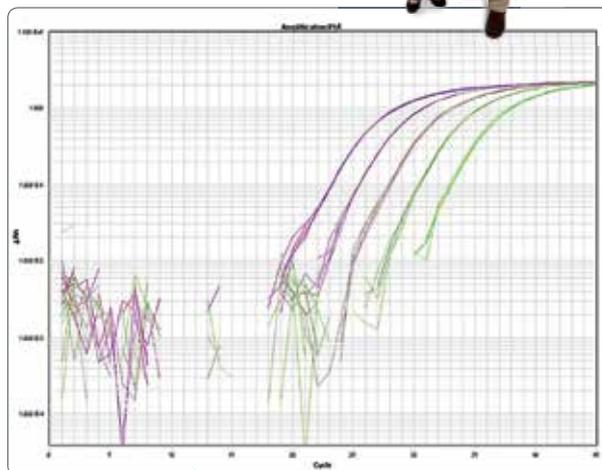
Short breaks in repetitive tasks can be of significant benefit. Break up data entry with variations in activity such as filing, reading, using the copier, or any other task that uses different muscles and motions than computer use. It is good to include micro-breaks of just a minute



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or two every half hour or so during data entry campaigns. There is good software now available that tracks keystrokes and mouse movement and alerts you when breaks are appropriate. It is often better to take many small breaks than one long break during the workday.

It is important to examine and analyze the work being performed. Look at this along the same lines as a job hazard analysis, where the parts of the job are examined on a task-by-task basis. In many cases we have seen, there is much unnecessary repetitive work because

of poor process design (or because the process was really not designed at all—it just grew). Questions that should be considered include: Can parts of this process be automated? Can equipment be linked directly to CPUs for data collection? Can databases be programmed to “talk” to each other? In some instances, perhaps, bar codes and readers might be used to reduce data entry; in other types of information collection and entry, readable/scannable forms might be appropriate. It is often well worth investing a little time to engineer a solution that will save significant time and effort in the long run.

“Exerting large amounts of force can result in fatigue and contribute to injury.”

Often we can trace pain to mouse over-use, typically combined with poor mouse location. Directing the conventional mouse requires a great amount of work through one arm, shoulder, and hand. It is often best to try to distribute this work and share it between both sides. One approach is to use keyboard commands instead. For those of you who remember those keyboard commands from the DOS days, most of them still work. For example in Windows, Ctrl-A will “select all,” Ctrl-C can be used to copy text and Ctrl-V will paste. Look at the menu bar at the top of your document next time you are at the computer; all the selections have one letter underlined (e.g., File, Edit, View, Table). If you hit Alt and the underlined letter, the drop-down menu will expand just as if you mouse-clicked on it. Ctrl-underlined-letter on the commands in the drop-down menu will perform that function. This can greatly reduce mouse use and, once you get familiar with the keyboard commands, actually speed up your work.

There are now at least a couple of “alternative mice” that place the tracking



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device between you and the space bar. This allows one to use both hands for mousing, sharing the work between them.

Some software programs also allow you to automate common tasks (such as inserting your address) with scripts called macros. These can significantly reduce the amount of typing you need to do.

Forceful exertion

Force is the amount of muscular effort expended to perform work. Exerting large amounts of force can result in fatigue and contribute to injury. The amount of force exerted depends on a combination of factors, including:

- The effort with which one strikes an object (e.g., pounding the keyboard)
- The shape and dimensions of an object you are working with
- How you grip an object or tool
- The preciseness of motion required to do the task
- The duration of force applied by the muscles (e.g., the amount of time spent without a muscle-relaxation break)
- Awkward postures (overreaching)

In addition to pounding the keyboard, some areas where unnecessary force is applied are in writing and filing/shelving. There are two general types of grips people use; a “pincher grip,” where you press your finger against your thumb, and a “power grip,” like you would hold a suitcase. The pincher grip requires much more force and should be avoided when possible (e.g., instead of pulling large files out of a cabinet by grasping with a pincher grip from the top, slide your hand beneath the folder and lift it from the bottom using a power grip).

“[A] pincher grip requires much more force and should be avoided when possible.”

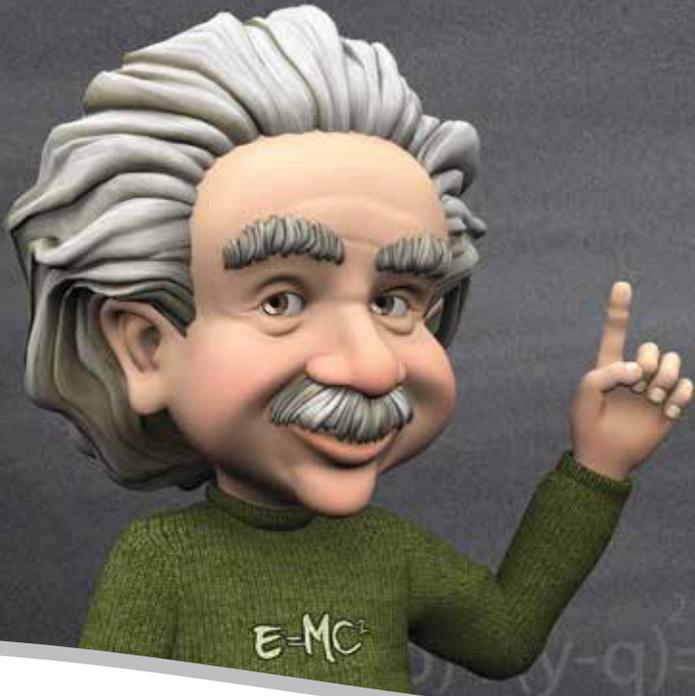
People often use quite a bit of force while holding those standard skinny pens and pencils. Because writing is precise work (after all, you must be able to read what you write), there is some resistance between the writing surface and your pen. The difficulty in gripping a thin barrel is that you must hold it tightly to maintain control. Much better are those wide-barrel pens and mechanical pencils with the soft grip at the end. One does not need to grip nearly as hard, thereby reducing strain on the muscles and tendons. Personal preference does come into play here, so you might audition a couple of different types of pens to see what feels most comfortable to you. Try to hold the pen as loosely as is practical yet still maintain control.

Despite efforts to both reduce the repetition or duration of your exertion and reduce the force applied to perform a task, there is not usually a single “golden bullet” that will be a panacea for one’s ergonomic woes.

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From discord find harmony,
In the middle of difficulty lies opportunity."
-Albert

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OSHA provides an excellent review through its eTool on ergonomics.^{1,2} The State of Washington also has some very good self-evaluation checklists and guides.³ One has to recognize and be cognizant of reducing all these risk factors both on and off the job to effectively reduce the potential for pain and injury.

References

1. Prevention of Musculoskeletal Disorders in the Workplace, U.S. Department of Labor, Occupational Safety and Health Administration. Washington, D.C. <https://www.osha.gov/SLTC/ergonomics/>
2. Computer Workstations, U.S. Department of Labor, Occupational Safety and Health Administration. Washington, D.C. <http://www.osha.gov/SLTC/etools/computerworkstations/index.html>
3. Office Ergonomics, Washington State Department of Labor and Industries. Tumwater, WA. <http://www.lni.wa.gov/Safety/TrainingPrevention/workshops/WorkshopInfo.asp?WkshopID=53#description>

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SAFETY TIP



PROVIDE FIRE EXTINGUISHERS, SAFETY SHOWERS, & EYE WASH FOUNTAINS

By James A. Kaufman

Fire extinguishers need to be appropriate to the type of fire. Type A fires form an ash. A water extinguisher is for fires involving burning wood or paper. Type B fires consist of coiling liquids like oil and grease. Carbon dioxide is an extinguisher for B type fires. Type C fires carry an electric charge. Halon extinguishers and dry chemical powders are to be used here. Active metal fires are type D. Sand and special powders can be used on these fires.

The extinguishers should be mounted at the correct height and designated with a sign above to indicate the location.

The American National Standards Institute (ANSI) Z-358.1-2004 standard provides design and performance recommendations for safety showers and eye wash fountains. It recommends weekly activation and annual testing.

Safety showers should provide water at a rate of 20 gallons per minute for at least 15 minutes. The valve should be a single-action level which stays on until it is pushed off.

Eye wash fountains should have a similar type actuating lever. The flow rate should be 1.5 gallons per minute for eye wash only and 4.0 gallons per minute for eye wash/face wash combination devices.

The OSHA Lab Standard requires that employers indicate in the written chemical hygiene plan how these devices will be maintained and who is going to be responsible for checking and testing them. Monthly inspections are appropriate.

Source: Kaufman, James A., *Laboratory Safety Guidelines - Expanded Edition*, The Laboratory Safety Institute, www.labsafetyinstitute.org.



Greg Martin

ASK THE EXPERT

A LIFECYCLE APPROACH TO METHOD VALIDATION, VERIFICATION, AND TRANSFER

by Rachel Muenz

Greg Martin, is president of Complectors Consulting (www.complectors.com), based in Pottstown, PA, which provides consulting and training in the area of pharmaceutical analytical chemistry. Mr. Martin has over 25 years of experience in the pharmaceutical industry and was director of pharmaceutical analytical chemistry (R&D) for a major PhRMA company for a number of years. In addition, he has volunteered for the U.S. Pharmacopeia for over 10 years, and currently serves as vice chair of the General Chapters—Physical Analysis Expert Committee and also serves on expert panels on Validation and Verification; Weights and Balances' Residual Solvents; and Use of Enzymes for Dissolution Testing of Gelatin Capsules.

Q: The USP Validation and Verification Expert Panel recently proposed integrating traditional approaches to method validation, transfer, and verification into the analytical procedure lifecycle process rather than treating them as separate things. What are the main reasons for that change?

A: The USP formed an Expert Panel on Validation and Verification to explore ways to incorporate Quality by Design (QbD) concepts into analytical procedures. Over the past decade, the pharmaceutical industry has been using QbD approaches, as described in ICH Q8, Q9, and Q10, to improve manufacturing processes by using a lifecycle model. If the lifecycle model is applied to analytical procedures, it becomes apparent that method validation, verification, and transfer are not independent activities, but parts of the lifecycle of the procedure.

From an industry perspective, there have been ongoing challenges with method transfer and with out-of-specification (OOS) results, which may be related to method performance and may be improved by adopting a QbD lifecycle approach. That would involve proactively considering the expected performance of the procedure, particularly variability, and the sensitivity of the method to the typical variances in method parameters.

Q: What will that integration mean for lab managers?

A: If the true expectations for method performance are identified and effectively addressed

early in the lifecycle of an analytical procedure, then better performance of the method can be expected. The end result will be analytical procedures that, by design, will function well in a wide variety of situations, with fewer transfer issues and fewer OOS results due to analytical variability.

Q: The key to the lifecycle method seems to be the ATP (Analytical Test Profile). What is the ATP, and how does it improve the method validation, transfer, and verification process?

A: QbD has taught us the value of starting with the requirements. The ATP clearly identifies the requirements and expectations of the analytical procedure, which is similar in many ways to the Quality Target Product Profile (QTPP) used in QbD for pharmaceutical manufacturing processes. It typically addresses performance questions about the analytical procedure: What are you trying to measure? Over what concentration range? In the presence of what matrix? What accuracy/precision/uncertainty is required? With what level of confidence? The ATP may also include some practical constraints, such as requiring that the procedure be performed on the equipment already available in the quality control laboratory or that the analysis be completed within a certain timeframe.

We are likely to find that statistical tools can assist us in attaining these goals, such as using confidence intervals to characterize overall uncertainty instead of the traditional point estimates for accuracy and precision, which can allow unacceptable levels of variability

to affect the performance of methods. For method transfer, equivalency protocols may replace the relatively simple comparison of results often employed currently.

While many labs may do this informally now, our experience is that scientists tend to focus on the capabilities of the instruments they are using rather than on the requirements for the reportable results to be able to make good decisions.

Once the requirements for the reportable result have been identified, this naturally leads to selection of an appropriate analytical technique and development of method understanding: well-designed experiments to investigate the method parameters that can impact method success, such as Design of Experiments (DoE) to evaluate optimal sample preparation and chromatographic conditions.

Q: What sort of feedback have you received from lab managers and other lab professionals on the lifecycle approach so far?

A: The feedback has been surprisingly positive, considering that most laboratories have well-established method development and validation procedures. I think this reflects the recognition of managers that the current approaches to method validation are not working as well as they should be.

In fact, USP just held a Workshop on Lifecycle Approach to Validation of Analytical Procedures with Related Statistical Tools on December 8 and 9 at their headquarters in Rockville, MD. Over 140 professionals gath-

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ered to discuss current thinking and future plans in this area. The response of the participants was overwhelmingly enthusiastic.

Lab professionals are actively looking for ways to address challenges with method transfer failures and OOS results due to poor method performance, and the use of a proactive, holistic approach is resonating with them. Some chemists are apprehensive about the use of statistics associated with this approach, but I am confident that is a hurdle that can be overcome.

Q: You recently taught a course on the lifecycle approach to analytical methods at the Eastern Analytical Symposium (EAS 2014). How did that go?

A: The course went really well. Eastern Analytical Symposium is a great conference, with lots of local support. I was surprised that the attendees for this course were seasoned professionals, averaging over 15 years' experience with method development and validation, since EAS often draws those newer to the industry. This again points to the fact that lab professionals are looking for a better way of dealing with method lifecycle, and the issues that result if methods are not meeting performance expectations.

In my courses, I always draw on the experiences of the attendees, since adult learners are more likely to use and apply what they learn if they can relate it to something that is concrete to them. This class had lots of experience to draw upon. When I pointed out that by using the lifecycle approach (with the ATP to articulate the method performance expectations, method understanding to

ensure they knew the strengths and weaknesses of the method, appropriate validation acceptance criteria, and ongoing verification of method performance), the attendees could reduce the types of problems they have had in the past, they wanted to learn how they could accomplish the same results.

Q: What were the main concerns of those who attended the course?

A: The attendees were concerned about the failure of methods to perform the way they need to in a GMP environment. If testing results in an OOS result, the impact is huge, and the investigations can take days or weeks. If the investigation concludes that the sample was acceptable, but the results were not initially in specification, then there was wasted effort and lots of anxiety. The bar is even higher when transfer of a method from one laboratory to another is not initially successful. Ultimately, the issues are resolved, but there must be a way to avoid the unnecessary effort and related stress. Using the lifecycle approach has the potential to help the situation significantly.

Q: When is it expected that the changes will be officially adopted? Are lab managers/researchers beginning to implement them already?

A: The official implementation of this approach is still over a year away for USP, and a planned ICH guidance is not likely before 2017. The good news is that the concepts can start to be applied now, and several companies, including both innovators and generics, have been using them. At the recent USP Workshop on Method Lifecycle, an FDA representative indicated that the FDA had already received and approved applications where the lifecycle approach was used for analytical methods.

The implementation is likely to be evolutionary. The companies that have already adopted this approach generally started with a pilot, but increased the scope when they realized the benefits. While the traditional approaches are still acceptable, when industry finds something that works better, they adopt it. Interestingly, the recent FDA guidance on Analytical Procedures and Methods Validation for Drugs and Biologics contains many of the traditional ideas but leaves the door open for use of the lifecycle concepts.

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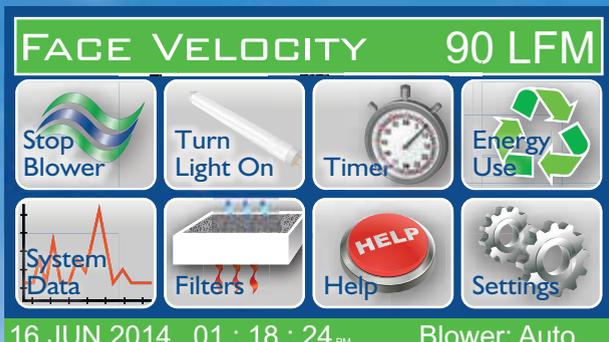
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INSIGHTS ON TACKLING FOOD FRAUD

A SMALLER WORLD CREATES BIGGER CHALLENGES

by Mike May, PhD

Some of the most common foods, like the cocoa from the beans shown here, make a prime target for food fraud. (Image courtesy of Nestlé.) ▼

For the general public, the concern over food fraud revolves around headline-grabbing examples, such as melamine—an organic compound used in plastics—appearing in infant formula from China in 2008 and beef replaced with horsemeat in the UK in 2013. For experts in the field, though, food fraud predates these examples by centuries, and many instances stay below the general public’s radar. In fact, says John Spink, director of the Food Fraud Initiative at Michigan State University in East Lansing, “food fraud has been a problem since the beginning of recorded history.” And it’s a *big* problem. In an opening letter to attendees of the 2013 annual meeting of the American Bar Association’s Tort Trial & Insurance Practice Session, the program chairs—David A. Reif of McCarter & English in Hartford, Connecticut, and John P. Buckley of Ungaretti & Harris in Chicago, Illinois—wrote, “Food fraud is a \$49 billion industry.”

In addition to the long history and high dollar value, food fraud extends over many types of foods. According to National Science Foundation International, headquartered in Ann Arbor, Michigan, “Food fraud originated as a money-making opportunity, a way to extend a food’s primary ingredients for added profit.” For instance, watering down milk extends the amount that can be sold. The financial triggers for food fraud, though, can spawn harmful products. For instance, the infant formula tainted with melamine caused some of the children to develop kidney stones. In addition, even some seemingly harmless alterations—at least from a health perspective—can be dangerous. In 2004, for example, the BBC reported that 13 Chinese babies died from malnutrition from excessively watered-down formula.

The problem, however, goes beyond children. Nearly everyone gets exposed to food fraud in some way. “The top 10 ingredients at risk for food fraud are mostly things that we use every day and take for granted, including milk, olive oil, honey, coffee, and so on,” says Nicola Vosloo, senior leader of strategy and global applications for food at PerkinElmer in Seer Green, UK.

Despite food fraud affecting so many everyday items, much of the problem remains a moving target. “It’s not the same food at the same time,” says Amy Kircher, director of the National Center for Food Protection and Defense (NCFPD), a Department of Homeland Security Center of Excellence at the University of Minnesota in St. Paul. “It’s not just infant formula or species substitution for fish.” She adds, “Many products are being adulterated, and the methodology of the fraud varies.”

METHODS ON THE MENU

For the food itself, someone can adulterate it by adding something inexpensive to a higher-value product, like adding water to milk. Likewise, something inexpensive can be substituted for a pricier item, such as marketing regular olive oil as extra virgin. The problem also encompasses how the criminals get away with the fraud.

The globalization of the food supply opens many opportunities for fraud. For one thing, a criminal might create an adulterated food product in one country—maybe one known for creating the poor product—and then ship it through so many countries that the country of origin gets “lost.” This so-called transshipping often arises in the honey industry, where products cut with corn syrup or watered-down versions end up sold as “pure” honey.

This technique can also be used to avoid import tariffs that apply to one country and not others. “We don’t know how common this is,” says Kircher, “but we do know that honey is transshipped to evade tariffs in certain countries. It is also transshipped or relabeled because some countries might add an adulterant that is banned in other countries.”

OCEANS OF OPPORTUNITY

Seafood makes one of the top food targets for fraud. In 2013, Oceana—a nonprofit international ocean conservation organization—reported that one-third of the retail seafood tested in the United States was a different species than the one

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indicated on the label. For some fish, the fraud climbed much higher: 59 percent and 87 percent mislabeling for tuna and snapper, respectively. Ongoing findings like these led Robert Hanner, associate professor at the Biodiversity Institute of Ontario and the Centre for Biodiversity Genomics at the University of Guelph in Canada, to describe the extent of seafood fraud as “systemic in the industry globally.”



▲ Only a wide range of analytical tests, such as the genomics performed in this lab, can fend off food fraud. (Image courtesy of Nestlé.)

Nonetheless, seafood fraud varies. “It depends on the species, geographic region, and likely the time of year as well,” says Hanner. “During the legitimate harvest season for a particular species, there is a greater likelihood of actually getting it.”

Like other forms of food fraud, many examples carry largely economic consequences. Consumers could pay red snapper prices and get the much cheaper tilapia. In other cases, the switch could cost the consumer his or her life. In 2007, for instance, the US Food and Drug Administration (FDA) published a warning that some fish labeled as monkfish could be puffer fish, which—if not properly prepared—can contain the potentially deadly neurotoxin called tetrodotoxin.

People in the food industry need an easy way to determine the right fish species from the wrong one. This could be done with DNA barcoding, essentially using part of a fish’s genetic code as an indicator of the species identity. Hanner explains, “We can use DNA sequence variation of standard marker genes to tell species apart.” A useful marker is the mitochondrial cytochrome c oxidase subunit I gene (COI), which exhibits low variation within a species but varies enough between them that it can be used to distinguish most species.

The application of DNA barcoding for species identification depends on having a database of barcodes derived from expert-identified reference specimens from around the world. “Building a reference library of known species that we can use to identify unknown fish is one of the goals of the International Barcode of Life—iBOL.org—project,” says Hanner.

The overall process of DNA barcoding, though, still requires a molecular biology lab and a few hours of work, but it could be turned into a quick tool that could be used in the food industry. Hanner and his colleagues are already working with InstantLabs in Baltimore, Maryland, to make an easy-to-use device that can run various assays. “We have already developed a diagnostic test for Maryland blue crab,” Hanner says. The technology will also be expanded to other seafood.

TOOLS ALREADY IN THE BOX

Fighting food fraud does not always depend on new technology. For example, DNA testing can reveal a horse-meat-for-beef switch. “This is technology that exists that we haven’t employed for detection,” Kircher says. Other technologies can also be used.

Spectrometry in the ultraviolet-visible (UV-Vis) range can also tell one food from another. Carl Peters, applications scientist at BMG LABTECH in Cary, North Carolina, says, “We have several customers who have contacted us about using UV-Vis spectrometry to analyze food products, juices, and, recently, alcoholic beverages.” He adds, “Certain signatures are representative of individual beverages.”

BMG LABTECH provides platforms for this kind of analysis. Peters adds, “We can do this on a relatively large scale. On plates with 1,536 wells, we can scan 200 to 1,000 nanometers in less than a second per well.”

Other spectral ranges, such as near infrared (NIR), can also be used to detect food fraud. At PerkinElmer, Vosloo says, “We’ve used NIR spectroscopy to screen milk powder and measure adulterations.” Moreover, Vosloo and her colleagues can do this without needing the many calibrations for each adulterant that previous techniques required. “Developing all of the calibrations is not practical when there are well over 50 known adulterants in milk powder,” Vosloo explains. “We developed new algorithms within our adulterant-screening software for targeted and nontargeted screening that offers increased sensitivity—over conventional methods—for the detection of adulterants in a matter of seconds.”



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SAFETY IN NUMBERS

For a food company, only a variety of technologies provide safety and certainty across the wide range of foods. Also, the testing needed depends on the food. As Matt Dofoo, consumer quality manager at Nestlé in Vevey, Switzerland, says, “From a technological standpoint, direct and indirect analytical methods are used for authenticity testing, based on the type of risk.” He adds, “Many types of targeted test methods are already in place to prevent known types of food-fraud adulterants from entering the food supply.”

Some technologies, such as Fourier transform infrared spectroscopy (FTIR), can be used in various ways. As examples, Dofoo says, “FTIR can act as an effective screen—milk fingerprinting—for detecting both known (including mineral oil, urea, ammonia-based salts, and detergents) and unknown potential adulterants in fresh milk at collection sites.” He also mentions other technologies being used, including nuclear magnetic resonance, isotope ratio analysis, and high-performance liquid chromatography.

To keep ahead of the game, companies also need tools for detecting the unexpected. For that, Dofoo says, “Moving forward, Nestlé is working with a number of groups that are developing and championing the use of untargeted test methods to prevent new adulterants from entering the food supply.”

SOPHISTICATED SCAMS

Food-fraud criminals apply a range of tools for picking their next targets. “They are watching the market, the weather, and policy changes for what can be a filler for ground beef, to see if they can slide in horsemeat,” says Kircher. “They are looking for a space in the market where they can adulterate a food, make money, and not get caught.”

Even the Ebola epidemic raises concerns over upcoming food fraud. West Africa supplies about three-quarters of the world’s cocoa. Although the Ebola epidemic has not decreased the cocoa supply so far, the price is already climbing on the world market. “So

people might enter the market with cocoa that is cut,” Kircher says.

For food fraud in general, what happens in one region can affect others. “In the past, a local butcher having a problem with ground beef maybe only affected a city block,” says Spink. “For a food company, billions of pounds of meat could go around the world in 24 hours.”

That increase in movement and speed creates evolving options for food fraud. In addition, the criminals keep upping the game. “The bad guys are clandestine, stealthy, resilient, and often very well-funded, and they actively avoid detection,” Spink says. To fight that kind of fraud, companies and countries around the world must work together, employ advanced technology, and combine criminology efforts. “We need to understand why and how organizations commit fraud and to understand their tendencies so that we can detect them and learn how to slow their growth,” Spink says.

In the end, fighting food fraud requires teamwork. As Dofoo says, “Combating food fraud cannot be done in a silo. The entire industry must work together with regulators and other stakeholders to prevent fraud.” Both old and new technologies from science and crime labs will come into play. In addition, techniques from both fields must keep advancing to fend off future attempts at food fraud. In many cases, success at fighting food fraud truly is a matter of life and death.

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A TRIO OF TOPICS HELPS SCIENTISTS START AUTOMATING

by Mike May, PhD

For many labs, automation provides the biggest return on sample preparation because it's the key time-consuming bottleneck for many processes. To smooth out the transition from manual to automated sample prep, though, scientists need to address three issues: what sample prep should be automated, whether to take an online or offline approach, and how much programming they are willing to learn. Experts interviewed here help novices navigate these challenges.

At The National Food Lab in Livermore, California, the question of where to automate sample preparation remains unanswered for Julie Hill, senior vice president of laboratory services. She says, "We've tested a couple of instruments for the QuEChERS extraction, but not that successfully." This process can be used to test foods for contamination, such as pesticide residues. She adds, "We were beta testing, so the instruments weren't ready for market but it made us a little shy to make the investment." Still, Hill's team runs hundreds of samples per week on this extraction. So, she says, "Automation would be cost-effective, but we want to make sure to purchase the right vendor's equipment that will be robust and reliable."

Despite a rough start and lingering concerns, Hill says that she will definitely add automation to sample preparation for this extraction. Hill plans to explore the latest options at Pittcon in March. She says, "There, our focus will be to look at automated equipment and talk to other labs." In deciding what to automate, Hill is taking a productive approach—survey the options and see what works for similar labs. That strategy will help many managers make the best decisions about what to automate.

Also, make sure to compare apples with apples. One lab's needs can differ significantly from another's. "Where automation is used and the primary reason for using it, changes from laboratory to laboratory," says Stuart J. Procter, business development chemist at Metrohm in Riverview, Florida. Quality control labs, says Procter, use automation of sample preparation to improve precision and accuracy, while contract analysis labs might use it to save time and money. Be sure to look for solutions that have been proven in your specific application.

Online or off?

For some sample preparation, the complexity of automation depends on how it is added. For instance, Darwin Asa, senior marketing manager in health sciences at Waters Corporation in Milford, Massachusetts, says, "You have to make a decision between automated offline and automated online sample prep." Automated offline sample prep is performed separately from the testing devices, such as liquid chromatography/mass spectrometry (LC/MS). In automated online sample preparation, it's integrated with the analytical device. Both have advantages and disadvantages.

"For some sample preparation, the complexity of automation depends on how it is added."

The offline approach uses one system for sample preparation and another for detection. This makes for a more flexible system, because the sample-prep instruments can be used for more than one detection system. Consequently, an offline system can be used to process many samples without stopping for analysis. In some labs, that might be an efficient technique, especially if the detection device is shared with other labs and not always available.

The offline approach also offers other flexible features. As Eric Phillips, gas chromatography (GC) and GC/MS marketing manager at Agilent in Santa Clara, California, says, "Offline systems can specialize. For example, there are systems that perform extractions, sample cleanup, derivatizations, serial dilutions, standard additions, and some combination of all of these." Those instruments can be used like modules that can be connected in many ways to perform different forms of sample preparation. The offline approach can also be more economical in labs that cannot afford overlapping kinds of equipment, such as multiple platforms that all contain—in an online fashion—the same devices for sample preparation.

When throughput matters the most, though, labs should consider online sample preparation. “The online approach is really good for people with lots of experience with the detection technology who really want to maximize their productivity,” Asa says. In some cases, an online system can run around the clock. The integrated sample preparation also reduces the need for expertise in the lab, because the device provides some of that.

Can you code?

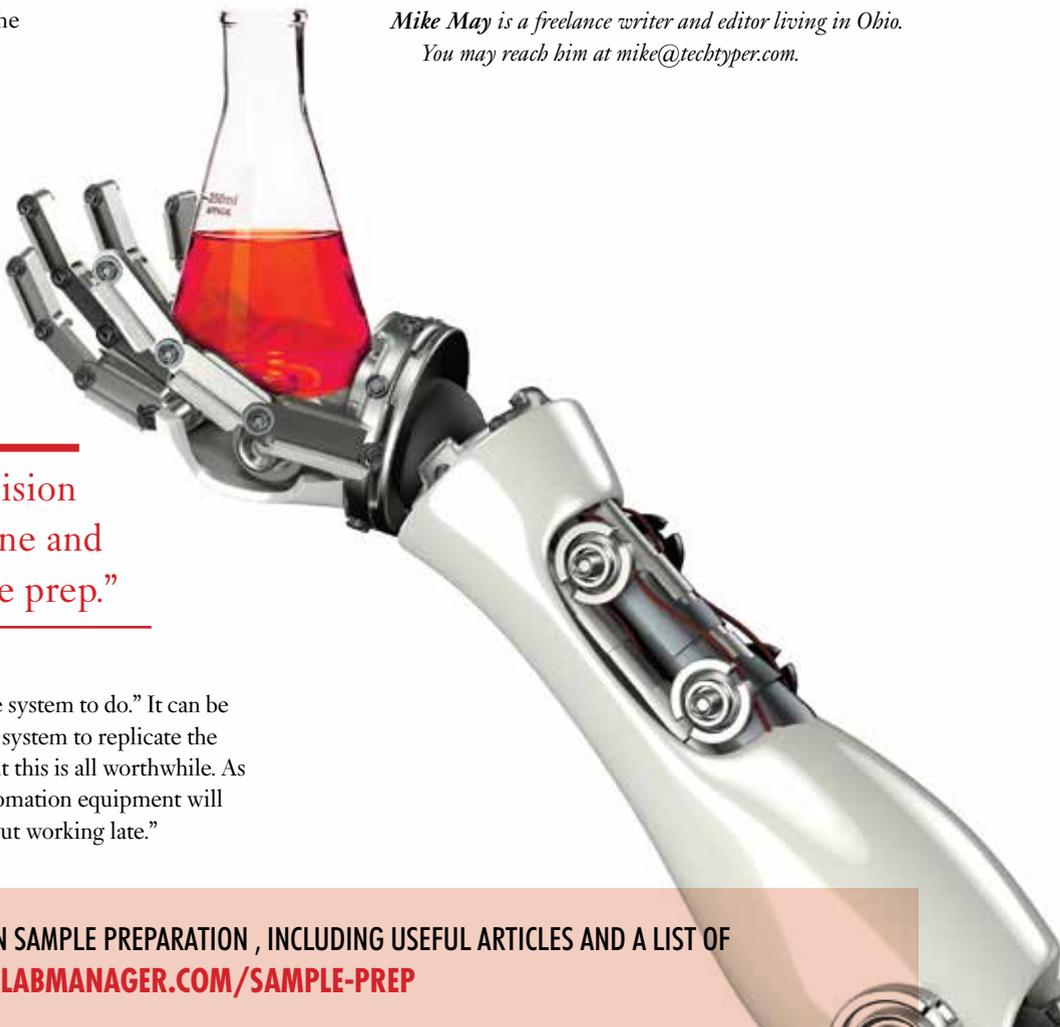
The choice of online or offline sample prep can also determine the need for coding. For example, the flexibility of an offline approach can increase the complexity, because the system probably includes a robotic workstation or a robotic liquid handler. “So someone needs to learn to write pipetting scripts that handle the processes,” Asa says.

For most technologies, the coding keeps evolving. You don’t need to know a particular computer language. As Phillips says, “All of that is generally handled by the manufacturers of the automation equipment.” But you will need to program the system to do what you want it to do. “Though that sounds easy,” Phillips says, “you need to be able to translate what is done

As technology moves forward, coding needs could get easier and easier. As an example, Hal Wehrenberg, product manager for software at Tecan in Männedorf, Switzerland, describes some sample-prep systems that rely on open platforms “that let you tailor instructions for daily usage.” He adds, “A screen can even show pictures of how to set up the workflow.” These app-like capabilities can change the experience needed to “program” any automation system.

With this information in hand, you can take on sample prep’s trio of automation topics. Ask around to decide what to automate, consider your need for speed or flexibility when thinking online or off, and know the code or find a system that looks more drag-and-drop. Once you make those three decisions, your lab’s sample prep could be easy, repeatable, and more effective than ever.

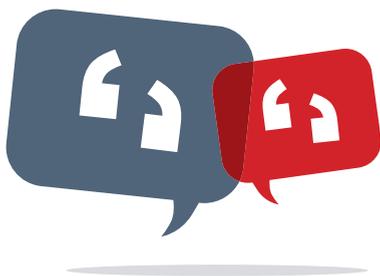
Mike May is a freelance writer and editor living in Ohio. You may reach him at mike@tecbtyper.com.



“You have to make a decision between automated offline and automated online sample prep.”

manually into exactly what you want the system to do.” It can be a little painstaking to patiently “teach” a system to replicate the steps that you’ve been doing by hand, but this is all worthwhile. As Phillips says, “Once this is done, the automation equipment will not forget steps, nor will it complain about working late.”

FOR ADDITIONAL RESOURCES ON SAMPLE PREPARATION , INCLUDING USEFUL ARTICLES AND A LIST OF MANUFACTURERS, VISIT WWW.LABMANAGER.COM/SAMPLE-PREP



Types of titrator used by survey respondents:

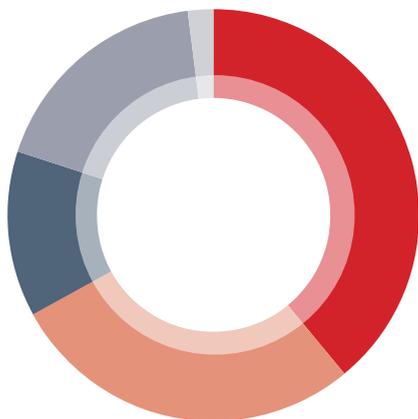
Potentiometric	69%
Karl Fischer Coulometric	36%
Karl Fischer Volumetric	34%
Other	9%

Titrator components used by survey respondents:

Evaporator	21%
Karl Fischer oven	36%
Autosampler	50%
Homogenizer	12%
Other	9%

Nearly 47% of respondents are engaged in purchasing a new titrator. The reasons for these purchases are as follows:

Replacement of an aging system	39%
Addition to existing systems, increase capacity	28%
Setting up a new lab	13%
First-time purchase	18%
Other	2%



ARE YOU IN THE MARKET FOR A... TITRATOR?

Modern titrators can be simply classified as one of two types: potentiometric and Karl Fischer, with the latter available in both coulometric and volumetric versions. While titration may be considered a basic analytical method, modern titrators are far from simplistic. Many titrators offer a variety of automation options and can perform titrations with great accuracy with minimal operator intervention. According to this year's survey results, over 82% of survey respondents use automated titration in their labs, with fully half of respondents also using an autosampler.

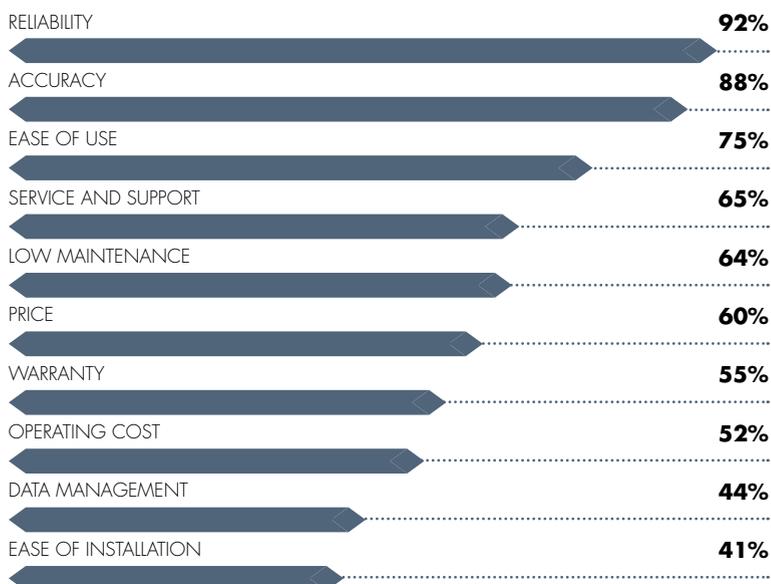
TOP 6 QUESTIONS

You should ask when buying a titrator

1. How precise is the titrant delivery system? 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? What is the replacement cost for electrodes?
5. Is the software field upgradeable?
6. What is the service and repair policy?
 - Is on-site support offered?
 - If something goes wrong with the meter, can it be fixed locally?
 - What is the general turnaround time for repair?

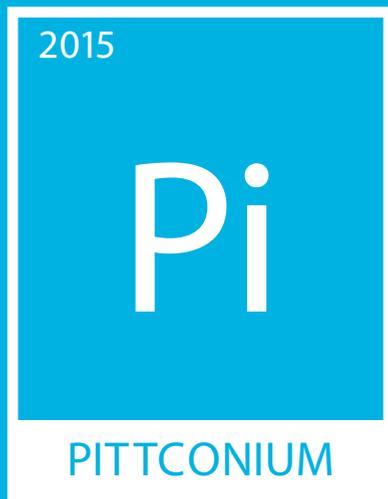
TOP 10 FEATURES/FACTORS

Respondents look for when purchasing a titrator



For more information on titrators, including useful articles and a list of manufacturers, visit www.labmanager.com/titrators

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Dr. Anne Carpenter



Dr. Arvind Rao

ASK THE EXPERT

TRENDS IN IMAGE ANALYSIS SOFTWARE

by Tanuja Koppal, PhD

Dr. Anne Carpenter leads the Imaging Platform at the Broad Institute of Harvard and MIT—a team of biologists and computer scientists who develop image analysis and data mining methods and software that are freely available to the public through the open-source CellProfiler project. She collaborates with dozens of biomedical research groups around the world to help identify disease states, potential therapeutics, and gene function from microscopy images. Carpenter received her PhD in cell biology from the University of Illinois, Urbana-Champaign, and completed her postdoctoral fellowship at the Whitehead Institute for Biomedical Research at MIT.

Dr. Arvind Rao has been an assistant professor in the Department of Bioinformatics and Computational Biology at the University of Texas MD Anderson Cancer Center since 2011. Prior to joining MD Anderson, he was a Lane Postdoctoral Fellow at Carnegie Mellon University, specializing in bioimage informatics. Rao received his PhD in electrical engineering and bioinformatics from the University of Michigan, specializing in transcriptional genomics. At MD Anderson, he is working on using image analysis and machine learning methods to link image-derived phenotypes with genetic data across biological scale (i.e., single-cell, tissue, and radiology data).

Q: What kinds of changes have you seen in image analysis tools in recent years?

A: Carpenter: Microscopy has been prevalent in a lot of different fields and extremely widespread across different types of labs for decades. Twenty years ago, when I was a student, microscopy images were used in a very qualitative way. You would choose a single, representative image from your experiments to publish in your paper, and that was the end of the story. In the past decade, it's become common to quantify the images from microscopy, especially when publishing your data. Image analysis software has also matured in this timespan, making it feasible for any biologist, no matter their computational expertise, to quantify various types of images.

Q: What changes do you expect to see going forward?

A: Carpenter: The scale of experiments has [increased] and will continue

to increase. While previously microscopy experiments were done on glass slides, now they are often done in multi-well plates in order to test multiple replicates, time points, and perturbations.

With the large number of experiments being done, image analysis software can help save the timespent looking at the images, and it also lends a higher degree of accuracy and objectiveness to the analysis of the data.

Another change is that, with the software tools becoming very user-friendly, a biologist can try and get started with image analysis on his or her own. Particularly in microscopy, one can always tell whether the software is doing a good job in identifying cells. So it's easy to get started on your own. There are also online Q&A forums and e-mail lists for various software packages where you can get advice from people. You don't necessarily need to work with an expert, unless it's a particularly challenging problem.

Q: Do you think software tools have now become user-friendly enough to be used by biologists without much computational training?

A: Rao: I think there is such a thing as being too user-friendly. In an effort to make software user-friendly, vendors have now started providing default options that may or may not apply to your dataset. There is also no clear information provided that tells people how to change those settings to apply to your data. So people often end up using these tools, especially algorithms, which are not necessarily tailored to address their biological question. It could end up making a really good experiment look bad or [making] an unimportant result look artificially strong. So you then end up either overly disappointed or too optimistic with the results obtained. With user-friendly tools you have to strike the right balance, and it is not easy to do. Hence, collaboration is very important. There has to be a clear and strong

partnership between the technical person analyzing the data and the biologist or clinician asking the questions.

Q: Why is there a need to develop and use open source software?

A: Carpenter: When I was doing my postdoctoral work, I went around looking for either an open source or commercial software that could help me count *Drosophila* nuclei in a high-throughput mode. None of the existing software worked. So I started looking at computational papers that had better algorithms for the biology I was looking at. I taught myself computer programming and collaborated with a graduate student at MIT to launch the CellProfiler project. Our goal was to take the advanced algorithms available to the computer science community and make [them] applicable to the biologists, for their use. The trend that we are seeing across all open source software today is that [it is] becoming more powerful and easier to use.

With most imaging software, you start with setting up a pipeline that resembles what you are looking to accomplish. Then you do need to tweak and configure it based on your image set, the cell type, phenotype, and other characteristics that you want to measure. Through trial and error, you can see what the results look like and make further adjustments if needed.

Q: Do you see any obvious gaps or areas that need improvement?

A: Carpenter: There are certainly a few areas that are still challenging, even for experts in the image analysis community. These include some types of bright field images that are very tough to quantify. Some cell types, like neurons, are particularly

challenging to work with. Tissue samples can be difficult to process, and working with whole organisms, like zebrafish and mice, can be difficult as well. Working with co-cultures can be challenging in two ways: on the experimental side it's difficult to find the right conditions where both cell types grow well together. Computationally, it can also be challenging because most software algorithms are designed to identify one particular type of cell and are not very good at identifying mixtures of cells that are different from each other. So we decided to use a machine-learning approach where we trained a computer to recognize the different cell types. In one experiment where we had primary human hepatocytes together with mouse fibroblasts, we used the CellProfiler Analyst to train the computer to help recognize the two cell types.

We often develop our own image processing algorithms for a project that requires them. We also scour the computer science literature for algorithms that may be useful for certain domains. Often computational scientists publish work showing the usefulness of a certain algorithm in a particular biological domain, but they don't produce software that a biologist can actually use. One of our goals with the CellProfiler project is to make such useful algorithms available to the biologists. The user interface should make sense to biologists and how they want to work. Hence, we are constantly refining our software based on the feedback we receive.

Q: What areas do you think need to be improved upon?

A: Rao: Biological variations, based on cell type and morphology, are induced by experimental conditions. Similarly, on the technical side, variability comes from using different types of instruments, such as in microscopy. The

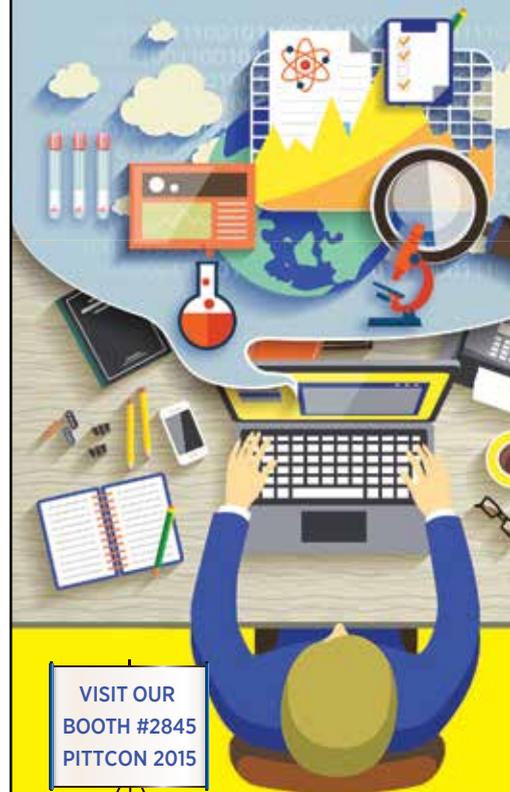
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same sample can look different under different microscopes, and it goes back to the notion of being user-friendly. Some of these microscopes come with preprogrammed settings. So you need to normalize the data for different factors like signal-to-noise ratio, gain, or filter settings, or you can end up with skewed results. These preprocessing settings can also induce systematic software-induced artifacts that are specific for that particular instrument. Normalization between staining conditions across data and appropriate preprocessing is another important consideration. These are all areas that need to be looked at more closely.

Q: Where do you see the biggest changes happening in image analysis tools?

A: Rao: In my opinion, the 3D image analysis area is set to explode. Super-resolution microscopy has shown us things that we could not have appreciated in the past. Being able to mine the 3D images obtained from such sophisticated instruments is going to be very informative. The information that you can mine from these images on a single-cell basis is huge. Extracting the data and using the statistical methods to quantify the heterogeneity of these cells is going to change the way we look at this data. Visualizing this multi-parametric data and correlating it with the biological conditions and integrating it with all the phenotypic information generated from a single cell is going to be a big step forward in the next few years.

Q: What advice do you have for lab managers?

A: Carpenter: I would ask people to be enthusiastic and just dive in and learn new things. Image analysis tools are easy to work with, and it is a useful skill that can be used to

answer all types of biological questions. On a more cautionary note, treat microscopy experiments like you would a molecular or biochemical experiment, keeping every condition constant and being consistent and rigorous across samples, if you want to ultimately compare the quantitative results from the various images.

Q: What advice do you have for lab managers evaluating and investing in new software tools?

A: Rao: My advice would be, to be as rigorous with the software tools as you are with the biological experiments. Just like you run duplicates and triplicates to improve the reproducibility in an experiment, the same thing should apply to software. In most cases vendors are open to giving you a free trial for at least a month. So you should look into how the different algorithms perform when analyzing your data. First and foremost, you need a good technical team in place to evaluate the nitty-gritties of all these tools. Every lab should have some gold-standard data set in place to evaluate various software options before they pick the appropriate tool. My personal bias is to stick with open source tools. On the other hand, commercial software is often better validated than the open source tools.

Tanuja Koppal, PhD, is a freelance science writer and consultant based in Randolph, NJ. She can be reached at tkoppal@gmail.com



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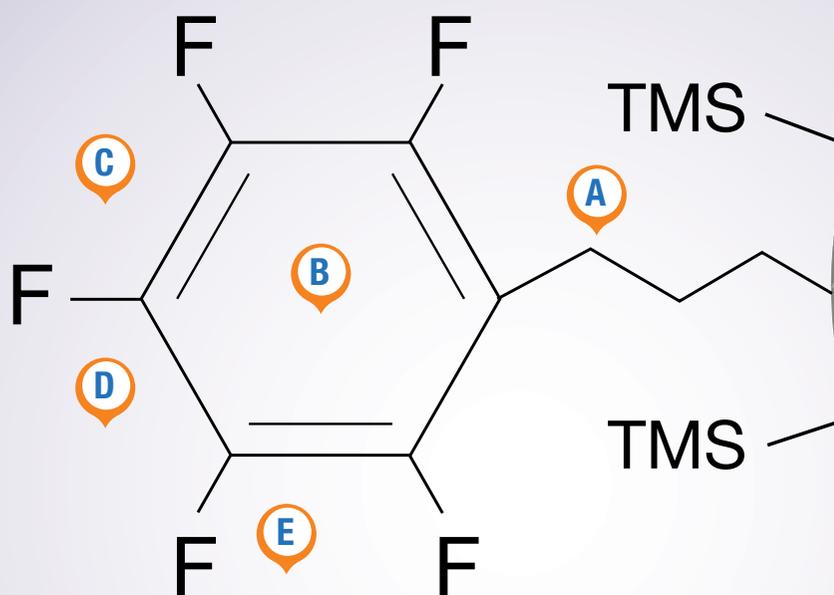


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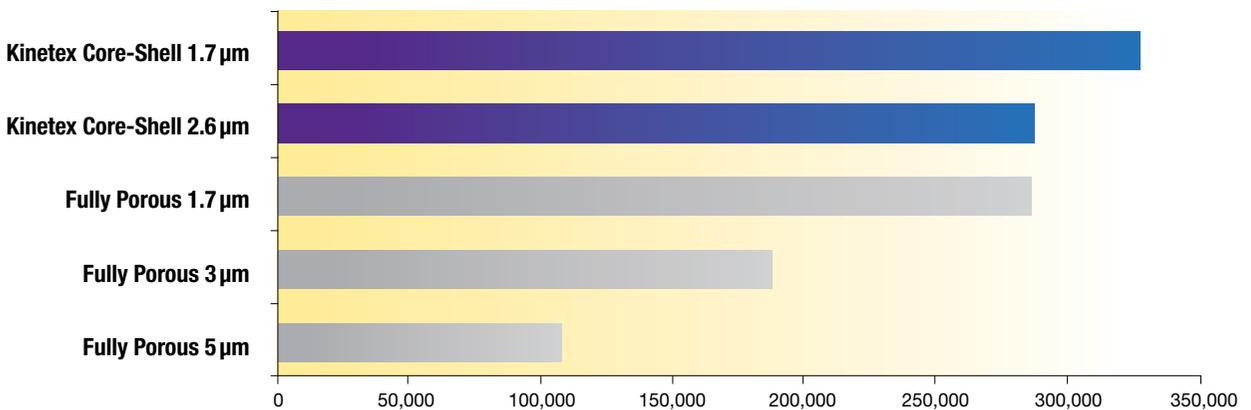


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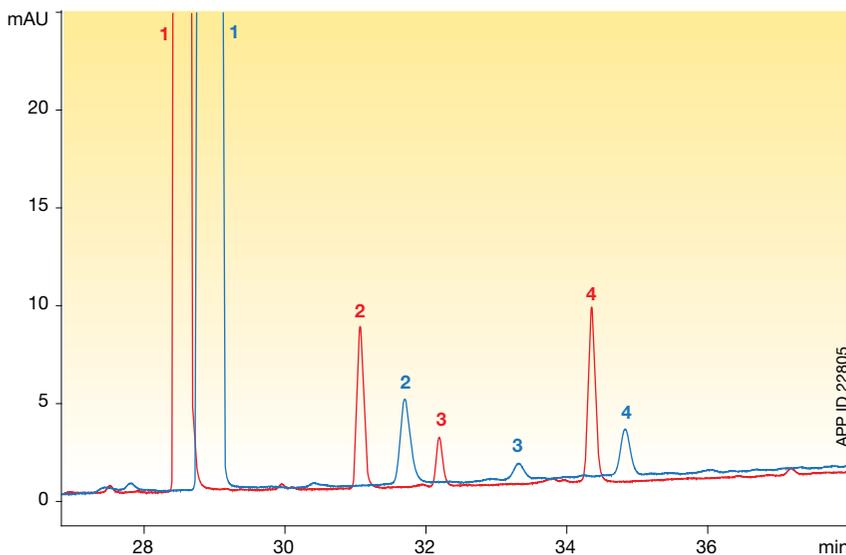
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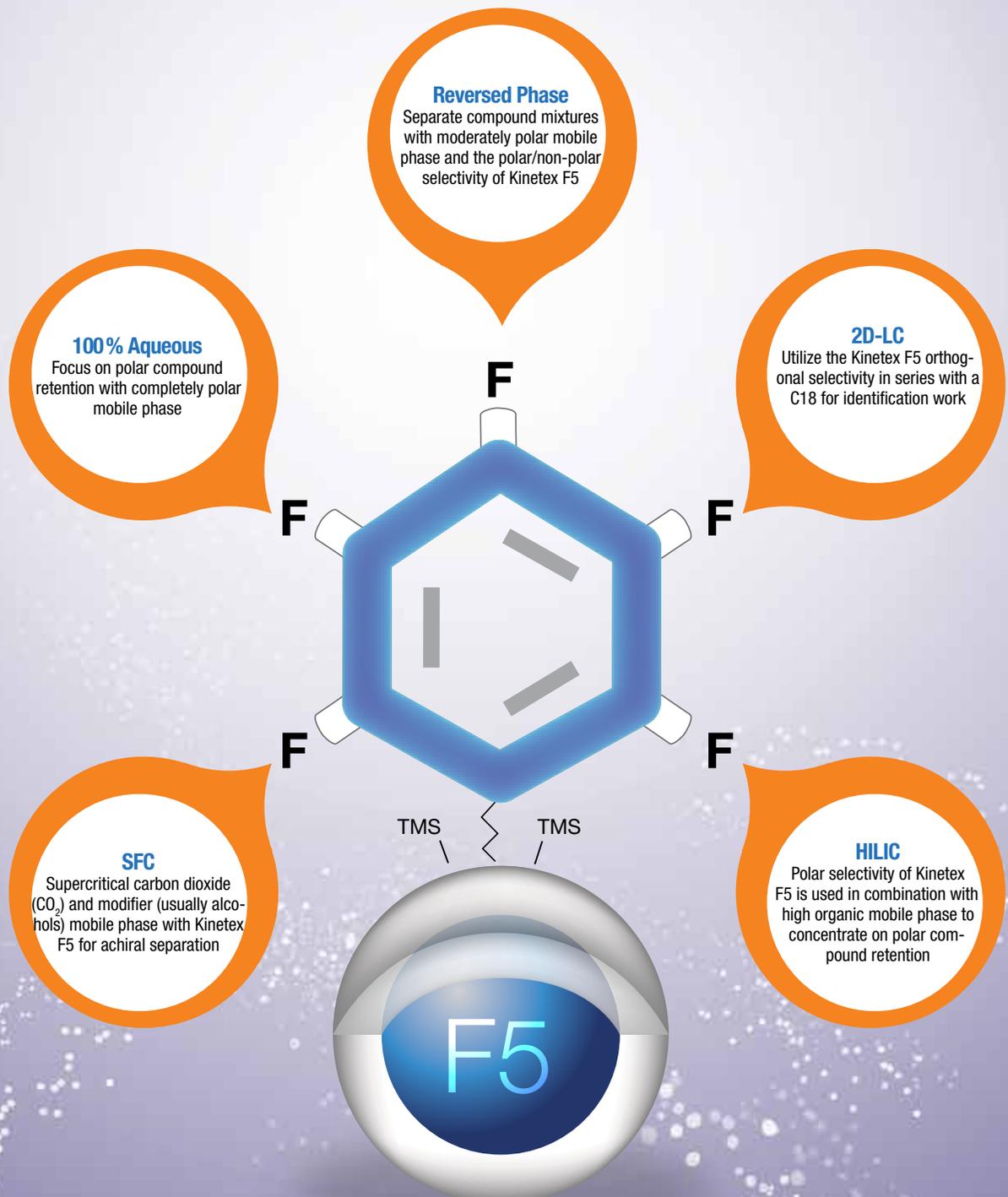
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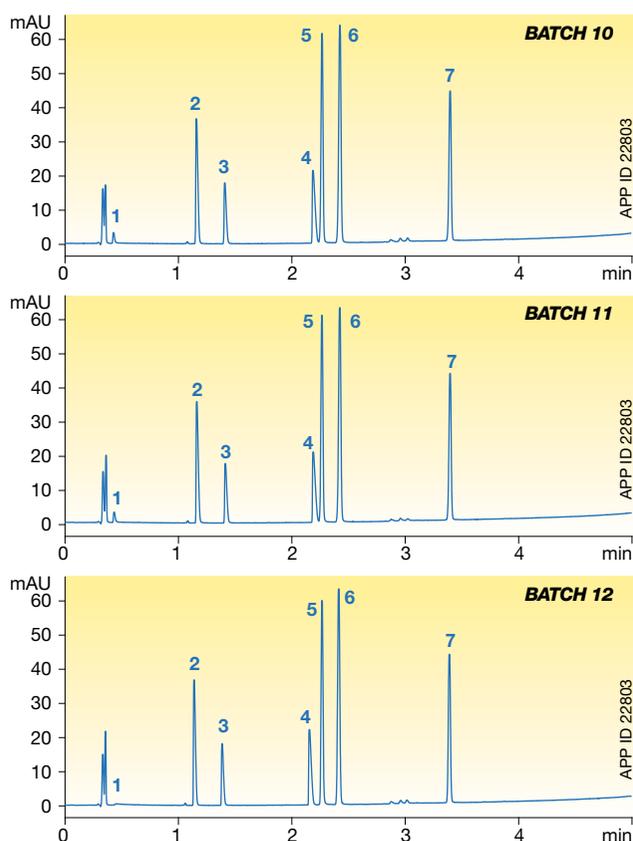


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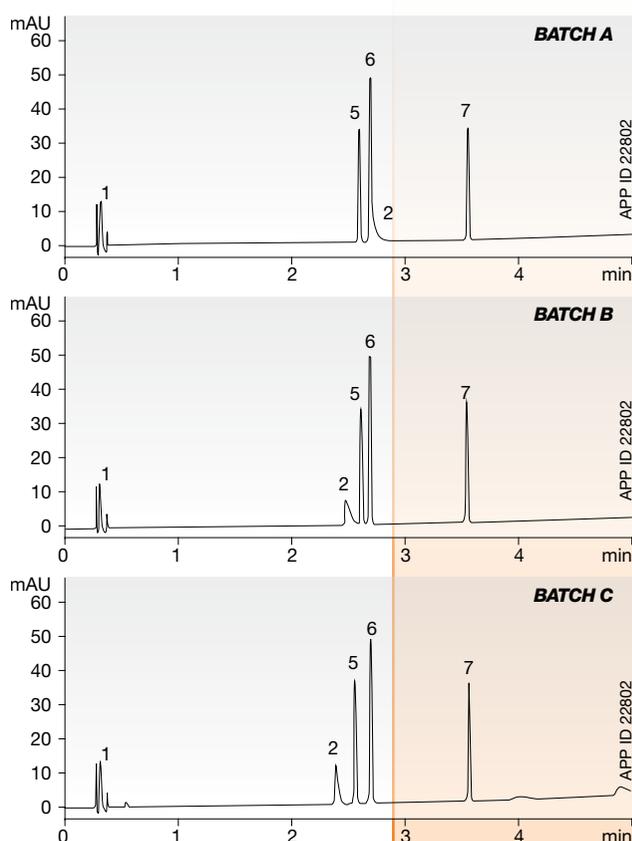
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Flow Rate: 1.85 mL/min

Temperature: Ambient

Detection: UV @ 254 nm

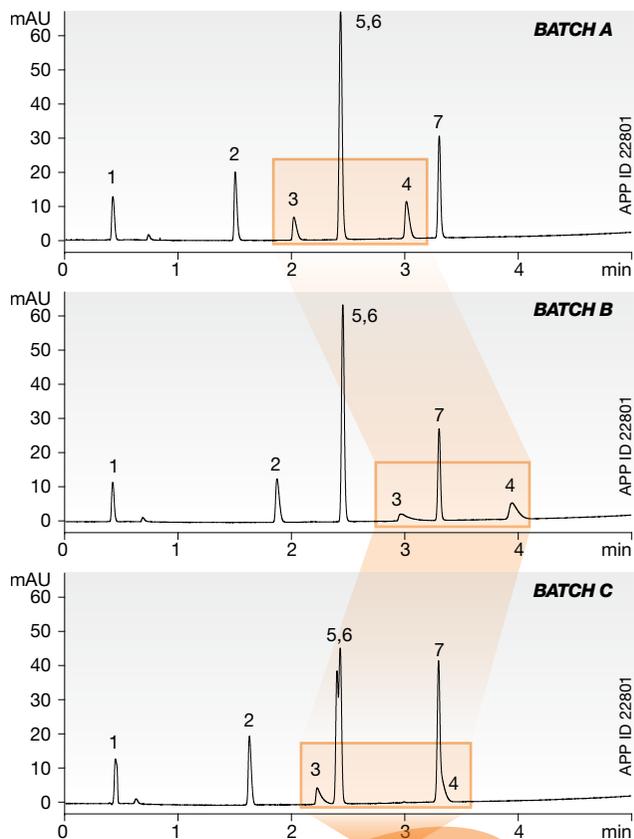
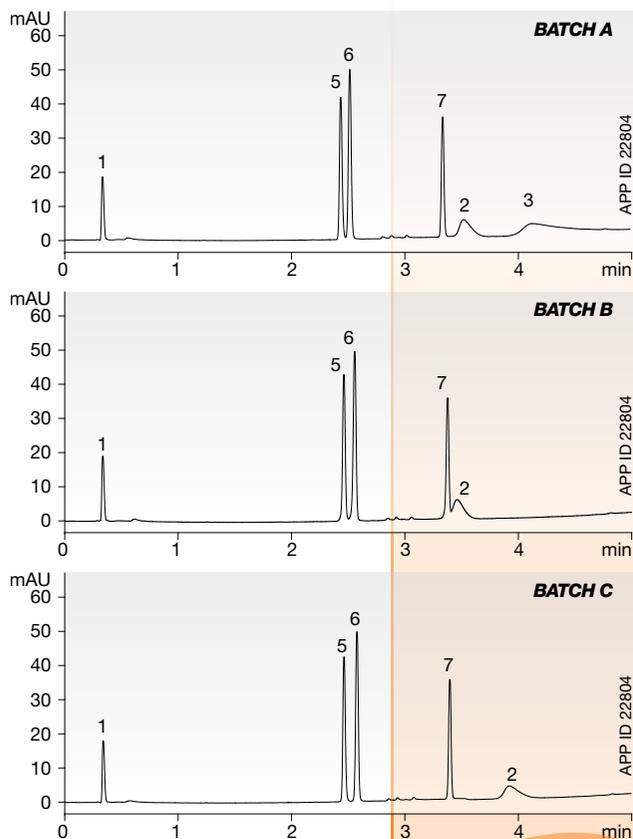
Sample: 1. Uracil
 2. Pindolol
 3. Chlorpheniramine
 4. Nortriptyline
 5. 3-Methyl-4-Nitrobenzoic acid
 6. 5-Methyl Salicyl Aldehyde
 7. Hexaphenone

What happened to peaks 3 and 4?

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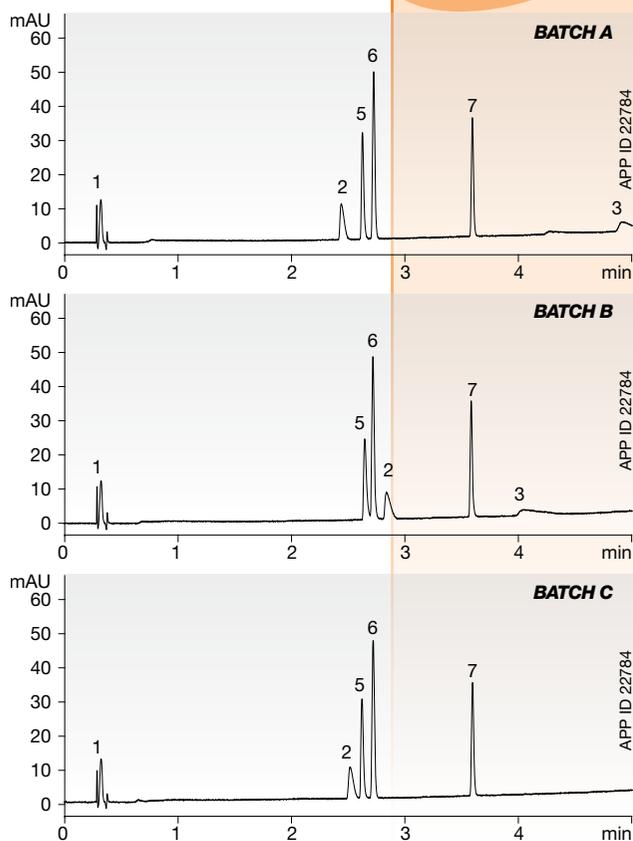
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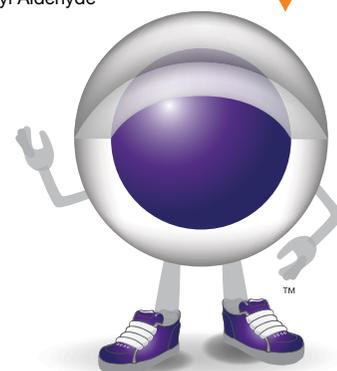
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5. 3-Methyl-4-Nitrobenzoic acid
6. 5-Methyl Salicyl Aldehyde
7. Hexaphenone

Are you okay with peak adsorptions and retention time shifts?

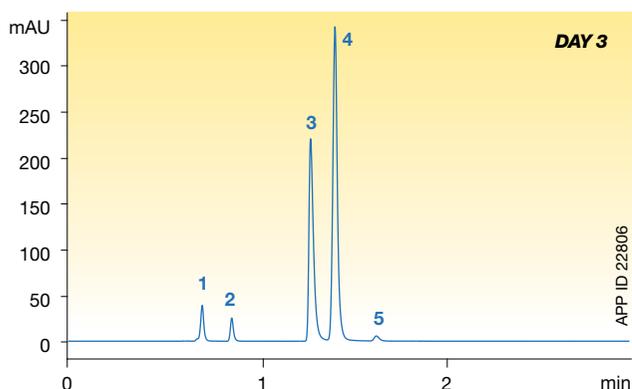
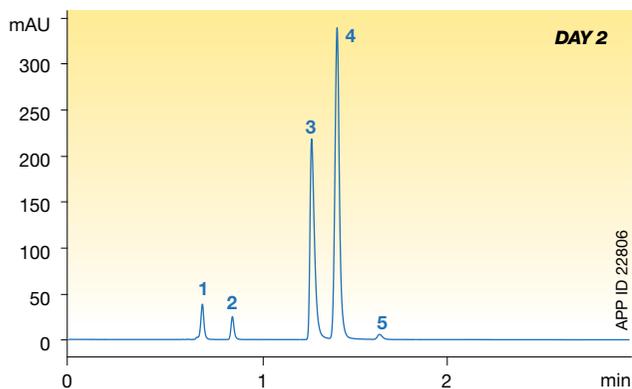
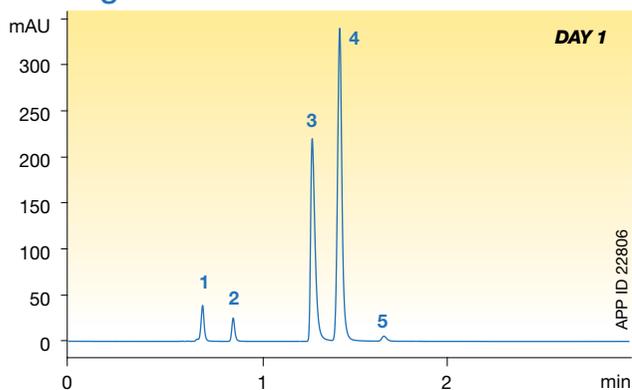
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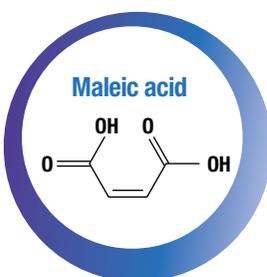
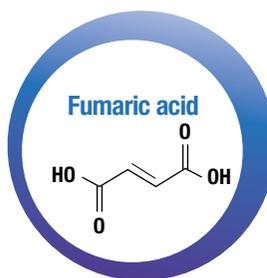
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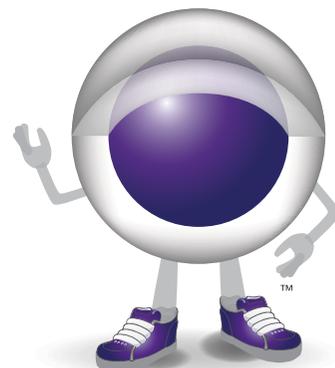
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Part No.: 00D-4723-E0
Mobile Phase: 20 mM Sodium phosphate pH 2.5
Flow Rate: 1.5 mL/min
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Even the isomers
Maleic acid and
Fumaric acid
are separated!

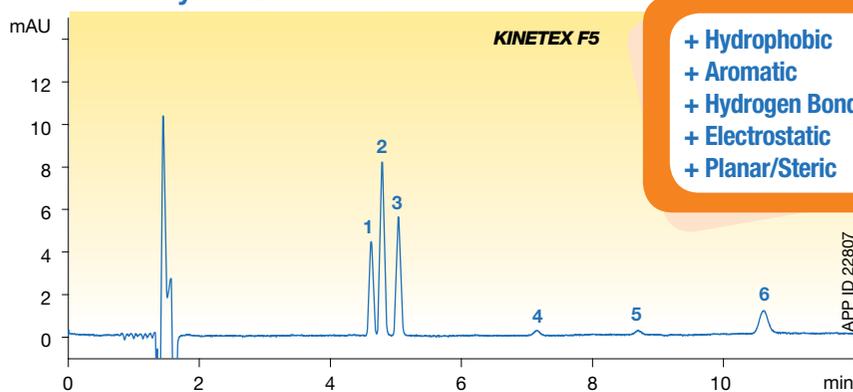


Each successive day, column was equilibrated, run and stored in the 100% aqueous conditions mentioned above.

Novel Selectivity For Isomeric Separations

While a C18 can differentiate between the small addition of a single methyl group between two similar compounds, it cannot separate compounds with only structural differences, like positional isomers. This is where the electrostatic and planar interactions of the Kinetex F5 give focused attention to the resolution you need.

Methoxybenzene Isomers



+ Hydrophobic
+ Aromatic
+ Hydrogen Bonding
+ Electrostatic
+ Planar/Steric

Conditions for all columns:

Column: Kinetex 2.6µm F5
Kinetex 2.6µm C18
Kinetex 2.6µm Biphenyl

Dimensions: 150 x 4.6mm

Mobile Phase: A: 0.1% TFA in Water
B: Acetonitrile

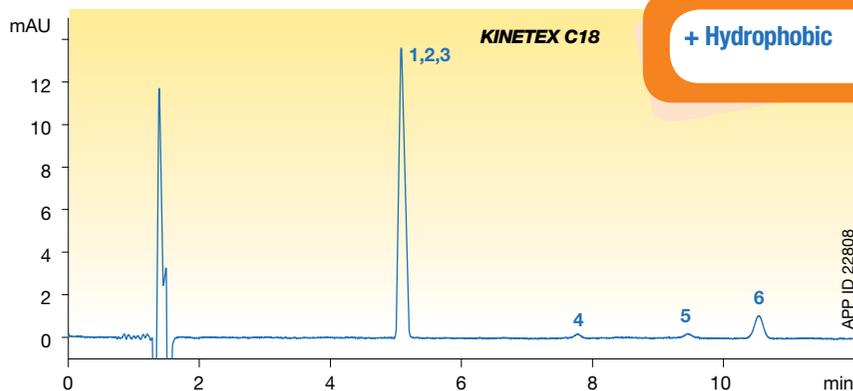
Isocratic: A/B (65:35)

Flow Rate: 1 mL/min

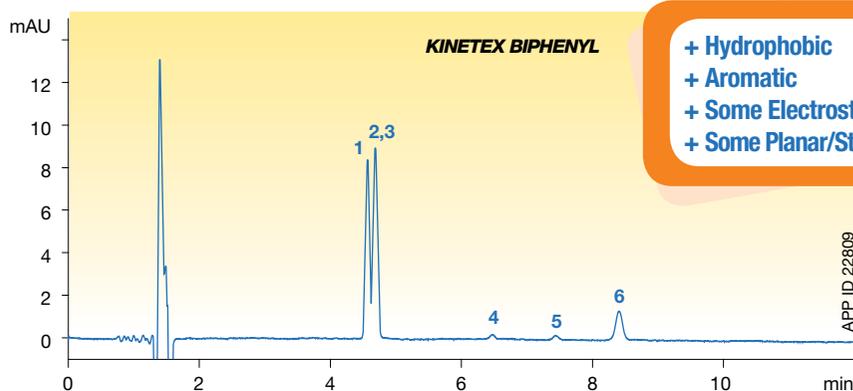
Temperature: Ambient

Detection: UV @ 254 nm

Sample: 1. 1,2,3-Trimethoxybenzene
2. 1,2-Dimethoxybenzene
3. 1,2,4-Trimethoxybenzene
4. 1,4-Dimethoxybenzene
5. Methoxybenzene
6. 1,3-Dimethoxybenzene



+ Hydrophobic



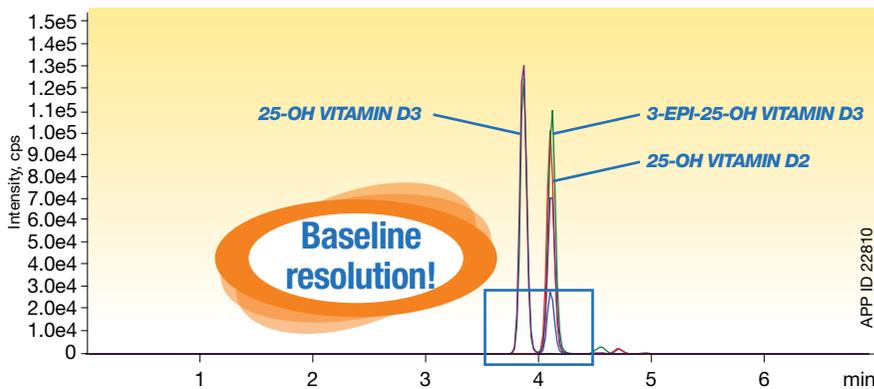
+ Hydrophobic
+ Aromatic
+ Some Electrostatic
+ Some Planar/Steric

Clinical Research

Vitamin D3 Epimers

Even tandem mass spectrometry (LC/MS/MS) analysis has need to utilize the wonderful cross functionality of Kinetex® F5. With the same fragment ions coming from the Vitamin D3 epimers, reproducible chromatographic separation is a must. The unique combination of polar/non-polar selectivity of Kinetex F5 easily performs this necessary separation in a highly sensitive and short analysis window.

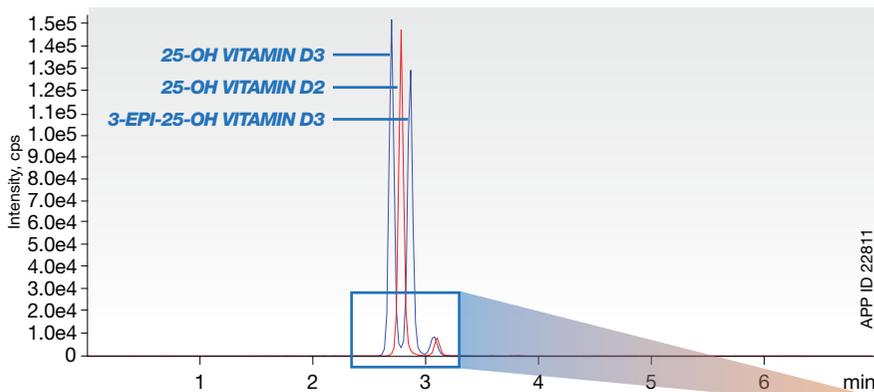
Kinetex 2.6 µm F5



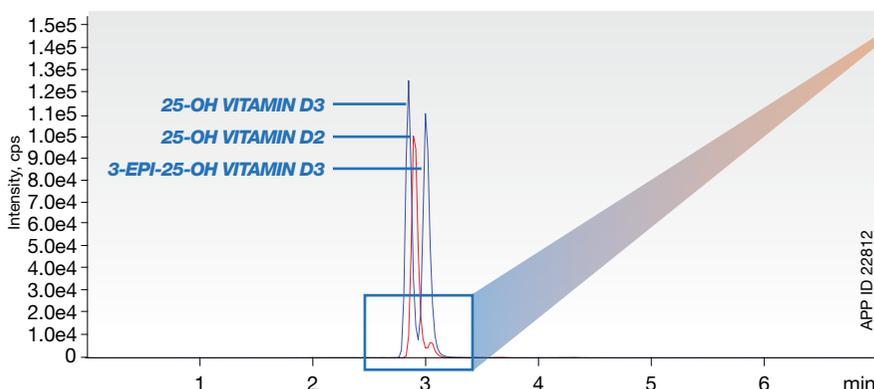
Conditions for all columns:

- Column:** Kinetex 2.6 µm F5
HALO 2.7 µm PFP
XSelect HSS 2.5 µm PFP
- Dimensions:** 100 x 4.6 mm
- Mobile Phase:** A: 0.1% Formic acid in Water
B: 0.1% Formic acid in Methanol
- Isocratic:** A/B (15:85)
- Flow Rate:** 0.75 mL/min
- Temperature:** Ambient
- Detection:** MS/MS (AB SCIEX API 4000™)
- Sample:** 1. 25-OH Vitamin D3
2. 25-OH Vitamin D2
3. 3-epi-25-OH Vitamin D3

Advanced Material Technology HALO® 2.7 µm PFP



Waters® XSelect® HSS 2.5 µm PFP



Vitamin D3 epimers are not fully separated

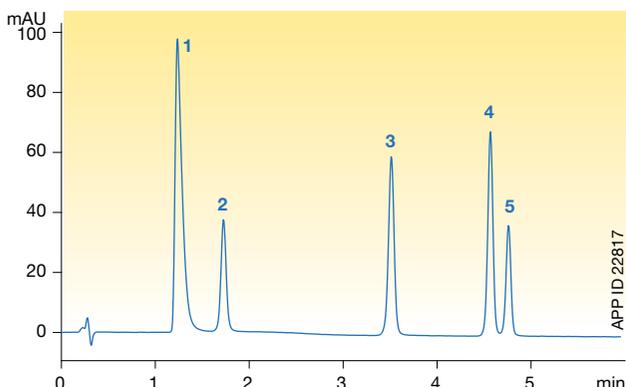
HALO is a registered trademark of Advanced Materials Technology, Inc. Waters and XSelect are registered trademarks of Waters Corporation. Phenomenex is not affiliated with any of the above companies. Comparative separations may not be representative of all applications.

Food Testing

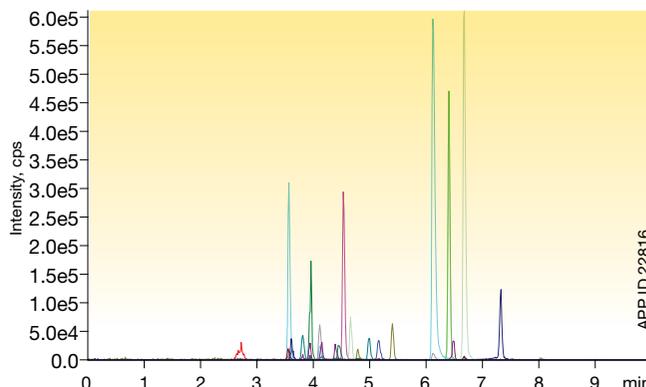
Multi Component Analysis

The versatility of Kinetex F5 core-shell columns matches marvelously with ingredient quantification and contaminant identification. Acidic food additives may tail and lack retention on a C18 column, but the Kinetex F5 offers superb polar retention and performance. Meanwhile, large multi component contaminant screens and their mixtures of acids, bases, neutrals and structurally similar compounds, can easily utilize the combination of polar, non-polar and geometric interaction mechanisms of the Kinetex F5 to get excellent separation and sensitivity.

Food Additives



Antibiotics Screen



Column: Kinetex 2.6 μ m F5
Dimensions: 150 x 2.1 mm
Part No.: 00F-4723-AN
Mobile Phase: A: 0.1% Phosphoric acid in Water
 B: Acetonitrile
Gradient: 5-35% A in 6 min. Hold for 4 min.
Flow Rate: 0.6 mL/min
Temperature: 30 °C
Detection: UV @ 240 nm
Sample: 1. Saccharin
 2. p-Hydroxybenzoic acid
 3. Sorbic acid
 4. Dehydroacetic acid
 5. Methyl paraben

Column: Kinetex 2.6 μ m F5
Dimensions: 50 x 2.1 mm
Part No.: 00B-4723-AN
Mobile Phase: A: 0.1% Formic acid in Water
 B: 0.1% Formic acid in Methanol
Gradient:

Time (min)	% B
0	0
0.08	0
1.08	100
8.08	100
11.08	0
11.58	0

Flow Rate: 0.5 mL/min
Temperature: 30 °C
Detection: MS/MS (AB SCIEX API 4000™)

Sample:

1. Amoxicillin	13. Sulfamethazine
2. Cefalexin	14. Sulfamethoxazole
3. Cefazolin	15. Sulfapyridine
4. Cefoperazone	16. Sulfaminoxaline
5. Cefapirin	17. Sulfathiazole
6. Cloxacillin	18. Neospiramycin
7. Dicloxacillin	19. Doxycycline
8. Ciprofloxacin	20. Tiamulin
9. Difloxacin	21. Valnemulin
10. Marbofloxacin	22. Rifaximin
11. Sulfadiazine	23. Lincomycin
12. Sulfamerazine	24. Nafcillin

Find more Kinetex F5 applications at www.phenomenex.com/KinetexF5Apps

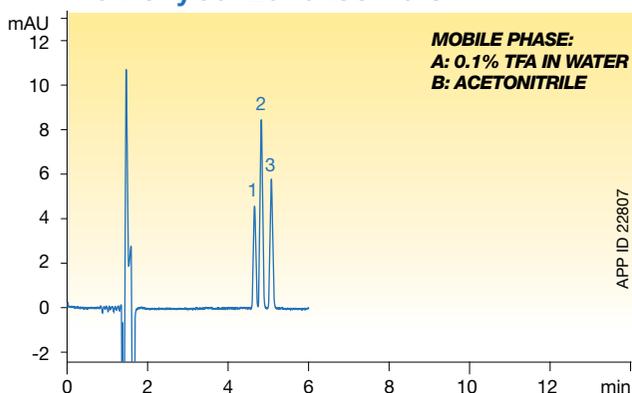


Methanol vs. Acetonitrile

A Phenyl Story

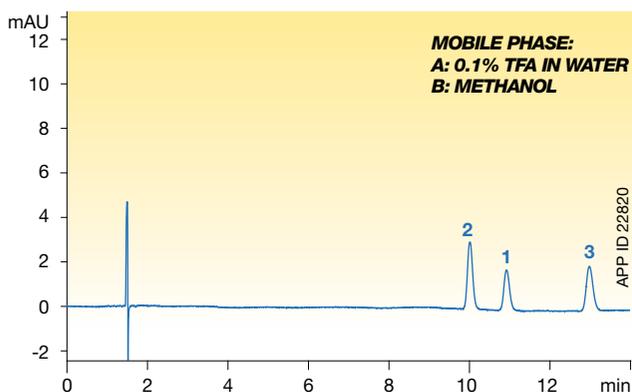
While mobile phase modifiers can help adjust retention, with the use of the Kinetex® F5, the major mobile phase constituent can also be used to manipulate elution order and retention properties. Acetonitrile can be used to disrupt pi-pi interactions between compounds and phenyl phases, while switching to the weaker solvent Methanol will encourage aromatic interactions.

Methoxybenzene Isomers



Conditions for all columns:

- Column: Kinetex 2.6 μ m F5
- Dimensions: 150 x 4.6 mm
- Part No.: 00F-4723-E0
- Mobile Phase: as noted
- Isocratic: A/B (65:35)
- Flow Rate: 1 mL/min
- Temperature: Ambient
- Detection: UV @ 254 nm
- Sample: 1. 1,2,3-Trimethoxybenzene
2. 1,2-Dimethoxybenzene
3. 1,2,4-Trimethoxybenzene

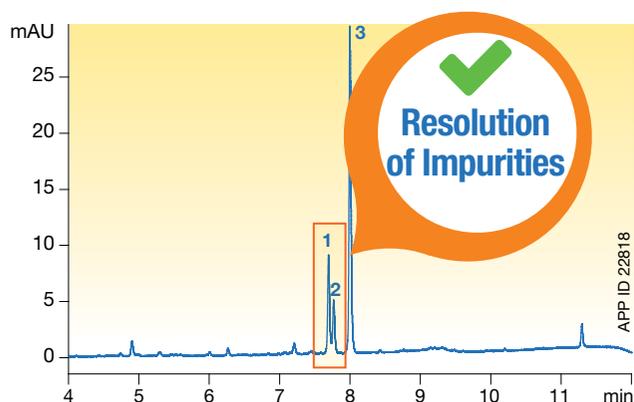


Impact selectivity and retention with solvent adjustment!

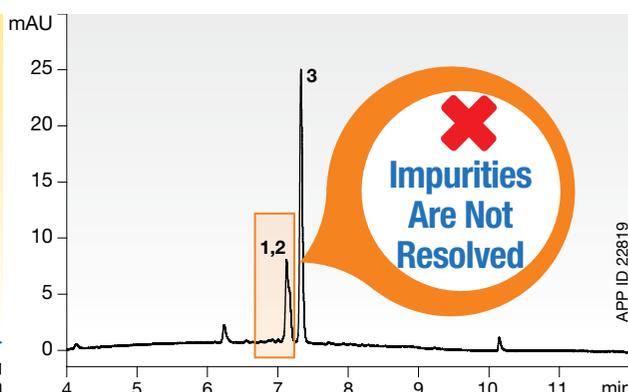
Trace Pharmaceutical Impurity Detection

Trace impurities of active pharmaceutical ingredients are incredibly important to identify and quantify. With the rapid performance value of core-shell technology combined with the versatility of a pentafluorophenyl, the Kinetex F5 is the precise alternative to other reversed phase columns that you need. Easily utilize the Kinetex F5 to get greater sensitivity, better resolution and all in shorter analysis times.

Kinetex 1.7 μ m F5



Waters® ACQUITY® CSH™ 1.7 μ m Fluoro-Phenyl



Conditions for all columns:

Column: Kinetex 1.7 μ m F5
 ACQUITY CSH 1.7 μ m Fluoro-Phenyl

Dimensions: 50 x 2.1 mm

Mobile Phase: A: 20mM Potassium phosphate pH 2.3
 B: Methanol

Gradient:	Time (min)	% B
	0	5
	10	95
	10.01	5

Flow Rate: 0.3 mL/min

Temperature: Ambient

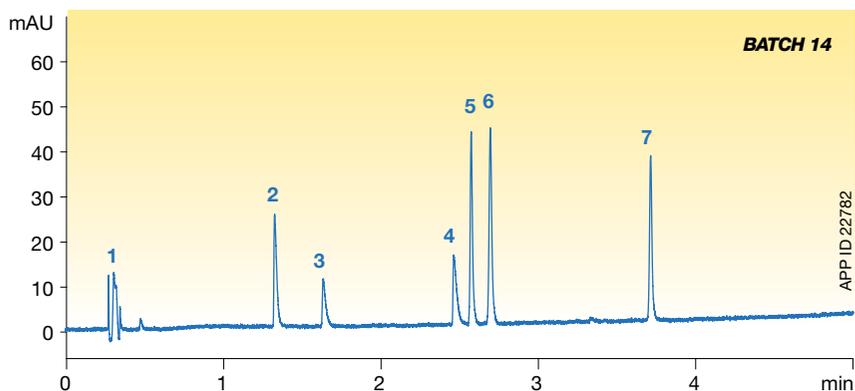
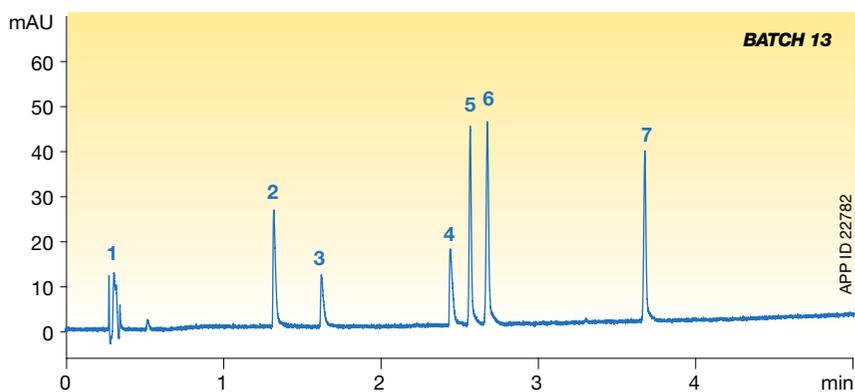
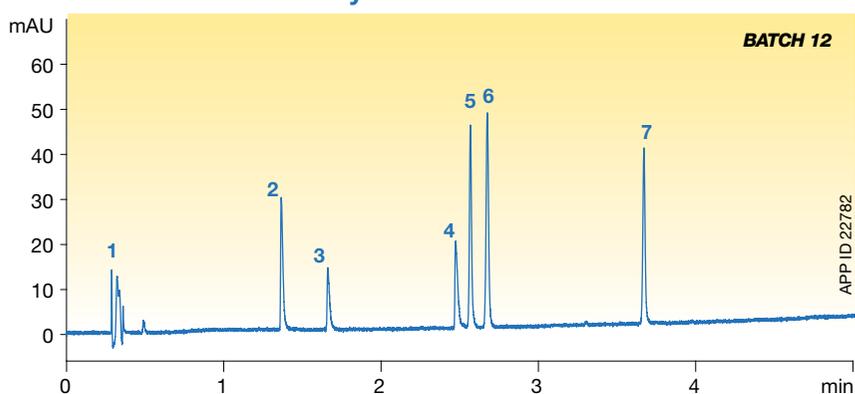
Detection: UV @ 254 nm

Sample: 1. Impurity 1
 2. Impurity 2
 3. Proprietary Active Pharmaceutical Ingredient

Incredible UHPLC Reproducibility

Highly sensitive UHPLC separations are dependent upon consistent quantitation and consistent results. With the reliability of the Kinetex® F5, you no longer have to settle for the inconsistent results of PFP products that currently exist on the market. Our highest standards of quality will ensure that you are fully satisfied with each and every Kinetex F5 column!

Trusted Consistency



- Column:** Kinetex 1.7 μ m F5
- Dimensions:** 50 x 4.6 mm
- Mobile Phase:** A: 0.1 % Formic in Water
B: 0.1 % Formic in Acetonitrile
- Gradient:** 5-95 % B over 5 min.
- Flow Rate:** 1.85 mL/min
- Temperature:** Ambient
- Detection:** UV @ 254 nm
- Sample:**
 1. Uracil
 2. Pindolol
 3. Chlorpheniramine
 4. Nortriptyline
 5. 3-Methyl-4-Nitrobenzoic acid
 6. 5-Methyl Salicyl Aldehyde
 7. Hexaphenone

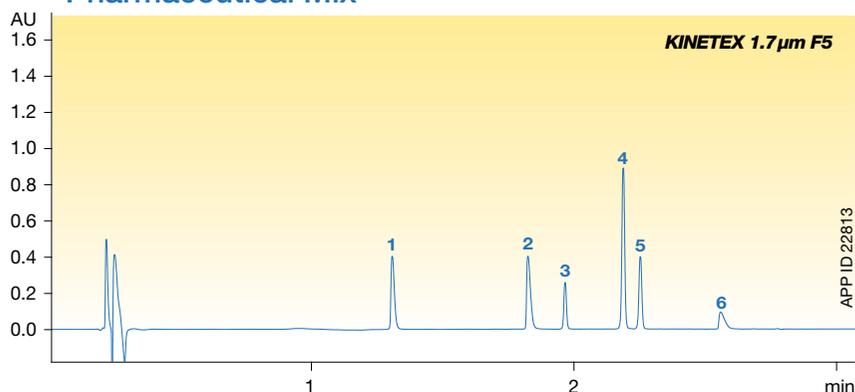


A Better PFP

Selectivity for UHPLC

Kinetex 1.7 μm core-shell technology produces increased efficiencies over traditional sub-2 μm columns on the market, yielding remarkable chromatographic resolution, higher peak capacities, and greater sensitivity. Add these performance gains alongside the novel selectivity and excellent reproducibility of the Kinetex F5 and you now have an incredible UHPLC solution at your fingertips.

Pharmaceutical Mix



Conditions for all columns:

Column: Kinetex 1.7 μm F5
ACQUITY CSH 1.7 μm Fluoro-Phenyl
ACQUITY HSS 1.8 μm PFP

Dimensions: 50 x 2.1 mm

Mobile Phase: A: 10 mM Ammonium acetate pH 3.2
B: Acetonitrile

Gradient	Time (min)	% B
	90	10
	90	10
	5	95
	5	95
	90	10
	90	10

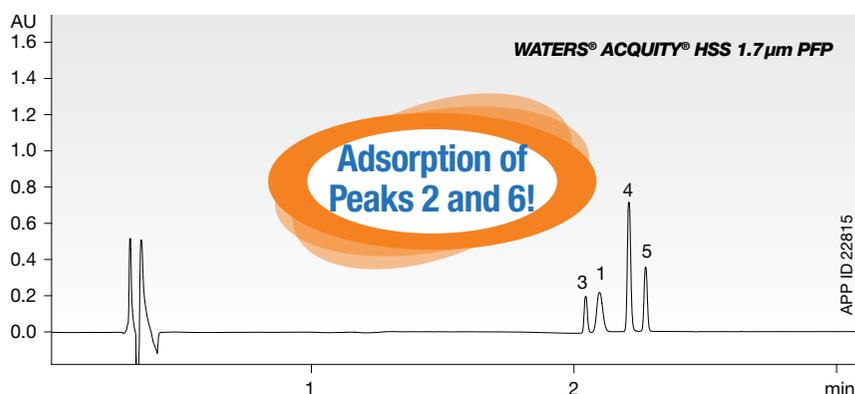
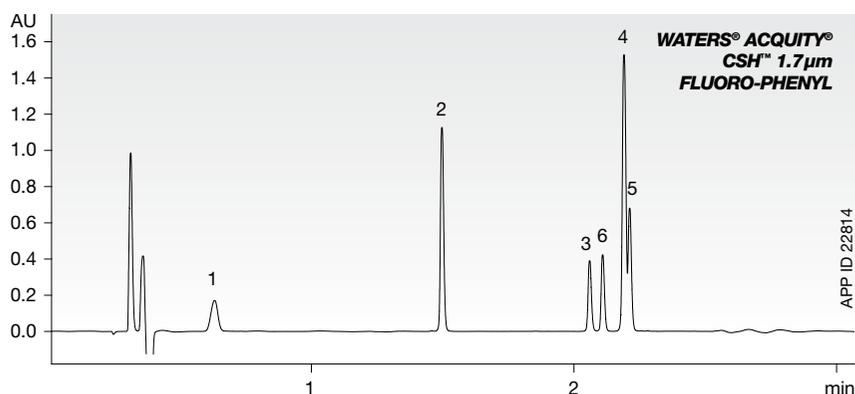
Flow Rate: 0.4 mL/min

Temperature: Ambient

Detection: UV @ 220 nm

Sample:

1. Pindolol
2. Propranolol
3. Indoprofen
4. Naproxen
5. Warfarin
6. Terfenidine



MEOW!!
Kinetex F5
is amazing!



Get Method Development Flexibility For Your Small Molecule Analysis

Recommended Selectivities If You're Working With:

Acids

- Kinetex® C18
- Kinetex F5
- Kinetex Phenyl-Hexyl

Bases

- Kinetex EVO C18
- Kinetex XB-C18
- Kinetex Biphenyl

Neutrals

- Kinetex C18
- Kinetex C8
- Kinetex Biphenyl

Aromatics

- Kinetex Biphenyl
- Kinetex Phenyl-Hexyl
- Kinetex F5

Acids, Bases, and Neutrals

- Kinetex C18
- Kinetex Biphenyl
- Kinetex EVO C18
- Kinetex F5

Highly Polar Compounds

- Kinetex EVO C18
- Kinetex F5
- Kinetex Biphenyl
- Kinetex HILIC

High pH

- Kinetex EVO C18

Isomers

- Kinetex F5

Upgrading Your Fully Porous Methods:

Fully Porous 3 μ m or 5 μ m

- **Kinetex 5 μ m** – Drop-in for easy performance improvements with no backpressure increase
- **Kinetex 2.6 μ m** – Dramatically improve results with efficiency/peak capacity gains

Fully Porous sub-2 μ m

- **Kinetex 2.6 μ m** – Get similar efficiencies at lower backpressure allowing for greater productivity gains
- **Kinetex 1.7 μ m** – Up to 20% greater efficiencies resulting in drop-in improvements
- **Kinetex 1.3 μ m** – Incredible efficiency gains on high end UHPLC systems

Fully Porous Preparative LC

- **Kinetex 5 μ m** – Drop-in for easy performance improvement with no backpressure increase

Choosing The Best Core-Shell Platform For You is Easy!

For Small Molecules

	5 μ m	3.6 μ m	2.6 μ m	1.7 μ m	1.3 μ m
UHPLC		■	■	■	■
HPLC	■	■	■	■	■
PREP LC	■				

Phase	Best Use	pH Stability	Available Particle Size(s)				
F5	Highly reproducible pentafluorophenyl propyl phase that offers a unique combination of polar, hydrophobic, aromatic, and shape selectivity	1.5 - 8.5*		2.6 μ m	1.7 μ m		
EVO C18	Robust reversed phase methods even in alkaline conditions with improved peak shape for polar basic compounds	1 - 12	5 μ m				
C18	All purpose phase that offers the hydrophobic retention and methylene selectivity chromatographers expect from a C18 column	1.5 - 8.5*	5 μ m	2.6 μ m	1.7 μ m	1.3 μ m	
XB-C18	C18 phase with protective butyl side chains for improved peak shape for basic compounds under neutral and acidic conditions	1.5 - 8.5*	5 μ m	2.6 μ m	1.7 μ m		
C8	USP L7 phase that provides less hydrophobic and methylene selectivity than a C18	1.5 - 8.5*	5 μ m	2.6 μ m	1.7 μ m		
Biphenyl	100% aqueous stable and allows for excellent reversed phase retention and enhanced polar and aromatic selectivity	1.5 - 8.5*	5 μ m	2.6 μ m	1.7 μ m		
Phenyl-Hexyl	Reversed phase chemistry that allows for greater retention and separation of aromatic hydrocarbons	1.5 - 8.5*	5 μ m	2.6 μ m	1.7 μ m		
HILIC	Unbonded silica phase for HILIC conditions to provide selectivity for polar compounds	2.0 - 7.5	5 μ m	2.6 μ m	1.7 μ m		

Phenomenex Application Specific Core-Shell Products

Material	Phase	Best Use	pH Stability	Available Particle Size(s)			
For Peptides (\leq 10,000 Da)							
Aeris™ PEPTIDE	XB-C18	Excellent hydrophobicity and methylene selectivity for peptide and peptide mapping separations	1.5 - 9.0	5 μ m	3.6 μ m	2.6 μ m	1.7 μ m
For Proteins ($>$ 10,000 Da)							
	XB-C18	Maximum hydrophobicity and high temp stability for hydrophilic and PEGylated proteins	1.5 - 9.0		3.6 μ m		
Aeris WIDEPORE	XB-C8	Medium hydrophobicity and high temp stability for moderately hydrophobic proteins and glycosylated proteins	1.5 - 9.0		3.6 μ m		
	C4	Lowest hydrophobicity for very large or very hydrophobic proteins	1.5 - 9.0		3.6 μ m		
For Synthetic Oligonucleotides (DNA/RNA)							
Clarity® Oligo-MS™	C18	Rapid, high efficiency reversed phase LC/MS analysis for QC and characterization	1.5 - 8.5*		2.6 μ m	1.7 μ m	

*pH stability under gradient conditions. pH stability is 1.5-10 under isocratic conditions.

Ordering Information

5 µm Minibore Columns (mm)					SecurityGuard™ ULTRA Cartridges†
Phases	30 x 2.1	50 x 2.1	100 x 2.1	150 x 2.1	3/pk
EVO C18	00A-4633-AN	00B-4633-AN	00D-4633-AN	00F-4633-AN	AJ0-9298
Biphenyl	00A-4627-AN	00B-4627-AN	00D-4627-AN	—	AJ0-9209
XB-C18	00A-4605-AN	00B-4605-AN	00D-4605-AN	—	AJ0-8782
C18	00A-4601-AN	00B-4601-AN	00D-4601-AN	00F-4601-AN	AJ0-8782
C8	—	00B-4608-AN	00D-4608-AN	—	AJ0-8784
Phenyl-Hexyl	—	00B-4603-AN	00D-4603-AN	—	AJ0-8788

for 2.1 mm ID

5 µm MidBore™ Columns (mm)				SecurityGuard ULTRA Cartridges‡
Phases	50 x 3.0	100 x 3.0	150 x 3.0	3/pk
EVO C18	00B-4633-Y0	00D-4633-Y0	00F-4633-Y0	AJ0-9297
Biphenyl	00B-4627-Y0	00D-4627-Y0	00F-4627-Y0	AJ0-9208
XB-C18	00B-4605-Y0	00D-4605-Y0	00F-4605-Y0	AJ0-8775
C18	00B-4601-Y0	00D-4601-Y0	00F-4601-Y0	AJ0-8775
C8	00B-4608-Y0	00D-4608-Y0	—	AJ0-8777
Phenyl-Hexyl	00B-4603-Y0	00D-4603-Y0	—	AJ0-8781

for 3.0 mm ID

5 µm Analytical Columns (mm)					SecurityGuard ULTRA Cartridges†
Phases	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	3/pk
EVO C18	00B-4633-E0	00D-4633-E0	00F-4633-E0	00G-4633-E0	AJ0-9296
Biphenyl	00B-4627-E0	00D-4627-E0	00F-4627-E0	00G-4627-E0	AJ0-9207
XB-C18	00B-4605-E0	00D-4605-E0	00F-4605-E0	00G-4605-E0	AJ0-8768
C18	00B-4601-E0	00D-4601-E0	00F-4601-E0	00G-4601-E0	AJ0-8768
C8	00B-4608-E0	00D-4608-E0	00F-4608-E0	00G-4608-E0	AJ0-8770
Phenyl-Hexyl	00B-4603-E0	00D-4603-E0	00F-4603-E0	00G-4603-E0	AJ0-8774

for 4.6 mm ID

5 µm Semi-Preparative Columns (mm)			SecurityGuard SemiPrep Cartridges***
Phases	150 x 10	250 x 10	10 x 10
C18	00F-4601-N0	00G-4601-N0	AJ0-9278
Biphenyl	00F-4627-N0	00G-4627-N0	AJ0-9280

for 10 mm ID

5 µm Axia™ Packed Preparative Columns (mm)					SecurityGuard PREP Cartridges*
Phases	50 x 21.2	100 x 21.2	150 x 21.2	250 x 21.2	15 x 21.2
EVO C18	00B-4633-P0-AX	00D-4633-P0-AX	00F-4633-P0-AX	00G-4633-P0-AX	AJ0-9304
Biphenyl	00B-4627-P0-AX	00D-4627-P0-AX	00F-4627-P0-AX	00G-4627-P0-AX	AJ0-9272
XB-C18	00B-4605-P0-AX	00D-4605-P0-AX	00F-4605-P0-AX	00G-4605-P0-AX	AJ0-9145
C18	00B-4601-P0-AX	00D-4601-P0-AX	00F-4601-P0-AX	00G-4601-P0-AX	AJ0-9145
C8	00B-4608-P0-AX	00D-4608-P0-AX	00F-4608-P0-AX	00G-4608-P0-AX	AJ0-9205
Phenyl-Hexyl	00B-4603-P0-AX	00D-4603-P0-AX	00F-4603-P0-AX	00G-4603-P0-AX	AJ0-9147
HILIC	—	00D-4606-P0-AX	00F-4606-P0-AX	00G-4606-P0-AX	AJ0-9277

for 21.2 mm ID

5 µm Axia Packed Preparative Columns (mm)					SecurityGuard PREP Cartridges**
Phases	50 x 30	100 x 30	150 x 30	250 x 30	15 x 30
EVO C18	—	00D-4633-U0-AX	00F-4633-U0-AX	00G-4633-U0-AX	AJ0-9305
Biphenyl	—	—	00F-4627-U0-AX	—	AJ0-9273
XB-C18	00B-4605-U0-AX	00D-4605-U0-AX	00F-4605-U0-AX	00G-4605-U0-AX	AJ0-9204
C18	00B-4601-U0-AX	00D-4601-U0-AX	00F-4601-U0-AX	00G-4601-U0-AX	AJ0-9204
C8	00B-4608-U0-AX	00D-4608-U0-AX	00F-4608-U0-AX	00G-4608-U0-AX	AJ0-9217
Phenyl-Hexyl	00B-4603-U0-AX	00D-4603-U0-AX	00F-4603-U0-AX	00G-4603-U0-AX	AJ0-9216

for 30 mm ID

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www.phenomenex.com/guardit



If you are not completely satisfied with Kinetex core-shell columns, send in your comparative data to a similar product with the Kinetex column within 45 days for a FULL REFUND.

† SecurityGuard ULTRA Cartridges require holder, Part No.: AJ0-9000

* PREP SecurityGuard Cartridges require holder, Part No.: AJ0-8223

** PREP SecurityGuard Cartridges require holder, Part No.: AJ0-8277

*** SemiPrep SecurityGuard Cartridges require holder, Part No.: AJ0-9281

Ordering Information

NEW

2.6 µm Minibore Columns (mm)						SecurityGuard™ ULTRA Cartridges†
Phases	30 x 2.1	50 x 2.1	75 x 2.1	100 x 2.1	150 x 2.1	3/pk
F5	00A-4723-AN	00B-4723-AN	—	00D-4723-AN	00F-4723-AN	AJO-9322
Biphenyl	00A-4622-AN	00B-4622-AN	—	00D-4622-AN	00F-4622-AN	AJO-9209
XB-C18	00A-4496-AN	00B-4496-AN	00C-4496-AN	00D-4496-AN	00F-4496-AN	AJO-8782
C18	00A-4462-AN	00B-4462-AN	00C-4462-AN	00D-4462-AN	00F-4462-AN	AJO-8782
C8	00A-4497-AN	00B-4497-AN	00C-4497-AN	00D-4497-AN	00F-4497-AN	AJO-8784
HILIC	00A-4461-AN	00B-4461-AN	00C-4461-AN	00D-4461-AN	00F-4461-AN	AJO-8786
Phenyl-Hexyl	00A-4495-AN	00B-4495-AN	00C-4495-AN	00D-4495-AN	00F-4495-AN	AJO-8788

for 2.1 mm ID

NEW

2.6 µm MidBore™ Columns (mm)						SecurityGuard™ ULTRA Cartridges†
Phases	30 x 3.0	50 x 3.0	75 x 3.0	100 x 3.0	150 x 3.0	3/pk
F5	—	00B-4723-YO	—	00D-4723-YO	00F-4723-YO	AJO-9321
Biphenyl	—	00B-4622-YO	—	00D-4622-YO	00F-4622-YO	AJO-9208
XB-C18	00A-4496-YO	00B-4496-YO	00C-4496-YO	00D-4496-YO	00F-4496-YO	AJO-8775
C18	00A-4462-YO	00B-4462-YO	00C-4462-YO	00D-4462-YO	00F-4462-YO	AJO-8775
C8	00A-4497-YO	00B-4497-YO	00C-4497-YO	00D-4497-YO	00F-4497-YO	AJO-8777
HILIC	00A-4461-YO	—	—	—	00F-4461-YO	AJO-8779
Phenyl-Hexyl	—	00B-4495-YO	—	00D-4495-YO	00F-4495-YO	AJO-8781

for 3.0 mm ID

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C18	00A-4462-E0	00B-4462-E0	00C-4462-E0	00D-4462-E0	00F-4462-E0	AJO-8768
C8	—	00B-4497-E0	00C-4497-E0	00D-4497-E0	00F-4497-E0	AJO-8770
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Biphenyl	—	00B-4628-AN	00D-4628-AN	00F-4628-AN	AJO-9209
XB-C18	00A-4498-AN	00B-4498-AN	00D-4498-AN	00F-4498-AN	AJO-8782
C18	00A-4475-AN	00B-4475-AN	00D-4475-AN	00F-4475-AN	AJO-8782
C8	00A-4499-AN	00B-4499-AN	00D-4499-AN	00F-4499-AN	AJO-8784
HILIC	00A-4474-AN	00B-4474-AN	00D-4474-AN	—	AJO-8786
Phenyl-Hexyl	—	00B-4500-AN	00D-4500-AN	00F-4500-AN	AJO-8788

for 2.1 mm ID

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C18	—	00B-4475-YO	00D-4475-YO	AJO-8775
C8	00A-4499-YO	00B-4499-YO	00D-4499-YO	AJO-8777
HILIC	—	00B-4474-YO	—	AJO-8779

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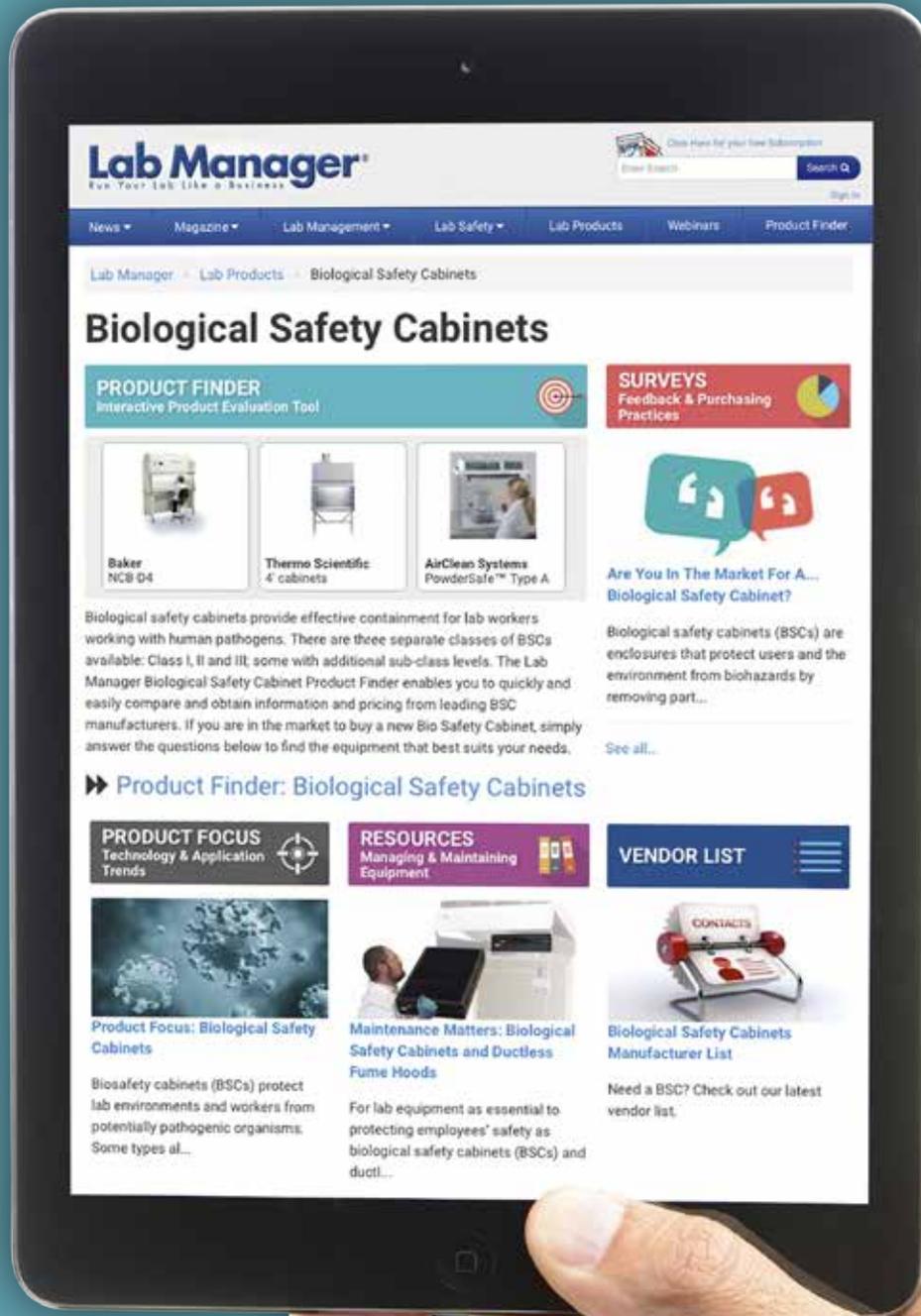
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INSIGHTS ON STREAMLINING CLONE SELECTION

IT ALL COMES DOWN TO VOLUMETRIC PRODUCTIVITY

by Angelo DePalma, PhD

Like great athletes and musicians, cells employed in cell-based assays or as expression systems for biopharmaceutical production are not born, but made. Cell lines that perform specifically and predictably arise from a population of cells that have undergone one or more genetic transformations (transfection) and are subsequently selected for desirable properties such as viability, protein or virus production; high culture density; or binding to drugs or antigens.

Transfection is not completely predictable. Copies of genes may insert randomly into the host cell's genome, often at nonproductive genomic loci. Multiple inserted copies may enhance desirable properties or may cripple a cell's ability to divide or thrive. Expressed foreign proteins themselves, or undesirable genetic insertions, may be toxic.

Clone selection or clone picking is the process by which individual cells are separated post-transfection, allowed to grow into colonies of genetically identical cells, and selected on the basis of one or more characteristics. Traditionally, selection begins with limiting dilution, a process by which a polyclonal suspension of cells is diluted to very low cell concentration. Small aliquots are then transferred to wells of a microplate in the expectation that one and only one transfected cell inhabits each well. As this cell divides, and the daughter cells divide, and so forth, a colony of identical cells forms.

Many things can go wrong during cell line development. According to Vitaliy Gavrilyuk, PhD, MD, CEO of cell line and bioprocess development firm CDI Bioscience (Madison, WI), issues arise from cells themselves (e.g., viability, protein-generating productivity, growth/expansion, ability to thrive in suspension versus

as attached colonies) or from low plating yields and cell numbers, suitability of the culture medium, the need for and availability of automation, human resources devoted to assays and plate handling, or the ability to scale culture conditions to sufficient quantities of product.

"Single cells don't grow very well," Gavrilyuk explains. "Remember, they originated from organs." Most biomanufacturing-worthy expression systems, such as Chinese hamster ovary (CHO) cells, are naturally attachment-dependent and must be weaned away from their preferred anchored state before they will thrive under suspension

conditions. Nor is limiting dilution terribly efficient. Only about 30 percent of wells contain a single, viable cell, a requirement for the technique to succeed.

Conventional microplate-based methods require both a means of estimating cell number or colony size and a separate assay to determine suitability (for example,

production of recombinant protein). "These operations require two or three extra devices, several manipulations, and at least one extra technician," Gavrilyuk explains.

"Moreover, the expansion time frame itself, 10 to 12 days, may be limiting." Cells may require additional expansion before sufficient sample becomes available for testing. The combination of expansion duration, growth conditions, transfection, and the presence of foreign recombinant proteins overwhelms many cell lines.

"Viability can be a huge roadblock," says Gavrilyuk. "You're putting a lot of pressure on these cells just by putting them into microwells. It's like dropping someone off on a desert island."

With clone selection a significant part of its business, CDI Biosciences employs a culturing and cloning technique based on semi-solid growth media—for example,

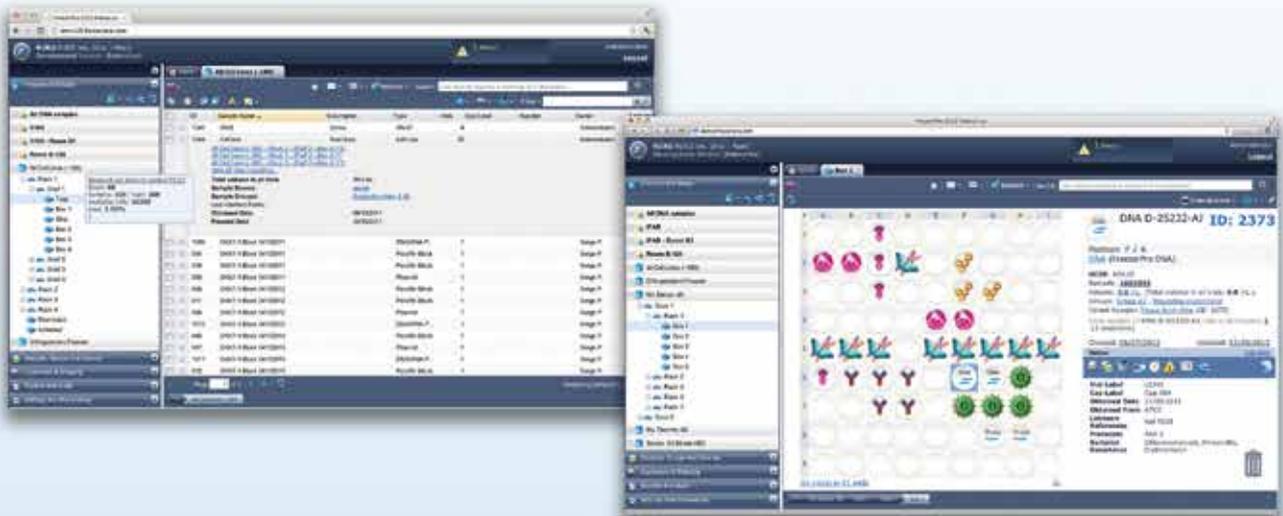
The combination of expansion duration, growth conditions, transfection, and the presence of foreign recombinant proteins overwhelms many cell lines."

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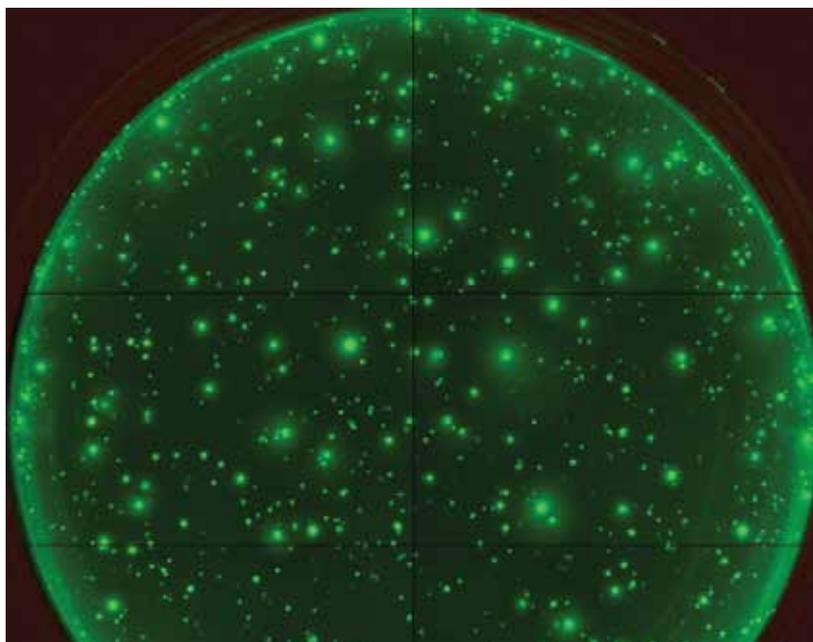
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agar or enhanced cellulose, which are supplied by numerous vendors. These media support individual cells within a semi-solid matrix instead of in suspension. The semi-solid matrix resembles attachment growth conditions and, says Gavrilyuk, provides higher plating yields and viability. “It’s not real attachment, but it’s enough of an improvement for robust cellular growth, and the medium gives us a greater chance to expand and find optimal clones.”

Within the semi-solid matrix, cells are detected by imaging colony size with white light and calculating production through fluorescence. When clone-picking time arrives, CDI uses an algorithm based on the ratio of productivity and colony size to determine which colonies are the most likely to perform best.



▲ When CHO-S colonies secreting a monoclonal antibody are cultured in diffusion-limiting methyl-cellulose matrix semi-solid media, immunofluorescence labeling (e.g. using FITC-labeled CloneDetect Reagent) allows the Molecular Devices ClonePix to select only the clonal highest-expressors among thousands of colonies.

MEASURING PRODUCTIVITY

Despite the high economic value of biopharmaceuticals, selecting clones merely on per-cell productivity is a mistake, Gavrilyuk warns. Cell line developers should instead focus on culture or volumetric productivity, a product of per-cell productivity and cell density at production scale. “The highest-producing clones usually show slower cell growth, hence lower culture density,” he says.

For example, one colony may produce one pictogram of protein per cell per day, and another just half that quantity. Which is superior? If the first colony will grow to only 1,000 cells per milliliter, but the second grows to 10,000 cells per milliliter, the answer becomes obvious. “It all comes down

to volumetric productivity,” Gavrilyuk tells *Lab Manager*.

Natalia Lysaya, global product manager for biotherapeutics at Molecular Devices (Sunnyvale, CA), notes that clone-picking from semi-solid media still entails a degree of uncertainty. “The major challenge is correlating the degree of fluorescence intensity related to protein secretion during clone selection to protein-producing productivity upon expansion,” says Lysaya. In other words, clones designated as high producers during selection may not fulfill their promise at higher cell density. The same disconnect exists for other desirable characteristics such as viability or the ability to achieve workable cell densities.

Root causes abound for this phenomenon, from conditions of initial culture and expansion to medium and nutrient composition to transfection technique. Some cells may be transiently transfected and thereby lose their capacity for producing protein as their population expands.

Conventional dilution techniques in suspension cultures have this problem as well. However, selecting colonies from semi-solid media makes the selection of colonies that are totally nonproductive from the start less likely.

To reduce the risk of productivity disconnection, Lysaya advises users to verify monoclonality and, to overcome the correlation problem, to perform two rounds of cloning. Regardless of the cloning and selection method, multiple cloning rounds are common with both production cells and hybridomas.

WHERE AUTOMATION FITS IN

Cell culture automation typically consists of a liquid handler, an incubator, and a monitoring system to assure maintenance of culture conditions. Kristina Klette, PhD, scientific leader for cellular and protein sciences at Hamilton (Reno, NV), considers the liquid handler as the core component. She advises purchasers to consider biosafety, manipulating adherent versus suspension cells, integration with incubators and imagers, software handling of parallel processes, and how pipettes manipulate liquids to reduce contamination risk.

“Automation is crucial for high-throughput clone selection, especially experiments that run in parallel,” Klette tells *Lab Manager*. Automated liquid handling and detection work together as one integrated system to streamline clone selection with minimal user intervention. Automated tasks include cell seeding, media exchange, expansion, passaging, clone selection, and harvesting of the cells for longer-term storage. “This occurs while the detection system tracks and monitors cell growth and parameters required for selection, passing this information to the liquid handling system that performs essential cell manipulation,” says Klette.

Automation and computerization have boosted the efficiency and throughput of most life science workflows, and clone selection is no exception. “People are interested in automation to eliminate tedious manual processes,” says Susanne Braum, PhD, senior product manager, liquid handling and cell biology, at Tecan (Männedorf, Switzerland). “Lab workers no longer need to come in over the weekend or in the middle of the

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night because cells require feeding or media exchange.”

Automated liquid handlers are said to dispense and aspirate about as well as a very skilled technician on a very good day. But unlike humans, the robotic pipettor never gets tired, bored, or distracted—and calibration disasters aside, robots never have an off day. Media changes and periodic feeds occur precisely when they need to, not simply when they’re convenient. This ensures that in a multi-plate experiment, each well experiences the same conditions at precisely the same time intervals—which leads to arguably the most significant benefit of all: consistency.

During biopharmaceutical development many usable and even outstanding clones are rejected not because of poor performance, but because manual liquid handling steps were non-uniform across microplates.

“In the long run, selecting the best clone in the shortest time frame means shorter development times,” Braum notes. “You’re able to check the efficiency of transfection and expression very quickly, and keep track of samples through the entire workflow. Automated workflows are reliable, robust, and reproducible.”

Imaging colonies to estimate cell populations is somewhat more difficult with semi-solid media compared with suspension-cultured cells, particularly using conventional plate reading and imaging equipment. Suspended cells fall to the bottom of the well when agitation stops, creating a sharp focal point, whereas colonies can form at any point in three dimensions in semi-solid media.

“The big challenge is isolating the rare or unique hybridoma populations early, and separating them from much faster-growing B-cell populations.”

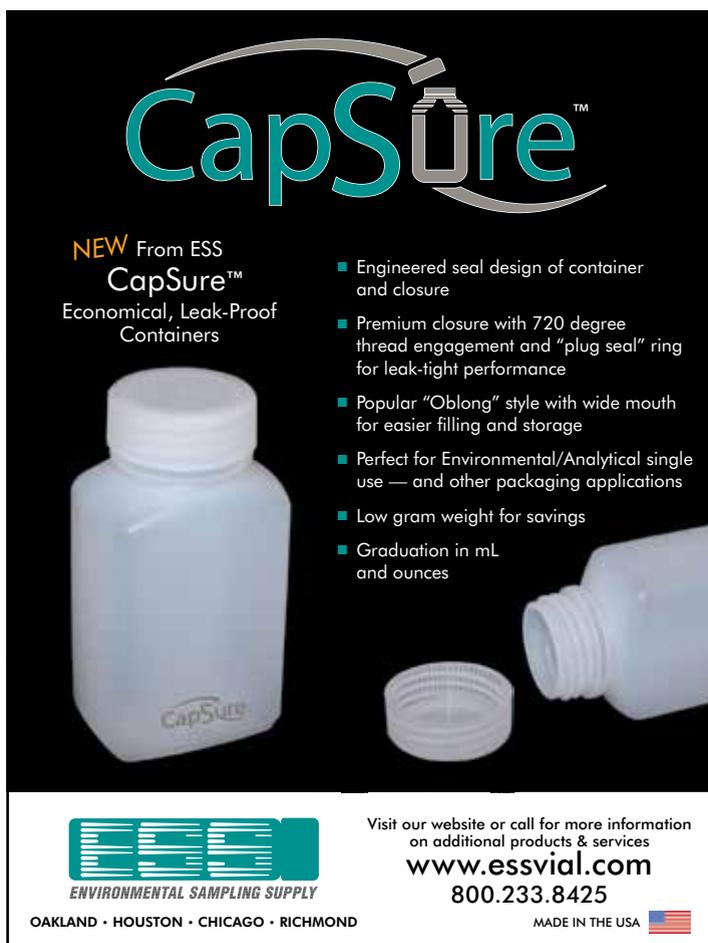
Automation compensates for a great deal of human variability, but automated workflows are approximately as inexact as manual operations with regard to plating efficiency. “Cloning is inherently a trial-and-error process,” Braum concedes. In other words, scientists don’t know if they got it right until rather late in the game. “But automation allows you to do way more in less time, and with greater reproducibility.”

IN THE BEGINNING

Biopharmaceutical antibody development projects usually begin with mouse hybridomas—immortalized, antibody-producing B (immune) cells from mice that have been challenged by an appropriate antigen. Investigators isolate, sequence, and reverse-engineer these antibodies into genes that are inserted into production cells.

The decision to go monoclonal or to settle with polyclonality is governed by the end use. Polyclonals (little or no clone selection required) suffice for research-grade antibodies, while human therapeutics are always monoclonals that require picking the most productive clones. The US Food and Drug Administration has been pushing for the use of monoclonal antibodies for human diagnostics as well.

Regardless of the ultimate production platform, hybridomas require selection as well. “The big challenge is isolating the rare or unique hybridoma populations



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early, and separating them from much faster-growing B-cell populations,” says Jason Goldstein, PhD, founder of contract research firm Annular Biotechnology (Atlanta, GA). “Once you immortalize B cells, you have a very narrow time frame in which to do this.”

When B cells are extracted from a mouse, they incorporate the entire repertoire of the animal’s immune systems—responses to every antigen it has experienced. Although the B cells of interest are likely amplified due to the recent antigen challenge, they may not be the fastest-growing. Rapidly reproducing cells can overwhelm a culture within a few generations.

According to Goldstein, this phenomenon illustrates another weakness of limiting dilution, which requires significant time to achieve monoclonality. “You’re at the mercy of growth rates of those hybridomas,” he says. “Once your target cells are overgrown, they’re gone.”

Overgrowth also arises from cultures contaminated by cells from species other than the desired line, or by cells that have undergone substantial genetic drift—hence why all serious cell-based work begins with authenticated cell lines. Authentication ensures that cells are genetically identical to refer-

ence strains maintained by nonprofit cell repository ATCC (Manassas, VA) and other organizations.

“The line would then need to be re-authenticated and characterized prior to making master and working cell banks, to ensure no cell line or other contamination occurred during the process,” explains Mindy Goldsborough, PhD, VP for ATCC Cell Systems.

Investigators should be aware, however, of the potential for changes in a cell line’s metabolism or growth as a consequence of inserting foreign genes. Before undertaking costly clone selection, companies should conduct long-term studies to validate that the transformed cells behave consistently and predictably over time. “They should first be concerned about that. I know that these companies care very much about the stability of their clones over time, and want to ensure that the cell line characteristics—whatever they are now, once the drug gene is in them—remain the same over time,” Goldsborough says. “They should be more concerned about that than about changes from the parental line.”

Angelo DePalma is a freelance writer living in Newton, NJ. You can reach him at angelo@adepalma.com.

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ROCKING LABORATORY SHAKERS

ASSURING CONSISTENCY OF RESULTS

by Angelo DePalma, PhD

Laboratory shakers come in a variety of configurations, including orbital, horizontal, incubator, tumbling, roller, overhead, rotator, and the subject of this article, rocking shakers. Within these categories, numerous variables are possible: physical size and sample capacity, speed adjustment, shaking direction, sample pitch, direct temperature control through heating or cooling coils, and environment control through enclosures or use within incubators. Manufacturers often add or enhance features in successive generations of a product line. Successful models are often cloned to larger or smaller size/capacity, as IKA (Staufen, Germany) recently did with its line of incubator shakers.

“Expanding a product’s range covers many more applications in cell research and biology,” says IKA shaker product manager Oliver Vogelsang. Rocking shakers are used for homogeneous mixing in flasks, culture flasks, Petri dishes, and tubes, particularly for mixing blood samples, solid and liquid suspensions, and cell cultures. “For these applications it is important to have a low and continuous speed for smooth shaking,” Vogelsang adds. “Also, the shakers and their attachments must be easy to clean.”

Avoid spills and sloshing

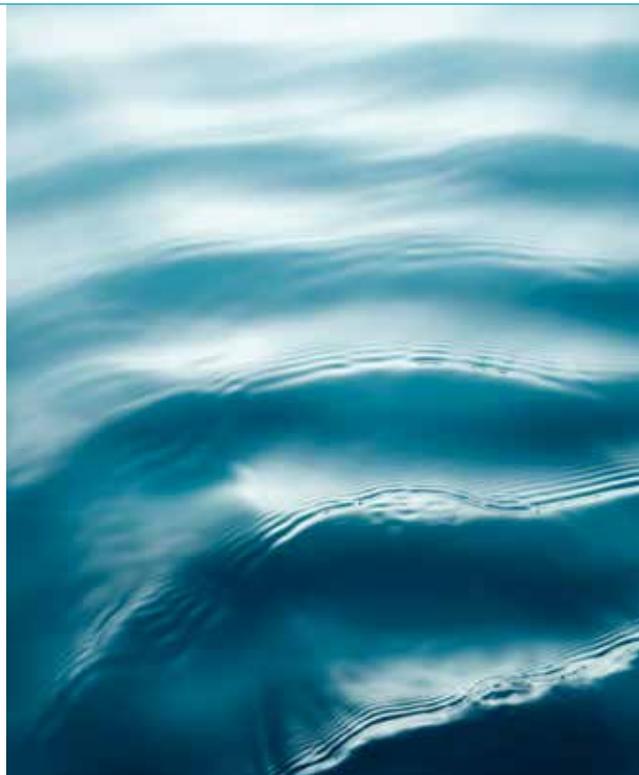
Electrophoresis gel staining and de-staining have been solid applications of rocking shakers for decades. Users should take care to match labware with rocking speed and pitch, however. Too-vigorous rocking may cause process fluids to spill from low-profile, poorly covered containers such as Petri dishes and kitchenware-like gel or sample holders. While over-rocking rarely hurts gels, it can create a mess on the rocking shaker’s surface and even spill onto the benchtop. In a worst-case scenario, liquid can seep into the motor and ruin the shaker. Placing the motor and other critical inner workings within a liquid-proof enclosure eliminates this occurrence.

Even for well-sealed or stoppered containers, users should consider the potential interaction between fluids and seal materials. Most lab-worthy plastic, glass, and rubber materials of construction are impervious to leaching and extraction by common water-based process fluids, but the addition of organic or caustic materials might affect the leachables/extractables profile.

A good deal of cell and tissue culture still occurs in Petri dishes and other low-profile culture ware. These are typically difficult to control because of the physical limitations of the container. Vogelsang advises users to rock these samples smoothly and continuously, in an incubator whenever possible, to reduce variability to a minimum. “Rocking speed should be constant throughout the entire test period to ensure that results are reproducible,” he explains.

“Users should take care to match labware with rocking speed and pitch.”

Rocking shakers have been so successful at their core applications that Wave Biotech, an early 2000s manufacturer of single-use bioprocess equipment, adopted the rocking design for cell culture mixing devices. Wave systems used a rocking table, similar to rocking laboratory shakers, to agitate the contents of disposable cell culture bags ranging in size from one liter to several hundred liters. The technology was considered so innovative at the time that major companies looking for an entry into bioprocessing competed to collaborate with Wave. Ultimately the company was acquired by Sartorius-Stedim biotech (another pioneer in single-use bioprocessing). The Wave idea now belongs to GE Healthcare.



Acquiring a rocker

Rocking shakers are rarely modified except for specialized, horizontal sample-holding areas. Flat, non-slip rubber is most suitable for low-profile containers like Petri dishes. Mats with protruding fingers hold vials or tubes in place during shaking, preventing them from rolling into one another or off the platform.

While rocking shakers are by no means high-tech products, it's a good idea to pay attention to such parameters as orbit, stroke length, cycle duration, and duration of rocking, says Nicole Kvasnicka, product marketing manager at Heidolph North America (Elk Grove Village, IL). Quality shakers provide a means of controlling these conditions precisely, not necessarily because overstimulation will ruin experiments, but for sample-to-sample consistency. Medical laboratories have appreciated this for decades, as have compliant labs operating under pharmaceutical Good Manufacturing Practices and Good Laboratory Practices. Research labs, even academic ones, are beginning to understand the value of consistency as well.

Kvasnicka advises against rocking shakers with low centers of gravity, saying, "This way you can turn them up to their highest RPM or cycle values and not have an instrument next to the shaker, or in some instances your entire work area, vibrating."

Other features to look for are adjustable speed and tilt angles, stacking trays that multiply the usable surface area, quiet operation and vibration-free operation, and support for holding tubes and vials horizontally.

Rocking shakers vary in price from about \$500 to \$4,000, based on motion characteristics, capacity, and programmability. Purchasers should consider not just price alone but value and reliability. Shakers are not known to break down. Many vendors do not even offer routine maintenance services. But in labs in which the devices operate 24/7, the risk of failure is too great. "Samples are worth much more than shakers," Kvasnicka says. "If your shaker breaks down, there goes your experiment."

Lest one think that rocking shakers are solely the domain of biology labs, Ralph "Trip" Boehnke, CEO of Eberbach (Ann Arbor, MI), notes that designers and developers of semiconductor boards employ rocking shakers for chemical etching. From this perspective, he warns customers not to be complacent with regard to a shaker's suitability. Results don't necessarily translate from similar applications. Depending on the conditions, gels may not de-stain, ingredients may not mix, or conditions may be averse to etching circuits within a reasonable timeframe.

Eberbach's focus on custom-built lab shakers is unusual among vendors. "Competing for the \$200 devices would be difficult for us," Boehnke admits.

Instrument customization reflects workflows that evolve or are anticipated to change over time. Examples include a larger-than-normal number of flasks or Petri dishes, the need for one shaker to accommodate two or more cell culture expansions, the ability to run two experiments side by side, or simply the need to do more with less. But this level of adaptability requires thorough communication between customer and vendor.

"We can make rocking shakers that are twice as large as what you typically find, or that can handle twice as much weight, but customers have to be specific about numbers and sizes," Boehnke explains. "The more information, the better the custom product will turn out."

Angelo DePalma is a freelance writer living in Newton, NJ. You can reach him at angelo@adepalma.com.

FOR ADDITIONAL RESOURCES ON SHAKERS, INCLUDING USEFUL ARTICLES AND A LIST OF MANUFACTURERS, VISIT
WWW.LABMANAGER.COM/SHAKERS



Types of microplate reader used by survey respondents:

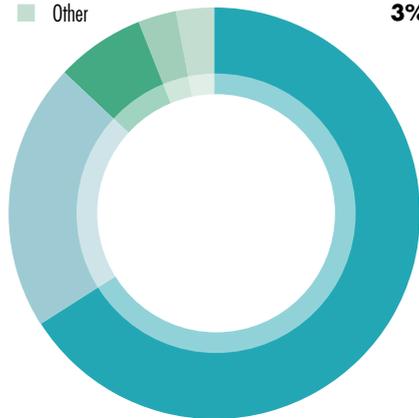
Absorbance	59%
AlphaScreen	3%
Fluorescence polarization	12%
Time-resolved fluorescence (TRF)	10%
Time-resolved fluorescence energy transfer (TR-FRET)	3%
Luminescence reader	31%
Multi-mode reader	33%
Microplate spectrophotometer	46%
Other	1%

Microplate reader components used by survey respondents:

Additional stacker cassettes	6%
Barcode scanner	18%
Bulk dispensing	8%
Centrifugation	27%
De-lidding stacker cassettes	2%
High-speed robot	5%
Labeling and sealing	9%
Microplate washers	52%
Microplate handlers	6%
Microplate stackers	8%
Microplate robotics	9%
Microplate sealers	16%
Other	9%

Nearly 24% of respondents are engaged in purchasing a new microplate reader. The reasons for these purchases are as follows:

Replacement of an aging system	66%
Addition to existing systems	21%
Setting up a new lab	7%
First-time purchase	3%
Other	3%



ARE YOU IN THE MARKET FOR A... MICROPLATE READER?

Microplate readers are commonly used in biological research for assay development (39.4%), measurement of biomolecule concentration (34.5%), cell biology (25%), biomarker research (24.0%), and DNA quantification (20% of survey respondents). In addition, microplate readers find use in disease study, IVF, proteomics, PCR setup, and stem cell research. With multiple read modes available and numerous accessories, choosing a microplate reader that meets your current and future needs can prove a daunting task.

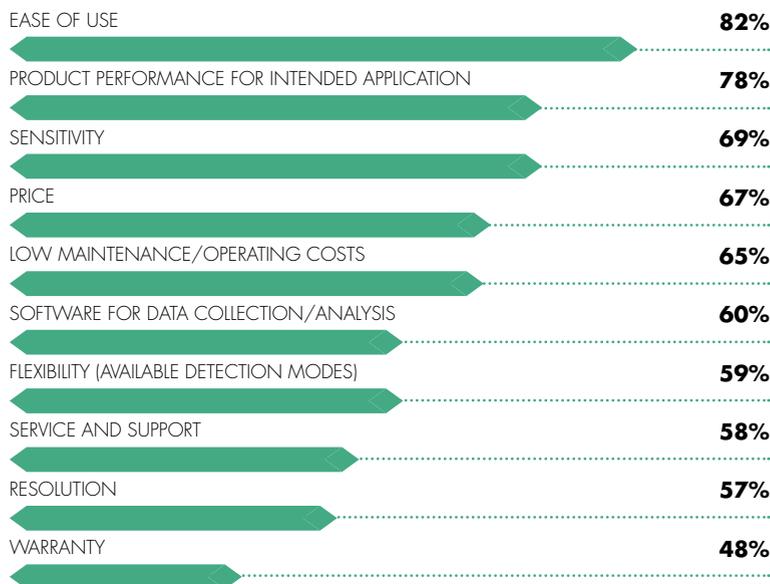
TOP 8 QUESTIONS

You should ask when buying a microplate reader

1. How many read modes are offered? Multiple read modes offer greater flexibility and value than single read modes.
2. What kind of detection technology is used? Monochromator-based detection offers flexibility, convenience, and spectral scanning; while filter-based detection is characterized by precise sensitivity and may often switch rapidly between distinct wavelengths for kinetic assays. Hybrid detection systems combine both technologies for the utmost in flexibility and sensitivity.
3. Is it upgradeable? If so, can the upgrade be installed on-site? On-site installations reduce overall downtime, and often the technician is available to answer questions or conduct training.
4. Is the reader automatable? Automating the process with a compatible microplate stacker increases throughput with walk-away operation.
5. Ask about the software—is it integrated and user-friendly? Does it allow for pre-programmed and custom protocols? What kind of analysis is offered? How is data exported?
6. Is on-site training available? Is there a fee? On-site training provides an opportunity for all staff to learn about the reader, reducing the number of subsequent trainings needed.
7. What options are available? Options such as gas control, barcode scanning, shaking, and injecting increase assay flexibility for those that need these features.
8. What assay validation data is available for the reader? Assay validation data specific for the reader provides proof that the reader performs as indicated.

TOP 10 FEATURES/FACTORS

Respondents look for when purchasing a microplate reader



➔ For more information on microplate readers, including useful articles and a list of manufacturers, visit www.labmanager.com/microplate-tech

STATIC AND DYNAMIC IMAGING PROVIDE PROS AND CONS

by Mike May, PhD

If a product or industry involves particles, and most do, someone analyzes the size of those particles.

As Deborah Huck-Jones, product manager for analytical imaging at Malvern Instruments in Malvern, United Kingdom, says, “Particle sizing is ubiquitous across industry.” The size and shape of particles can change, for instance, how foods taste or how pharmaceuticals perform. Both static and dynamic image analysis can be used to assess particle size. An image from a microscope can be used for static analysis, and dynamic technology captures image information from a sample in motion. The choice often depends on the sample. “For powders, like pharmaceutical ingredients, you might use static image analysis,” says Mark Bumiller, regional sales and marketing manager at Particle Sizing Systems in Huntington Beach, California. “People probably go to a dynamic method for suspensions, like protein aggregations in some new therapeutics.”

Other factors also affect the selection. Huck-Jones says, “Static imaging produces the highest quality/resolution images and is often used to automate traditional manual microscopy methods.” She adds, “Dynamic imaging, in contrast, is very fast.”

Some systems simultaneously capture multiple features of particles. For example, Lew Brown, technical director at Fluid Imaging Technologies in Scarborough, Maine, says his company’s dynamic device can analyze 50,000 particles a minute for size plus 30 other measurements, including shape. “Analyzing more particles,” Brown says, “provides better statistics.” In addition, some imaging systems collect new kinds of particle information. As Huck-Jones points out, “Coupling static imaging with other technologies is a current trend that allows users to gain more particle-specific data. For example, morphologically directed Raman spectroscopy—MDRS—uses imaging data to define particles that can be usefully chemically identified by Raman spectroscopy.” She adds, “Good examples of the application of MDRS come from the pharmaceutical industry, where it can be used to reliably identify an active pharmaceutical ingredient within a blend or matrix and then gather information about size and shape for that ingredient alone, rather than for the formulation as a whole.”

Trying multiple tools

In measuring and analyzing the size of particles, scientists often use multiple tools. For example, Igathinathane Cannayen, assistant professor of agricultural and biosystems engineering at North Dakota State University in Fargo, developed an inexpensive static system based on a digital scanner and an image-processing plugin. He also collaborates with Ugur Ulusoy, associate professor of mineral processing at Cumhuriyet University in Sivas, Turkey, to use a 3D dynamic image analyzer. He adds, “Routinely, we use the standard mechanical sieving for comparison.” In these technologies, Cannayen looks for several features, including accuracy and automated analysis, the calculation of several particle size distribution parameters, textual and graphical outputs, and the flexibility to incorporate user-defined analysis. Many scientists also use laser diffraction, which does not include imaging.

Like Cannayen, most scientists would upgrade to static or dynamic image analysis, not to replace a previous approach, but to add to the options. Bumiller says, “Well-funded labs use several ways to look at any particle-characterization issue.” They use different approaches for specific situations. As Brown says, “You might just use the particle-size distribution until something is wrong, but then go to a dynamic system to get more information.” For example, says Bumiller, “Image analysis is usually pulled in when shape information is what they are trying to figure out.”

The images also let users aim their own brains on particles. “If you have a problem in a process and you see fibrous particles that look like paper,” Brown says, “you may suspect that a filter has broken somewhere.” So far, the human brain remains the best tool for many aspects of image analysis, so it helps to keep that tool in the process where needed.

Mike May is a freelance writer and editor living in Ohio. You may reach him at mike@techtypewriter.com.

FOR ADDITIONAL RESOURCES ON PARTICLE SIZING, INCLUDING USEFUL ARTICLES AND A LIST OF MANUFACTURERS, VISIT WWW.LABMANAGER.COM/PARTICLE-SIZING

THE FUN AND EFFICIENCY OF PERSONALIZATION

by Angelo DePalma, PhD

Dealing with difficult samples

Refractometer manufacturers quote accuracy and reproducibility to the fourth, fifth, and sometimes even the sixth decimal places. A good manufacturer will only advertise this level of accuracy after carefully running standards. “The problem is that users don’t buy refractometers to measure standards,” observes Peter Marriott, product manager at Rudolph Research Analytical (Hackettstown, NJ). “They buy instruments for industrial scale products such as food or chemicals, which exist as complex matrices, and for which measuring refractive index is far more challenging.”

Traditional Abbe refractometers, though dated, are still sometimes used for difficult samples because they provide analogue feedback on measurement quality. Marriott refers to first- and second-generation automatic refractometers as “closed boxes” that generate a number but do not provide the end user with information on how they are reading the sample. “Now, with third-generation systems, for example incorporating Rudolph’s Smart Measure technology, users obtain feedback on what is going on with the sample, which helps improve measurement protocols.”

Another limitation of early automatic refractometers was the measurement of samples that change over time. Evaporation and taking on water from the atmosphere, for example, increase and decrease, respectively, the concentration of target analytes. Both effects may be minimized by using a temperature-controlled sample cover. Another issue is composition change within the sample itself. Regardless of what causes the change, its effects can only be mitigated if the user knows it’s occurring. “Only with current-generation computer-controlled instruments that sample repeatedly at extremely high speed do such changes become easy to detect,” Marriott says.

Temperature control has always plagued refractometer measurements. Despite being “solved” more than a decade ago, it continues to concern present-generation end users. Refractive index is temperature sensitive, and a temperature-corrected refractometer will only work for a limited range of samples, such as those containing sugar, and even then only if the sample temperature is fairly stable to begin with. For non-sugar samples—which include most calibration standards—and for samples that are applied at process temperature, only a temperature-controlled (as opposed to corrected) refractometer provides reliability, according to Marriott.

Purchase decisions

The standard rule of thumb—match instrument capabilities with measurement needs—is obvious but easy to overlook given the wide diversity of refractometer system capabilities. Neimar da Silva, product specialist at Anton Paar (Ashland, VA), advises purchasers to resist the temptation of over-specifying their

instrumentation. “Focus instead on accuracy and simple operation. An advanced refractometer with touchscreen operation and FDA CFR part 11 compliance is a must for pharmaceutical labs, but it is serious overkill for the food industry.”

Similarly, the ability to measure at multiple wavelengths might appeal to a pure research organization but is probably inappropriate for those interested only in a snapshot concentration of one ingredient.

Where high- and low-end applications overlap is in modular instruments that measure two or more parameters. All-in-one instruments that combine refractive index with density, color, polarimetry, pH, or turbidity can save time and instrument costs. Refractive index is usually secondary, as instrument design goes, to the second measurement parameter.

“The flavors and fragrances business is based on purchasing large quantities of raw materials and selling very small quantities in finished products,” da Silva says. “Combined, density plus RI is a quick way to ensure that they’re not receiving adulterated or synthetic materials.”

Daniel Buchmann, product manager for density and refractometry at METTLER TOLEDO (Schwerzenbach, Switzerland), notes that benchtop and more portable refractometers provide different accuracies based not only on the RI measurement but on temperature. Handhelds typically provide three-decimal-point measurements, rarely four, while benchtop units return results accurate to four or five places.

According to Buchmann, such differences matter on the measurement specifications. Quality ranges for raw concentrated juices are broad because such products, and measurement temperatures, vary significantly. “By contrast, final product concentration specs will usually be much tighter. You have more leeway in raw materials,” Buchmann says.

High-accuracy measurements are where temperature control becomes significant, particularly for nonaqueous samples. Water RI changes by 0.0001 units per degree Celsius, but for dodecane the change is four times greater. In pure temperature terms, measuring RI to five-place accuracy requires temperature control to 0.05 °C. “That’s why at the high end purchasers should consider both factors,” Buchmann cautions. An additional factor is evaporation, which not only concentrates analytes but cools the sample.

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FOR ADDITIONAL RESOURCES ON
REFRACTOMETERS, INCLUDING USEFUL ARTICLES
AND A LIST OF MANUFACTURERS, VISIT
WWW.LABMANAGER.COM/REFRACTOMETERS



ARE YOU IN THE MARKET FOR A... LAB OVEN?

Laboratory ovens are common instruments in most laboratories and are used across most scientific disciplines. Lab ovens are most commonly less than 12 cu.ft. in volume, although a great variety of sizes are available in benchtop, stackable, and floor-standing models. Over 25% of survey respondents reported using larger ovens in their labs. While lab ovens are most commonly used for heating and drying (75.6% of respondents), they find a variety of other uses including temperature-linked experimentation (41.7%), evaporating (37.0%), baking (16.5%) and sterilization (11.8%).

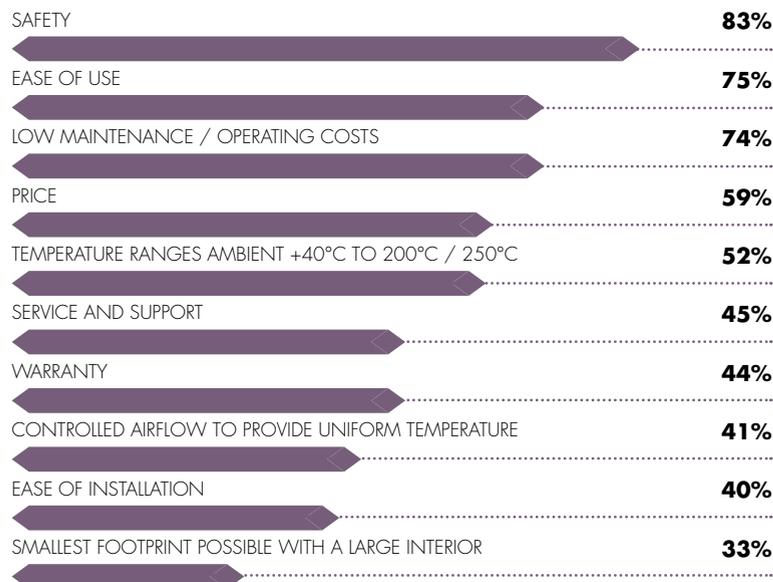
TOP 5 QUESTIONS

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?

TOP 10 FEATURES/FACTORS

Respondents look for when purchasing a lab oven



Types of lab ovens used by survey respondents:

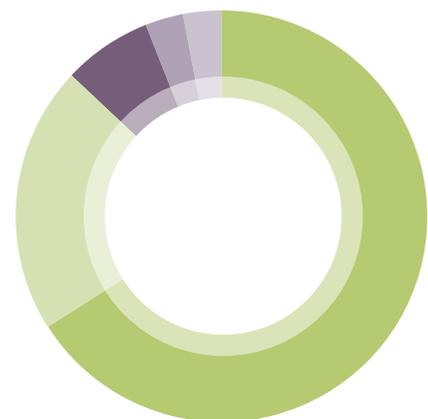
General Purpose Oven	72%
Mechanical Convection Oven	33%
Microwave Oven	33%
Vacuum Oven	17%
Gravity Convection Oven	15%
Safety Oven	2%
Other	4%

Main applications respondents use their lab ovens for:

Heating and drying	76%
Temperature-linked experiments	42%
Evaporating	37%
Baking	17%
Sterilization	12%
Other	7%
Annealing	6%
De-gassing samples	5%
Distilling	2%

Nearly 24% of respondents are engaged in purchasing a new lab oven. The reasons for these purchases are as follows:

Replacement of an aging system	66%
Addition to existing systems	21%
Setting up a new lab	7%
First-time purchase	3%
Other	3%



➔ For more information on lab ovens, including useful articles and a list of manufacturers, visit www.labmanager.com/lab-ovens.



Types of freeze dryer used by survey respondents:

Manifold Benchtop	34%
Manifold Console	26%
Shelf Benchtop	23%
Non-Sterile Production	19%
Dry Ice Benchtop	17%
Shelf Console	9%
Sterile Production	8%
Other	4%

Freeze dryer applications as reported by survey respondents:

Pharmaceuticals	38%
Material stabilization and/or storage	38%
Other	21%
Food Processing	9%
Starters and Cultures	9%
Nutraceuticals	6%

Nearly 45% of respondents are engaged in purchasing a new freeze dryer. The reasons for these purchases are as follows:

Replacement of an aging system	43%
Addition to existing systems	25%
Setting up a new lab	18%
First-time purchase	14%



ARE YOU IN THE MARKET FOR A... FREEZE DRYER?

Freeze dryers find use in a variety of research and manufacturing environments and are commonly used for material storage, food and pharmaceutical processing, as well as for less common applications such as taxidermy and document recovery. With a wide variety of options available, there is much to consider when purchasing a new freeze dryer.

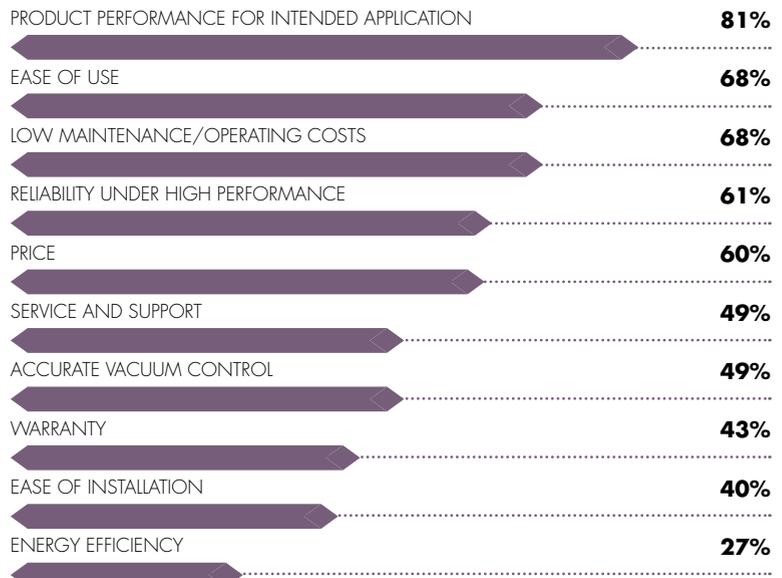
TOP 5 QUESTIONS

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 1/2 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? Accessories can allow you to stopper under vacuum or nitrogen without using compressed gas.
5. Is this a shared freeze dryer? A hybrid pump is recommended to prevent damage to the pump.

TOP 10 FEATURES/FACTORS

Respondents look for when purchasing a freeze dryer



➔ For more information on freeze dryers, including useful articles and a list of manufacturers, visit www.labmanager.com/freeze-dryers.

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It can be a mistake if you do not select a system that is designed for your type and size of samples. Below is a quick step by step guide to help you with the selection process.

Select Condenser Temperature based on the Sample's Eutectic Point

The difference in temperature between your sample and the condenser is the driving force of lyophilization. It is very important that the condenser be at least 20°C colder than the sample's eutectic or freezing point. The condenser collects the vapors before they reach the vacuum pump. If the condenser is not cold enough to collect the vapors the vacuum pump can be damaged and samples may not stay frozen during lyophilization.

Select Model of Freeze Dryer for your Sample Size

Freeze Dryers have 3 important specifications in regards to size. Make sure the model you select will accommodate the size of sample you intend to lyophilize and the number of samples you need to load at the same time. The Specifications are: Volume that is removed in 24 hours, Amount of ice the condenser will hold before defrosting and Volume the condenser can accommodate at one time when loading.

Select Vacuum Pump & PTFE Coatings

If your samples contain solvents, acids or corrosive compounds it is important to ensure your Freeze Dry System is able to accommodate these harsh compounds. A PTFE coated condenser is recommended for acids. A Freeze Dry System requires a vacuum level of 2×10^{-2} mBar. An Oil Pump works well with aqueous samples but can be damaged if exposed to solvents or harsh chemicals. Scroll or Hybrid pumps are recommended when freeze drying solvents and harsh chemicals.

Select Drying Accessories

A wide variety of drying accessories are available to ensure your samples are processed according to your needs. Common drying accessories are different sized Drying Chambers with flask ports or trays, Manifolds for flask or ampules, and Tray Dryers with or without Stoppering.

Freeze drying samples doesn't have to be difficult if you do your homework and choose the correct freeze dryer from the start.

For further information, visit www.labconco.com where you will find details on each system as well as instructional videos, or call 800.821.5525.



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IMPLEMENTING AN ASSET MANAGEMENT PROGRAM

Problem: A variety of factors can result in obsolete laboratory equipment and R&D devices. Project completion, equipment upgrade, lab closure, and downsizing all create surplus pharmaceutical assets no longer required in the same capacity—or at all. Given budget restrictions and the importance placed on environmentally-sound business practices, organizations can't afford to allow surplus assets to lie idle or dispose of them without thought to the process. Surplus requires an innovative and sustainable process that supports strategic business goals.

Solution: Implementing an asset management program will connect your surplus to larger, strategic initiatives by enabling visibility of all assets across the entire organization. The process should include: implementing a companywide redeployment tool, setting guidelines for surplus, incorporating best practices and aligning the right resources to manage the program.

A first step in creating an asset management program that works for your organization is to implement a web-based, enterprise-wide system to support redeployment. A digital tool facilitates company-wide visibility of all its excess equipment, displaying readily accessible surplus to lab managers across the company. This system is particularly useful in the event there is a need for a specific item in one lab that is already sitting unused in another lab.

Redeployment is a cost effective option and best practice for idle assets; especially if it saves the company from spending money on procuring new equipment. To ensure redeployment is effectively utilized, organizations should establish criteria for which items should be reutilized versus sold. Guidelines to consider for the internal process include:

- Redeploy high value items that maintain use over a long period of time
- Don't spend more on breakdown, removal, shipping, and installation than the cost of purchasing the asset in new condition
- Sell lower-value lab equipment from its location or consider donating the items
- Establish a cut-off date for internal acquisition; industry standard is 30 days

If no one within the company has requested or found use for an item within the allotted amount of time, it should be remarketed and sold. Consider implementing the following best practices which will allow you to achieve maximum recovery for the item:

- Determine estimated values for the piece(s) of equipment
- Determine a sales channel for the equipment, such as: online auction, private sale, or local advertisement
- Create marketing collateral (advertisements, press releases) in order to properly market the item(s)

- Determine buyer base and buyer location
- Schedule a preview period so potential buyers can come inspect the item
- Have a removal period in place

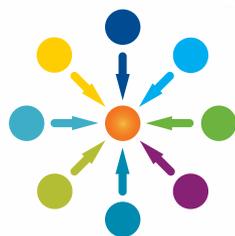
While most companies have invested resources to optimize their forward supply chain, oftentimes the reverse supply chain is approached as an afterthought or added to the plate of logistics or operations employees who don't necessarily have the bandwidth to implement a best-in-class asset management system. Sometimes the best choice is to work with a trusted partner whose primary business is providing solutions for surplus assets. A reputable partner will have professionally managed data-driven services to manage, value, and sell all types of pharmaceutical equipment while bringing extensive knowledge of the secondary market and ensuring transparency, sustainability, and efficiency, as well as a vetted buyer base and compliant removal of the assets.

By aligning the right resources and applying best practices for redeployment and remarketing of assets, an asset management program can support strategic business goals and enable companies to unlock the value of their surplus and idle assets.

For more information, visit www.liquidityservices.com or contact sell@liquidityservicesinc.com



◀ *Redeploy high-value items that maintain use over a long period of time, but don't ever spend more on breakdown, removal, shipping, and installation than the cost of purchasing the asset in new condition.*



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SINGLE MOLECULE MEASUREMENT

Problem: The human genome encodes thousands of secreted proteins, each of which is an actor in the delicate biochemical balance of diagnostics. Even a slight change in any one of these proteins can mean the difference between sickness and health. Such a change also provides a critical window into the body and helps to direct diagnosis and treatment, however, the vast majority of secreted proteins are present in concentrations well below what conventional technologies can measure, and their role in human health is poorly understood.

The field of proteomics has been around for decades and relies on targeted antibodies to detect biomarkers in the blood. Traditional ELISA readout systems require large volumes that ultimately dilute reaction product, requiring millions of enzyme labels to generate signals that are detectable utilizing conventional plate readers. Sensitivity is therefore limited and, if biomarkers are detected, it likely means the disease is already active and potentially widespread. For this reason, the clinical use of protein biomarkers to detect and monitor disease progression requires the measurement of extremely low concentrations of proteins in complex samples in order to detect disease in its first stages, improving and accelerating patient care.

Solution: By measuring individual proteins at concentrations 1,000 times lower than the best immunoassays available today, researchers are able to detect, measure and validate new and existing biomarkers at concentrations previously unattainable and much earlier in the disease progression.

In order to achieve this new form of measurement, Quanterix developed a digital platform, called Simoa, to detect individual protein molecules in single molecule arrays. The technology first isolates individual immunocomplexes on paramagnetic beads using standard ELISA reagents. The main difference between Simoa and conventional immunoassays lies in the ability to trap *single* molecules in femtoliter-sized wells, allowing for a “digital” readout of each individual bead to determine if it is bound to the target analyte.

In contrast to conventional assay reactions, the signal generation volume in a Simoa assay is 2 billion times smaller, allowing for a single target molecule in a sealed microwell to quickly generate enough fluorophores to be measured using conventional fluorescence imaging—as opposed to millions of molecules needed for accurate measurement. Quanterix is currently working on several influential studies in fields such as oncology, neurology, and infectious disease detection. A couple of examples where Simoa has proven effective in research include:

- The platform was used to detect early increases in prostate specific antigen (PSA)—a biomarker commonly used to diagnose prostate cancer—following removal of the prostate in men with cancer. Earlier detection of these rising levels would allow men with cancer recurrence to immediately undergo more effective treatment for potentially better outcomes.

- It can also be applied to HIV detection and achieve results with 3,000 times greater analytical sensitivity than conventional immunoassays and at an affordable price—something that hasn’t been available to underdeveloped countries.
- The platform has been used to measure brain biomarkers implicated in Alzheimer’s disease and traumatic brain injury, where its inherent sensitivity allows those markers to be easily measured in blood, in contrast to today’s immunoassays, which require a painful, costly lumbar tap to obtain cerebrospinal fluid.

For more information, visit www.quanterix.com/products/simoa-hd-1-analyzer



▲ Simoa HD-1 Analyzer

SAMPLE MANAGEMENT

Problem: Laboratories are faced with challenges when it comes to storing and tracking samples. Researchers have to manage sample tubes to ensure they're reliably logged in and out of a laboratory's database or laboratory information management system. There are many moving parts of a laboratory, and multiple researchers may handle the same sample throughout several stages before, during, and after the storage process. With multiple hands on one sample, tracking the location and status of samples can be challenging, and as the number of samples stored increases, so do the challenges. Unfortunately it is not unusual to lose samples, to find that labels have fallen off, or for samples to become compromised because of evaporation or temperature variations.

Solution: There are four main aspects of sample management that can help ensure that costly, resource-intensive pitfalls don't occur. They are:

- 1. Collect:** A critical aspect of successful sample storage across a range of temperatures is the preservation of sample material over the storage lifetime. Selecting a tube that enables accurate tracking over the lifetime of the sample is crucial. Storage tubes with custom coding or tubes that are laser etched with a unique 2D code, allow the user to associate sample information with individual samples identified by the specific 2D barcode. To ensure sample tracking with highest contrast for readability over long periods of time, various temperatures, and even some frost on the tube, the barcodes are laser etched on the base of every tube.
- 2. Seal:** Each storage tube must have a secure seal to preserve the quality of its contents by preventing evaporation and contamination from outside the tube, to ensure sample integrity. There are numerous innovative ways to seal sample tubes. Heat-sealing tubes with a pierceable foil seal offers easy access with manual or automated pipette tips and is a cost-effective option for securing samples. A gasketed screw top closure offers seal reliability, and in many cases is compatible with both handheld and benchtop automated decappers.
- 3. Track:** Managing sample data is key in tracking samples over their lifecycle, and laboratories need a robust offering of sample management products and services to address scaling needs. Instant access to information helps laboratories respond to organizational pressures, streamline operations and contribute to the overall efficiencies, cost savings and revenue-generating activities. Integrating all the activities in the lab with a laboratory information management system (LIMS) is essential to streamlining the lab and making data available where it is needed.

For example, a database such as the VisionTracker™ program, tracks the location of storage tubes (non-coded, 1D and 2D) in a box and freezer rack, the location of

the rack in a cold storage unit, and all associated sample data to keep track of every sample. The database should allow users to easily search samples for quick retrieval, is CFR21 Part 11 compliant, and is an easy and simple tool for tracking sample information and location.

Also, a barcode reader quickly decodes 2D barcoded storage tubes with both single tube and full rack reading capabilities. Together with manual or automation friendly designs, barcode readers accommodate a range of throughput and tracking requirements.

In addition to tracking consumables such as barcoded storage tubes, a LIMS provides secure and integrated data management throughout the laboratory setting so that data generated by all instruments is captured and stored in a central repository. A LIMS also helps the lab automate and manage workflow and SOPs so that lab processes, such as tracking storage tubes and samples, can be more easily and effectively managed. Enterprise level Thermo Scientific LIMS are proven in the broadest range of industries, from early stage drug discovery and pharma QA/QC, to food production, oil and gas, and environmental testing.

- 4. Store:** Maximize cold storage space with dense low temperature storage and CryoBoxes with a 13 x 13 divider to double storage capacity. Thermo Scientific cold storage products offer complete, proven solutions ranging from +4°C refrigerators to -196°C cryogenic freezers that allow scientists to concentrate on their research, rather than the storage of samples. Ultra-low temperature freezers feature ultra space efficiency, fast temperate recovery after door openings, and are energy efficient. Other advances in cold storage include wireless monitoring systems for remote access that alert users when sample integrity is threatened.

For more information, visit www.thermoscientific.com



▲ Managing sample data is key in tracking samples over their lifecycle, and laboratories need a robust offering of sample management products and services to address scaling needs.

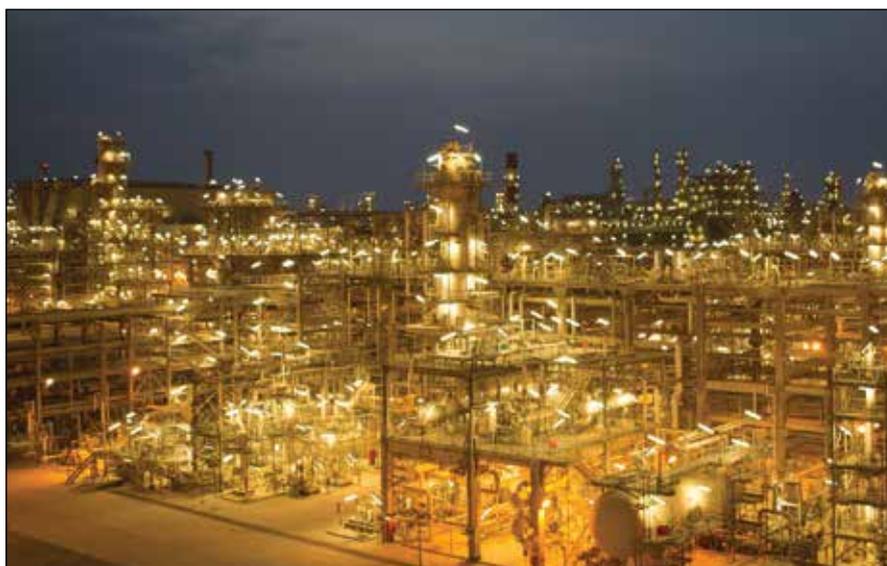
SHELL's Pearl GTL Runs on LIMS

By Colin Thurston, Thermo Fisher Scientific

There are no shortages of world records when it comes to Pearl GTL. The facility, located 80 kilometers north of Doha, Qatar, includes the largest GTL plant and one of the largest instrumentation and control systems anywhere on earth. The facility became fully operational in 2012. The project, engineered by Shell and Qatar Petroleum, has the capacity to extract 1.6 billion cubic feet of gas per day from the North Field, which can be processed into 120,000 barrels per day of condensate and natural gas liquids and 140,000 barrels per day of gas to liquids (GTL) products.

The Issues

The scale and diversity of Pearl GTL makes it an incredibly complex operation. It was clear from the beginning that Pearl GTL would need a highly sophisticated software solution to manage the data coming out of a quality control system that receives a constant stream of 34,000 transmitted measurements. These tests gauge well content, volume, emissions, equipment condition and hundreds of other issues integral to the plant's operation. In addition to collection and storage, the data also needed to be organized, integrated and analyzed to ensure product quality, plant and customer safety, environmental protection and production efficiency.



SampleManager LIMS has advanced new tools and user-interface enhancements that improve laboratory process mapping management and automation, allowing users to make logical choices about workflow, instrument integration and data reporting for management metrics or regulatory requirements.

Furthermore, Shell and Qatar needed a solution that would ensure that Pearl GTL's labs remained in compliance with standards such as ISO 17025. The ISO standard sets an international benchmark for running a testing laboratory, laying out qualifications for suppliers, training, record-keeping, equipment calibration and much more.

The LIMS Solution

Given the operation's intricacy, not just any LIMS solution would do. In addition to organizing sample results, Pearl GTL's LIMS would need to be fully integrated and communicate with a variety of other systems, including operations manage-

ment, batch tracking and ERP systems. Without full integration of the LIMS to existing enterprise systems, making a venture the size and scale of Pearl GTL successful would be nearly impossible.

Shell chose Thermo Scientific SampleManager LIMS for its hi-tech testing laboratories, standardizing on the solution across all laboratory equipment and production systems. The LIMS offered unparalleled support for each of the Pearl GTL facility's stringent requirements, and its implementation helped drive success from the very beginning.

Automation and Error Elimination

One of Shell's main reasons for choosing the LIMS was its capability to work with other systems. At Pearl GTL, the LIMS is integrated with an operations management system (known as OTTER), process historian (PI), the oil movement and batch tracking system, laboratory instruments and other production systems.

The way the LIMS integrates with PI is a particular source of efficiency for Shell and Qatar Petroleum at Pearl GTL. Where some labs manually send test results to operations, technologists and process engineers, among other users, at Pearl GTL results become available to all relevant parties within the PI system as soon as they are authorized in SampleManager.

Quicker Production and Reporting

Another critical consumer of lab data is Pearl GTL's oil movement and batch tracking system. The LIMS creates efficiencies by eliminating wait times. When panel operators need to move oil to new tanks in preparation for shipping, for example, they do not have to wait to be notified of test results, minimizing demurrage charges for loading delays that can cost as much as \$35,000 per day. Since Pearl GTL opened, the facility has incurred no demurrage charges, an incredible feat for an operation so large.

The LIMS has also enabled a paperless environment that eliminates many human errors inherent in traditional laboratories. Human beings make an average of 3 to 6 mistakes for every 1,000 lab readings transcribed. In a sampling program the size of



SampleManager's workflow capabilities simplify implementation, allowing lab managers to easily model their processes in the LIMS. As laboratory needs evolve, workflows can be modified to change with them.

Pearl GTL's, this would amount to dozens of errors – if not hundreds – every day. SampleManager solves this problem by integrating with lab instruments that automatically transmit data to the LIMS as soon as final results are produced.

From the Field to the Lab

A LIMS also helps Pearl GTL operators more proficiently collect data from the field for analysis in the lab. Using the OTTER system, all sample points in the field are marked with radio frequency identification tags. When field operators perform sample rounds, a handheld computer guides them to each sample point and then automatically records the required information, whether the sampling task is routine or non-routine.

The LIMS is fully integrated with OTTER, so the data collected in this system are instantly transferred to SampleManager from the field for analysis by managers or technicians back in the lab, saving Pearl GTL an estimated 2,400 hours worked per year.

Compliance and Safety

The LIMS enables Pearl GTL to meet an increasingly crucial requirement of oil and gas laboratories: regulatory compliance. ISO 17025 established an international standard for how sampling labs manage data collection, security, instrumentation, traceability, personnel and more. By collecting complete data records, the LIMS ensures that Pearl GTL is always in compliance with ISO 17025 and other standards. The solution also guarantees that compliance can be easily proven in the case of an audit.

The LIMS also enables Pearl GTL to ensure the ongoing safety of its workforce. Through dedication and assiduous monitoring of safety related data through its LIMS, the facility has earned an impressive safety record: Despite its enormous size, in 2010 the facility hit 77 million hours worked without a single lost-time injury.

Conclusion

Since its launch in 2006, the ambitious Pearl GTL project has operated efficiently, safely and profitably, supported by a proven, dynamic software platform. Managing such a highly refined and ambitious sampling program would have been impossible without a LIMS. The LIMS fully integrated multiple systems within the testing laboratory, including operations management, batch tracking and laboratory instruments, and extended that integration into the field where the LIMS automates data transmission via handheld devices. Today, LIMS remains a lynchpin that enables Pearl GTL to adhere to the highest standards of safety, quality, compliance and profitability.

Colin Thurston is Project Director for the Informatics Business at Thermo Fisher Scientific.

For more information, please visit www.thermoscientific.com/SM11 or email us at marketing.informatics@thermofisher.com.

ANALYTICAL

Particle Size and Shape Analyzer

EyeTech™

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- Equipped to meet any application requirement



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fastGC

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- PTR-TOF systems are capable of measuring trace gas samples in real-time with a high mass resolving power; new module adds an optional chemical separation step before the analysis
- Consists of a short GC column with an advanced heating concept for ultra-fast heating and equally fast cooling rates which makes this pre-separation step nearly real-time



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- Easy to use
- Includes installation qualification and operation qualification procedures
- Aims to meet the industry need for pharmaceutical catalyst analysis



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www.panalytical.com

UV-VIS-NIR Spectrophotometer

UV-3600 Plus

BOOTH 3121

- Equipped with three detectors—PMT (photomultiplier tube) for ultraviolet and visible regions, and InGaAs and cooled PbS detectors for the near-infrared region—to ensure high sensitivity across the entire measured wavelength range
- Compared to spectrophotometers with only PMT and PbS detectors, significantly reduces noise level to assure high-accuracy measurements across the entire wavelength range
- Provides a wavelength range of 185 to 3,300 nm



Shimadzu

www.ssi.shimadzu.com

Fluorescence Spectrometer

FluoroMate FS-2

BOOTH 711

- Delivers a high resolution measurement with minimum 0.5 nm spectral bandwidth
- Features high sensitivity, better than 4000 : 1 (RMS)
- Includes software for complete analysis with various method settings and intuitive UI
- Extends versatility in sample measurement with comprehensive accessories
- Offers a spectroscopic window into molecular properties and behavior
- Meets the demands for both research and routine lab analysis for a wide range of applications



Scinco

www.scinco.com

Electrochemical Detector

CE 4720

BOOTH 3700

- May be added to Cecil Instruments’ modular Adept and Q-Adept HPLC and IonQuest ion chromatography systems
- Can also be used with third-party liquid chromatography systems, as control is through the detector’s stand-alone control keys
- Features three modes: DC, scanning DC and pulsed amperometric
- Sensitivities of 10 –15 mol are achievable with ease and simplicity



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www.cecilinstruments.com

Laboratory and Process Analyzers

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- Detect impurities in hydrocarbon streams using dry colorimetry technology
- Serve the petrochemical, chemical, food & beverage and biofuels industry for online or laboratory settings
- Majority of impurities are measured at ultralow PPB levels in gas or liquid and use ASTM and UOP methods where applicable
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MEMS-based Gas Chromatograph

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- Reports the chemical name and concentration right to the screen and stores every chromatogram on a micro-SD card
- Enables lab quality results in the field at the site where the samples are taken



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Automated Chemistry Analyzer

OI Analytical FS 3700

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- Suited for running samples to perform ongoing daily monitoring for water quality and/or regulatory compliance in wastewater facility or environmental lab setting
- Can improve productivity in measuring cyanide, nitrate/nitrite, phosphate, Total Kjeldahl Nitrogen (TKN), ammonia and many other parameters
- Modular hardware allows FIA and/or SFA methods to be run interchangeably on the same unit



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- Feature high resolution for the UV, VIS, and NIR ranges
- Suited for integration into portable instruments for laser induced breakdown and Raman spectroscopy due to their small size and robust performance
- Can be configured in a large number of ways, supporting several commonly-used CCD and CMOS detectors, as well as the option for scientists to use their own electronics with the spectrometer



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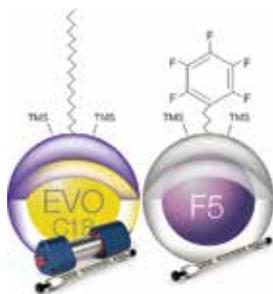
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HPLC/UHPLC Columns

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Phenomenex

www.phenomenex.com

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- Series includes the ICPE-9810 (axial) and ICPE-9820 spectrometers (dual view)
- Feature a photometric system ideal for analyzing a large variety of samples
- Allow for simultaneous analysis of trace and high-concentration samples without concern for contamination by simply switching between axial and radial views
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Portable Raman Spectrometer

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- Features deeper TE cooling and tablet synchronization capabilities than regular i-Raman series instruments
- A high quantum efficiency CCD array detector, innovative smart spectrometer technology, and high dynamic range allow this unit to deliver an improved signal to noise ratio
- Small footprint, lightweight design, and low power consumption provide research-grade Raman capabilities anywhere



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www.bwtek.com

UV-Vis UV Spectrophotometer Sensors

YSI

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- Measure numerous parameters as part of an IQ SensorNet system
- Can measure a broad spectrum (256 wavelengths for each measurement) for increased accuracy
- Are reagentless and have built-in UltraClean® ultrasonic cleaning, both features enabling lower maintenance requirements over the life of the sensor
- YSI also offers single wavelength sensors available for certain parameters



Xylem

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Combustion Elemental Analyzer

CS844LS

BOOTH 1717

- A low sulfur version of the market-leading CS844 combustion elemental analyzer
- Incorporates a sulfur trap to enhance detection limits and precision, minimizing cycle time and maintenance needs
- High-efficiency combustion furnace offers the efficient combustion of a wide variety of samples and minimizes clean-up
- Features a high-velocity HEPA vacuum system, 10- and 60-position sample autoloaders, and Cornerstone® brand software



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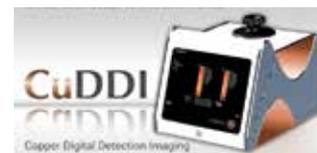
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Copper Digital Detection Imaging

VISAYA

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- Using a high-resolution camera with optical intelligence, CuDDI identifies exact levels of corrosivity present from petroleum through a 4-step automated vision algorithm and classification process
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- Allows the simultaneous analysis of small molecules and megadalton proteins on one analytical platform
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www.bruker.com

Core-Shell HPLC Columns

SpeedCore PH Plus
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- Offer users the ability to work at low, mid, or high pH on a core-shell column
- Provide ultra-high efficiencies whilst expanding the ability to use pH range as a method development tool
- Now offer an expanded pH range from pH 1-12, meaning no buffer or pH limitations
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PRODUCT SPOTLIGHT

BLUETOOTH BOOST

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Lab professionals who love Bluetooth will be particularly happy with Hanna Instruments' recent release of the world's first professional pH probe with Bluetooth® Smart (Bluetooth® 4.0) technology.

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"Part of our philosophy involves making science accessible to the masses," said Michelle Salisbury, applications manager for Hanna Instruments. "The HALO does exactly that. It has the potential to be a real game changer [as it] makes it easier and more affordable than ever to do pH measurements. Home users, schools, laboratories ... virtually anyone can perform accurate pH measurements with an iPad, the Hanna Lab App, and HALO."

The app itself allows users to turn their iPads into full-featured pH meters when used with the HALO. That means they can perform calibration, measurement, continuous data logging, graphing, and data sharing on their tablets. Measurement and logging of pH and temperature at one second intervals start as soon as the probe is connected and those measurements can be displayed with tabulated data or as a graph. The graph can be panned and zoomed with the iPad's pinch-to-zoom technology for better viewing.

For more information, visit www.hannainst.com

BASIC LAB

Ductless Fume Hood

Purair 20
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- A face velocity at 100 fpm ensures containment of fumes and an alarm will alert the operator when the airflow falls to an unacceptable level
- All mechanisms in the head section of the Purair 20 are on the clean side of the filter, thus preventing contamination
- Work area has a removable spillage tray which can be easily cleaned



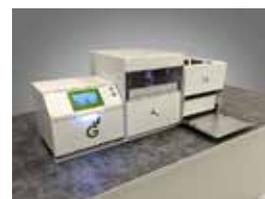
Air Science USA

www.airscience.com

Automated Pipette Tip Washer

TipNovus™
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- Enables labs to wash and sanitize contaminated pipette tips in large quantities for reuse
- Offers labs a choice to re-use plastic pipette tips several times; cutting associated consumable costs by up to 90%
- Uses a unique method of washing and sanitation that is safe for both the lab and the environment
- Provides a throughput of 24 tip racks/hour; 2,304 tips/hour



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www.grenovasolutions.com

Sample Prep Station

PrepEngine
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- Developed through collaborations with leaders in the pharmaceutical and biotech industry to speed up the sample preparation process
- This 10-station system can prepare content uniformity samples or assays up to 90% faster than conventional methods
- Provides adjustable speed from 100 to 6000 rpm and run times from 5 seconds to 30 minutes



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Vapor Delivery Modules

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- Incorporate a (thermal or Coriolis) liquid flow controller, one or two mass flow controllers for carrier gas and a temperature-controlled mixing and evaporation device
- Feature a 1.8" TFT display and push-buttons for local readout and control
- Can generate vapor flows within the range of 100 sccm up to 10 SLM



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Universal Steel Laboratory Cabinet

Panorama

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- Engineered using an innovative design process
- Part of a new line of high-quality steel casework that provides a wide variety of sizes and styles that are field-convertible
- New Mistral fume hood is also available, providing excellent safety and reliability to maximize containment of gases, fumes and vapors within the laboratory environment



Hamilton Scientific

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Atomic Force Microscope

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- Utilizes a self-detecting cantilever, eliminating the need for tedious laser alignment
- Proprietary intelligent scanning (SIS) provides excellent data accuracy
- Seamless operation via auto measurement: features include high-speed Q-curve, auto-approach, and parameter optimization, offering true point-and-click results for sample topography and phase imaging
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Class II, Type C1 Biosafety Cabinet

Purifier® Axiom™

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- Can function as a Type A2, which recirculates air back into the laboratory, and as a Type B2, which is ducted to the outside
- Offers an Omni-Flex design, allowing the cabinet to be installed in a Type A mode when not working with chemical hazards or in a ducted Type B mode when the application changes for using hazardous vapors



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- Replace existing fluidic control systems such as manifolds installed with multi isolation valves and are being widely used for various new fluidic control projects and innovations
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1,200°C Tube Furnaces

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- Offer an extensive range of compact split and non-split tube furnaces for laboratory use
- Available with heated lengths of 150, 300, 450 and 600 mm and a maximum tube diameter of 60 mm
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Filtered Fume Hood

Protector® Echo™

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- Unit's sensor package, backup filters and optional g-Guard® remote monitoring software are intended to work with a broader range of chemicals than other ductless enclosures
- In the event of chemical breakthrough or loss of airflow, an alarm sounds and the communication system alerts a designated email address
- Allows a designated safety officer to be made aware of problems through an Internet-enabled mobile device



Labconco

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Glassware Washer

G7825 Standard

BOOTH 3319

- Cleans a wide variety and large volumes of glassware, making it a customized solution for the education market, but still well-suited to any laboratory
- Provides high throughput at a competitive price while being extremely user-friendly
- Profitronic interface offers fast programming and ease of use
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Professional Waterproof Portable Meters

HI9819X Series

BOOTH 3619

- Designed to measure pH, ORP, ion concentration with an ISE, conductivity (EC), and dissolved oxygen (DO)
- Series includes the HI98190 (pH/ORP), HI98191 (pH/ORP/ISE), HI98192 (EC/TDS/resistivity/salinity), and HI98193 (DO/barometric pressure/BOD) models
- Feature a large backlit graphic LCD that is easily viewed under any lighting condition
- All meters have dedicated keys for routine functions



Hanna Instruments

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Correlative Microscopy Stage

Linkam CMS196

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- Allows scientists to keep a sample vitrified at a constant -196°C in its own chamber, avoiding contamination, while enabling the full workflow of CLEM
- Up to three electron microscopy grids can be placed on a specially-designed cassette
- Cassette can be easily and safely transported from the observation chamber—without contamination or devitrification—to an electron microscope for further analysis



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Fume Hood

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- UL 1805 listed, tested to ASHRAE 110 standards, provides containment at face velocities as low as 60 fpm and is designed for multiple applications
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Mott Manufacturing

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MEX-AAF

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- Newly-designed rectangular 10" by 19" hood profile allows for exhaust capture from dual oven ports in close proximity
- Features a 17" vertical adjustment, 10" horizontal extension capability and 180° swiveling wall mount for quick and easy repositioning



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- Provides a simple yet effective means of eliminating any static charge that can affect the accuracy of the user's measurement, when used in conjunction with NRD's proprietary Staticmaster® 2U500 Alpha ionizing cartridge
- Includes a 72" ground wire and plug adapter
- The only self-powered static eliminator available today that yields a "zero volts" balanced output to completely eliminate electrostatic charge



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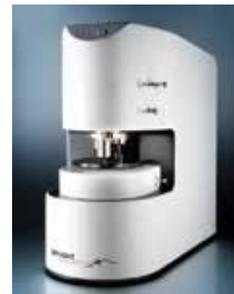
www.NRDPrecisionWeigh.com

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- Outperforms existing Fourier Transform Infrared (FTIR) microscopes in traditional metrics such as spatial resolution, speed, and field-of-view (FOV)
- Enables new modalities such as live absorbance contrast imaging and sparse data collection
- Features a small desktop footprint and the elimination of cryogenic cooling
- Offers a modern data collection and analysis workflow through its ChemVision™ software



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LC/MS Membrane Nitrogen Generator

NitroFlow 60

BOOTH 3836

- Self-contained nitrogen generator is capable of producing up to 60 slpm of pure LC/MS grade nitrogen at pressures of up to 110 psig
- Suited for multiple LC/MS and new LC/MS instruments requiring high flow
- Output flow produced by the unit is equivalent to using one cylinder of compressed gas every two hours



Parker Balston

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High Pressure Hydrogen Generators

H2PEM-PD

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- Produce up to 1,300 cc/minute of 99.99999+ % pure hydrogen
- Eliminate dangerous and expensive cylinders of hydrogen fuel gases and helium carrier gases
- Allow users to supply, control, and automate all hydrogen gas supplies
- A single generator can support up to as many as 20 instruments with fuel and carrier gas
- Suited for fast, ultra-fast and flash GC requirements



Parker Balston

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General Purpose Water Baths

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- Combine exceptional temperature control with full-featured digital functionality and ease of operation
- Designed to accommodate a wide variety of clinical and laboratory applications
- Maintain bath temperatures from ambient $+5^{\circ}$ to 99°C with $\pm 0.1^{\circ}$ stability and $\pm 0.2^{\circ}\text{C}$ uniformity
- Available with 2, 5, 10, 20, or 28 liter single chamber reservoirs



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E-capper

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- Produces top quality seals and minimizes the risk of repetitive strain injuries in operators tasked with sealing deep well microplates or storage tube racks with re-useable cap mats
- Applies firm even pressure simultaneously across the whole cap mat, ensuring a tight even fit across the plate or rack
- Delivers perfect sealing time after time, thereby ensuring sample integrity



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CO2 Incubators

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- Allow scientists to maximize their productivity with excellent reproducibility, reliability and efficiency
- ISO class 5 HEPA filters protect against airborne microbes and particulates
- Steri-Run, a fully automatic on-demand overnight 180°C sterilization cycle assures uniform 6-log high-temperature sterilization on all surfaces
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Thermo Fisher Scientific

www.thermoscientific.com

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- Provides higher speed and higher throughput analyses of up to four independent samples
- Features built-in flow and optional vacuum sample preparation, extended Dewar life, and a more robust cryogen level control, coupled with a new sleek look, and user-friendly touchscreen
- Both the standard and the advanced LX models are offered with one, two, three, or four sample stations and five gas input ports



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Ultracentrifuge

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- Allows researchers to easily protect samples while achieving reliable and consistent results
- Offers up to 100,000 rpm performance in a small footprint to maximize space in the lab
- Provides lightweight and fatigue-resistant Thermo Scientific Fiberlite carbon fiber rotors
- Includes automatic tube balancing compensation, which accelerates sample preparation by allowing visual sample balancing up to 5 millimeters



Thermo Fisher Scientific

www.thermoscientific.com

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E^{max}

BOOTH 3818 & 3819

- The combination of high friction and impact results in extremely fine particles within the shortest amount of time
- High energy input is a result of a speed of 2000 min⁻¹ and the jar design
- A water cooling system allows the high energy input to be effectively used for the grinding process without overheating the sample



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www.retsch.com

-40°C Blast Freezers

XBF40 Series

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- Provide rapid cooling during the sample preparation process, prior to freezer storage
- Available in two options: the XBF40D-MD, designed for rapid plasma freezing, and the XBF40D, for general-purpose applications
- Helps researchers save time during sample preparation and is also economical, versatile and easy to use
- Adjustable shelves allow users to place various types of containers



Thermo Fisher Scientific

www.thermoscientific.com

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Essential Weights

BOOTH 2408

- Designed with convenience in mind without sacrificing precision
- Available in sets of three or four stainless steel test weights specifically tailored to the user's balance
- Pharmaceutical and laboratory professionals can benefit from being able to customize configurations ideal for specific calibration, shift test, and sensitivity tests
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Multiparameter Handheld Meter

YSI ProDSS

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- Adds turbidity measurement as an option to the handheld line
- Incorporates universal ports, a color display, as well as smart sensor technology
- Smart sensors enable automatic configuration of the sensor when installed, and those configurations stay with the sensor—even if removed from the instrument—providing ultimate flexibility



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Snap-N-Spike® and Snap-N-Shoot®

BOOTH 2419

- New solution-based certified reference materials (CRMs) of seven Cannabis biomarkers have been released—cannabidiol (CBDV), cannabigerol (CBG), cannabigerolic acid (CBGA), cannabichromene (CBC), cannabidiolic acid (CBDA), delta9-tetrahydrocannabinolic acid A (THCA-A), and tetrahydrocannabinol (THCV)
- Suitable for use in Cannabis testing applications by GC, GC-MS, HPLC, or LC-MS-MS, including potency testing, cannabinoid and impurity profiling, pharmaceutical research, or forensic analysis



Cerilliant

www.cerilliant.com

PBDE Standards

BOOTH 4000

- Chem Service offers 95 percent of its chemicals with a 98 percent purity or higher, so there is no need for purity correction
- The Environmental Protection Agency has consistently added to its significant new use rules on PBDEs (polybrominated diphenyl ethers) in the past decade
- PBDEs are commonly used as fire retardants in a variety of products



Chem Service

www.chemservice.com

HPLC Solvents

BOOTH 4305

- High purity solvents are low residue and low water
- Provide low UV-absorbance
- Assure optimum sensitivity and long-term stability
- Distilled and purified
- HPLC acetonitrile, methanol, and ethanol solvents available



Concord Technology

www.tjconcord.com.cn

Pharmaceutical Primary Reference Standards

BOOTH 2522

- Are high purity, fully characterized, and satisfy the requirements of the International Conference on Harmonisation of Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH) and Food and Drug Administration (FDA)
- Produced under ISO Guide 34 and accompanied by a comprehensive certificate of analysis
- Detailed assay data obtained by qNMR and other accredited techniques is also included



LGC Standards

www.lgcstandards.com

NFκB Translocation Kit

Amnis®

BOOTH 2017

- Permits quantitative, statistically-robust assessment of NFκB translocation
- Allows for analysis at single-cell level
- Optimized and designed for Amnis® imaging flow cytometers
- Uses imaging flow cytometry to obtain statistically significant quantitative assessment of NFκB translocation
- Works with cultured cell lines and whole blood cells



EMD Millipore

www.emdmillipore.com

Reference Materials

BOOTH 3605

- Available for a range of applications including density, flash point, liquid color, refractive index, TAN/TBN, and viscosity standards
- Paragon holds dual accreditation status under the United Kingdom Accreditation Service (UKAS) to international standards of ISO 17025 and ISO Guide 34, ensuring a high level of quality assurance on a global scale
- Feature some of the lowest levels of uncertainty of measurement available



Paragon Scientific

www.paragon-sci.com

30 mL Shots for ICP and ICP-MS Standards

Plasma Shots®

BOOTH 2428 & 2429

- For ICP and ICP-MS grade single elements standards
- Deliver high quality in a smaller volume so users will have less waste and expired materials
- Same day shipping available and no hazardous shipping costs
- Offer accreditation by A2LA under ISO 17025 and ISO Guide 34



SPEX CertiPrep

www.spexcertiprep.com

QuEChERS Kits

SiliaQuick™

BOOTH 1346

- Provide efficient and reliable performance even at very low residue concentration
- Mean decreased money and time spent on sample preparation
- Offer convenient packaging for extra productiveness



Silicycle

www.silicycle.com

INFORMATICS

Liquid Handler Software

ArtelWare v1.2

BOOTH 2440

- Adds sophisticated tools for liquid handler monitoring with Artel's MVS® Multichannel Verification System
- New, color-coded heat maps for relative inaccuracy and %CV allow users to view performance trends over the microplate
- Also features ability to export any performance trending graphs to a variety of formats, delivering visual data to decision-makers and supporting compliance reporting needs



Artel

www.artel-usa.com

Chemical and Sensory Software

AroChemBase V5

BOOTH 4110

- Provides a direct link between user's chromatograms and an enlarged library of chemical and sensory data
- Makes compound characterization easier and more reliable
- Allows users to refine their searches with the multi-criteria search engine, save search results, or add their own data
- Designed for any GC or GC-MS brand

Alpha M.O.S

www.alpha-mos.com

Laboratory Information Management System

Matrix Gemini

BOOTH 2837

- More than an easily-configurable LIMS for a variety of laboratories and applications
- Provides a systematic quality management resource for tracking, storage, auditing, and reporting of data across all segments of a business or company
- 'OneTime configuration tools' allow this LIMS to be configured without the use of custom programming or esoteric basic scripting tools



Autoscribe Informatics

www.autoscribeinformatics.com

Research Discovery Application

SciFinder®

BOOTH 2731

- Provides access to the world's most comprehensive and authoritative source of chemistry and related scientific information
- Scientists use SciFinder's extensive suite of tools to find the references, substances, and reaction information critical to their research discovery efforts
- Enables users to increase productivity, achieve faster breakthroughs, and make better decisions



Chemical Abstracts Service

www.cas.org

Chromatography Software

Clarity version 5.0.5

BOOTH 4211

- Now enables both direct instrument control and digital data acquisition for Hitachi Chromaster and Primaide HPLC systems with the release of new control drivers
- Hitachi drivers will be available in selected territories through Hitachi official partners
- Features an intuitive approach, excellent performance, cost-effectiveness and proficient technical support



DataApex

www.dataapex.com

Cartridge Extractor Software

SmartPrep® version 2

BOOTH 1547

- Validated software is designed for the SmartPrep Extractor cartridge-based solid phase extraction (SPE) system
- Further simplifies SPE processes by expanding on small volume loading and sample cleanup techniques for testing within the food safety/packing migration, environment and health monitoring, as well as agriculture/animal health markets
- Manual SPE methods for standardized FDA, USDA, EPA, and AOAC methods can be converted for use with the SmartPrep extractor



Horizon Technology

www.horizontechinc.com

Laboratory Information Management System

LabVantage

BOOTH 2937

- Allows users to run their labs more efficiently and with fewer errors by automating tasks and integrating with instruments and systems
- Can adapt to changing business needs after initial implementation
- Comes standard with features essential to laboratory operations
- Able to support hundreds of concurrent users as well as interface with most instruments



LabVantage Solutions

www.labvantage.com

Control Software for Atomic Spectroscopy

Syngistix™

BOOTH 1026

- Cross-platform instrument control solution enables lab professionals conducting inorganic elemental analyses to work seamlessly across multiple techniques and enhance their productivity
- Provides workflow-based navigation with a modern user interface harmonized across all PerkinElmer atomic spectroscopy techniques
- Features a unique icon-based design that simplifies navigation and walks the user through every step of the analysis



PerkinElmer

www.perkinelmer.com

LAB AUTOMATION

Microwave Digestion System

Discover SP-D Gold

BOOTH 2509

- Provides lab personnel with a fully automated option for preparing difficult sample matrices such as crude oil, polymers and aromatic compounds
- Can operate at temperatures of up to 300C and pressures to 700 psi
- Provides the necessary conditions to completely digest the sample and provide a clear solution for analysis
- Easy to use



www.cem.com

CEM

GC Autosampler

PALARUS™

BOOTH 2125

- Offers: servo motor drive; simultaneous x-y movement; fast, software programmed injection; Ethernet or USB connection; internal PAL BUS with Windows; HiDef hand control or virtual PC terminal; and 324 vial capacity
- Configured to be an integrated companion to Falcon's CALIDUS GC
- Provides a huge efficiency boost to the user



www.falconfast.net

Falcon Analytical

Liquid Solution Production System

Revo

BOOTH 729

- Smart, adaptable and fully automated
- Offers complete control over measuring and mixing solid and liquid compounds, and over environmental constraints, including sterility
- Allows users to order and customize solutions remotely using its web or mobile interface, and notifies users when they have been filtered, securely dispensed, and are ready to be collected
- Provides excellent process integration and data transparency



www.labminds.co

LabMinds

Automated Tube Labeler

Sci-Print VX2

BOOTH 1104

- Can label a variety of tubes including microtubes, cryovials and vacutainers ranging in size from 0.5 ml to 50 ml
- Small footprint saves valuable space in the lab
- Helps increase productivity and efficiency in the lab
- Provides valuable walk-away time to attend to other important tasks
- Eliminates human error and ensures consistency of label placement



www.scinomix.com

Scinomix

LIFE SCIENCE

Reactor

MiniBlock

BOOTH 1346

- Acts as the central platform in advanced systems for parallel synthesis
- Patented valve mechanism enables simultaneous bottom drainage of all reaction vessels, aided by the use of vacuum and pressure
- Offers full internal Flow-through parallel processing of chemical reactions
- Specially designed for parallel synthesis and screening reactions
- Compact, flexible, and modular design easily fits into users' workflows



SiliCycle

www.silicycle.com

Compact Flow Cytometer

CytoFLEX

BOOTH 337

- Delivers high sensitivity and resolution for excellent fluorescence and nanoparticle detection
- Fits in a 16-inch square bench space and weighs just 50 pounds
- Offers up to 21 configurations, from basic setup to a multi-color, multi-laser sophisticated analyzer
- Patent-pending optical design optimizes excitation and light collection efficiency from up to three lasers (405, 488 and 638 nm)



Beckman Coulter

www.beckmancoulter.com

Multichannel Fiberoptic System

Art Photonics FluDuoFiber

BOOTH 2743

- Modular platform of the system allows users to change LED and diode lasers for different excitation wavelengths—with correspondent filter changes in PMT channels
- Dual channel system and correspondent fiber probes can be also modified to triple or more channels and can be customized not only for its use in lab, but for a broad variety of other applications



Electro Optical Components

www.eoc-inc.com

Protein Detection System for IHC

SNAP i.d.® 2.0

BOOTH 2017

- Streamlines immunohistochemistry workflows and significantly decreases slide handling time
- Enables parallel processing of up to 24 tissue slides at a time, reducing process variability
- Applies proven vacuum-driven technology to remove reagents from tissue sections, in seconds
- Intuitive format reduces slide handling and speeds wash steps during blocking, washing, antibody incubation, and labeling



EMD Millipore

www.emdmillipore.com

Life Science Products

VTS, MicroTS, and Co-Mix
BOOTH 318

- Current portfolio includes heat-sealing solutions for microplates, with the VTS microplate heat sealer and its compact counterpart, the MicroTS
- PCR plates and deep-well plates (including unique film and foil seals), and tube pickers for microtubes are also offered
- Vitl also offers the Co-Mix combined mixer and vortexer, which allows users to utilize both functions simultaneously



Vitl Products

www.vitlproducts.com

SUPPLIES & CONSUMABLES

Reciprocating Seal for SFC

BOOTH 1230

- Suitable for pressures at 6,000 psi and above
- Reciprocating flange seal with a PEEK backup ring combines proven canted coil spring energizer technology and advanced polymer formulation ideal for CO₂ pumps used in supercritical fluid chromatography (SFC)
- Designed to handle temperatures as low as 5°C
- Engineered to operate effectively at both the low and the high pressures inherent in SFC



Bal Seal Engineering

www.balseal.com

Flash Purification Cartridges and Samplers

SNAP ULTRA C18

BOOTH 1811

- Optimized for use with Biotage ACI™ and Isolera™ flash systems and are available in 12g, 30g, 60g, 120g, 400g, 950g and 1,850g cartridge sizes
- Enable chemists to load 2-3% weight percentage of samples onto reversed phase columns, a marked improvement when compared to the currently typical 0.5-1% loads



Biotage

www.biotage.com

High Performance UVC LEDs

Optan

BOOTH 4311

- Provide high light output and spectral quality to provide increased measurement accuracy over a wide concentration range
- Offered in peak wavelengths from 250 – 280 nm and power bins from 0.5–4 mW
- Suited for spectroscopic applications in analytical and life sciences instrumentation
- Reliability and long lifetimes allow for uninterrupted, continuous operation while reducing the overall cost and footprint for the end user



Crystal IS

www.cisuvc.com

Glassware

BOOTH 1305

- Glassco specializes in volumetric, jointed, and filtration glassware
- Manufactured from ASTM E -438 TYPE-1 CLASS A (BORO 3.3)
- Made as per DIN EN ISO, ASTM AND USP standards



Glassco

www.glasscolabs.com

Atomic Absorption Lamps

BOOTH 3901

- Priced for budget-conscious labs where AA spectroscopy instrumentation is used
- Provide stable light output over the entire lamp life
- Made in Japan and all connectors on the wires are exactly the same as the OEM instrumentation that they fit into, such as Shimadzu and Hitachi
- Can be used in a spectrometer to determine different elements in solution



JM Science

www.jmscience.com

IVD Products

Minitubes

BOOTH 1223

- Minitubes draws its own tubing, providing users with smooth ID, the least variation in ID and OD dimensions in almost whatever metal material is required
- Allows improved precision in sampling for seamless capillary tubing, needles, and other tubing used in LC-GC and UHPLC
- Minitubes can fabricate components such as sample needles and loop capillaries in-house



Minitubes

www.minitubes-usa.com

Laboratory Glassware

BOOTH 831

- Normax is an ISO 9001:2000 certified manufacturer of scientific glassware with over 60 years of expertise and several certifications issued by SGS- ISO 9001:2008, ISO 13485 and CE 0120
- Company specializes in Pasteur pipettes, petri dishes, volumetric articles (such as volumetric flasks, graduated pipettes, measuring cylinders, burettes) with batch certification, watch glasses, and desiccators, and many more lab products are offered



Normax

www.normax.pt/EN

SVOC Certified Reference Materials

BOOTH 3626

- Essential for accurate measurements of semi volatile organic compounds (SVOCs) in indoor air and emission testing
- VSL provides traceable primary gas standards for users' analyses and quality control
- Fulfil ISO 17025 and ISO guide 34 and are accredited by the Dutch accreditation council
- A large selection of components and concentrations from styrene to phthalates is available



VSL

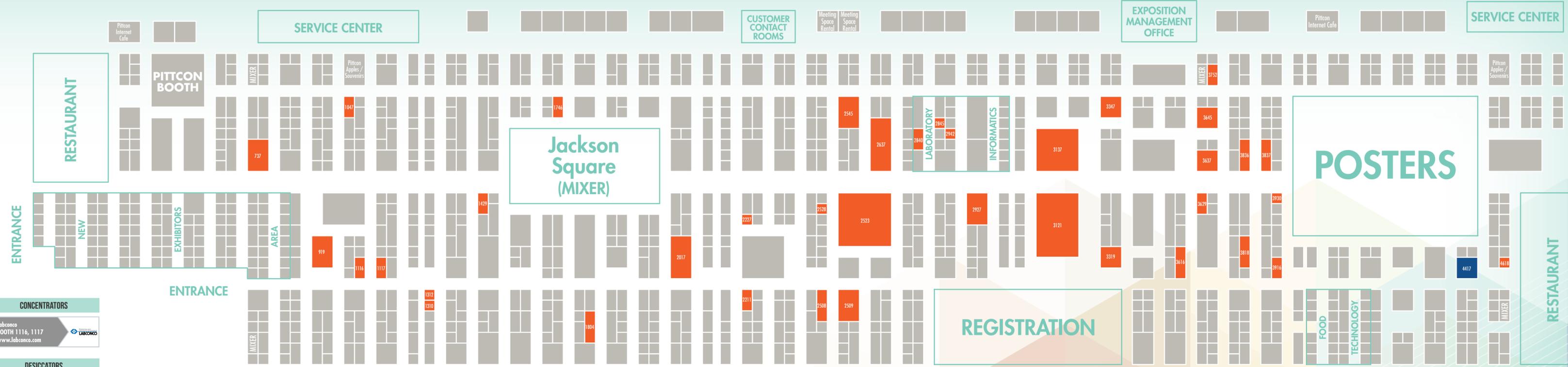
www.vsl.nl/en

LabManager

PITTCON

20 ERNEST N. MORIAL CONVENTION CENTER 15

BOOTH 4417
New Orleans, LA



ANALYTICAL INSTRUMENTS

- Metrohm BOOTH 2637
www.metrohmusa.com
- Shimadzu BOOTH 3121
www.ssi.shimadzu.com
- SPECTRO BOOTH 1746
www.spectro.com
- Thermo Fisher Scientific BOOTH 2523
www.thermoscientific.com
- Waters Corporation BOOTH 3137
www.waters.com

BALANCES/SCALES

- Adam Equipment BOOTH 3916
www.adamequipment.com
- Shimadzu BOOTH 3121
www.ssi.shimadzu.com

BATHS/CIRCULATORS

- Julabo BOOTH 2227
www.julabo.com/us
- PolyScience BOOTH 919
www.polyscience.com
- Thermo Fisher Scientific BOOTH 2523
www.thermoscientific.com

CHILLERS

- Julabo BOOTH 2227
www.julabo.com/us
- PolyScience BOOTH 919
www.polyscience.com
- Thermo Fisher Scientific BOOTH 2523
www.thermoscientific.com

CHROMATOGRAPHY

- Metrohm BOOTH 2637
www.metrohmusa.com
- Phenomex BOOTH 3637
www.phenomex.com
- Shimadzu BOOTH 3121
www.ssi.shimadzu.com
- Thermo Fisher Scientific BOOTH 2523
www.thermoscientific.com
- Waters Corporation BOOTH 3137
www.waters.com

CHROMATOGRAPHY ACCESSORIES

- Phenomex BOOTH 3637
www.phenomex.com
- Waters Corporation BOOTH 3137
www.waters.com

CONCENTRATORS

- Labconco BOOTH 1116, 1117
www.labconco.com
- PolyScience BOOTH 919
www.polyscience.com

DESICCATORS

- W.A. Hammond
www.drierite.com

EVAPORATORS AND DRYERS

- Genevac Ltd.
www.genevac.com
- Glas-Col BOOTH 3616
www.glascol.com
- KNF Neuberger BOOTH 2211
www.knfusa.com
- Labconco BOOTH 1116, 1117
www.labconco.com

FORENSIC EVIDENCE DRYING CABINETS

- Labconco BOOTH 1116, 1117
www.labconco.com

FREEZE DRYERS/ LYOPHILIZERS

- Labconco BOOTH 1116, 1117
www.labconco.com

FREEZERS/REFRIGERATORS

- Eppendorf BOOTH 2927
www.eppendorfna.com
- Nor-Lake BOOTH 3629
www.norlake.com
- NuAire BOOTH 3752
www.nuaire.com
- RURO BOOTH 2942
www.ruro.com

FUME HOODS

- AirClean BOOTH 737
www.aircleansystems.com
- Labconco BOOTH 1116, 1117
www.labconco.com
- Mystaire BOOTH 2508
www.mystaire.com
- NuAire BOOTH 3752
www.nuaire.com

GAS GENERATORS

- Parker Balston BOOTH 3836, 3837
www.labgasegenerators.com
- PEAK Scientific BOOTH 3347
www.peakscientific.com
- Proton OnSite
protononsite.com

GLOVE BOXES

- Labconco BOOTH 1116, 1117
www.labconco.com
- NuAire BOOTH 3752
www.nuaire.com

HPLC INSTRUMENTS & ACCESSORIES

- Phenomex BOOTH 3637
www.phenomex.com
- Waters Corporation BOOTH 3137
www.waters.com

HPLC SYSTEMS

- Metrohm BOOTH 2637
www.metrohmusa.com
- Shimadzu BOOTH 3121
www.ssi.shimadzu.com
- Thermo Fisher Scientific BOOTH 2523
www.thermoscientific.com
- Waters Corporation BOOTH 3137
www.waters.com

INCUBATORS

- NuAire BOOTH 3752
www.nuaire.com
- Eppendorf BOOTH 2927
www.eppendorfna.com
- Thermo Fisher Scientific BOOTH 2523
www.thermoscientific.com

INFORMATICS (CDS, ELNS, & LIMS)

- BIOVIA BOOTH 2840
www.bds.com/biovia
- LabAnswer BOOTH 2845
www.labanswer.com
- RURO BOOTH 2942
www.ruro.com
- Thermo Fisher Scientific BOOTH 2523
www.thermoscientific.com
- LabX BOOTH 4417
www.labx.com
- LabX Media Group BOOTH 2545
www.labxmediagroup.com
- The Scientist BOOTH 4417
www.the-scientist.com

LAMPS

- Sonntek BOOTH 3930
www.sonntek.com

LIQUID HANDLING

- Drummond BOOTH 2637
www.drummondsci.com
- Metrohm BOOTH 2637
www.metrohmusa.com
- Sarstedt BOOTH 2927
www.sarstedt.com

MASS SPECTROMETRY

- Shimadzu BOOTH 3121
www.ssi.shimadzu.com
- Thermo Fisher Scientific BOOTH 2523
www.thermoscientific.com
- Waters Corporation BOOTH 3137
www.waters.com

MEDIA/PUBLISHING

- Lab Manager BOOTH 4417
www.labmanager.com
- LabWrench BOOTH 4417
www.labwrench.com
- LabX BOOTH 4417
www.labx.com
- LabX Media Group BOOTH 2545
www.labxmediagroup.com
- The Scientist BOOTH 4417
www.the-scientist.com

MICROPLATE TECHNOLOGY

- BioTek BOOTH 2840
www.biotek.com
- Genevac Ltd.
www.genevac.com

MICROWAVE DIGESTERS

- CEM BOOTH 2509
www.cem.com
- Milestone BOOTH 2545
www.milestonesci.com

MILLS, SIEVES AND GRINDERS

- Retsch BOOTH 3818
www.retsch.com

MOISTURE ANALYZERS

- Adam Equipment BOOTH 3916
www.adamequipment.com

OVENS

- BINDER BOOTH 1429
www.binder-world.com
- Eppendorf BOOTH 2927
www.eppendorfna.com

PIPETTES

- BrandTech Scientific BOOTH 1312
www.brandtech.com
- Drummond BOOTH 2637
www.drummondsci.com
- Eppendorf BOOTH 2927
www.eppendorfna.com

PLASTICWARE

- BrandTech Scientific BOOTH 1312
www.brandtech.com
- Sarstedt BOOTH 2927
www.sarstedt.com

POWER SUPPLIES

- Universal Electric
www.aecorp.com

SAMPLE PREP FOR CHROMATOGRAPHY

- Metrohm BOOTH 2637
www.metrohmusa.com
- SPECTRO BOOTH 1746
www.spectro.com

SERVICE PROVIDERS

- UNITY Lab Services BOOTH 2523
www.unitylabservices.com

SHAKERS

- Eberbach BOOTH 1429
www.eberbachlabtools.com
- Eppendorf BOOTH 2927
www.eppendorfna.com
- Julabo BOOTH 2227
www.julabo.com/us

SPECTROPHOTOMETERS

- Shimadzu BOOTH 3121
www.ssi.shimadzu.com
- SPECTRO BOOTH 1746
www.spectro.com

TITRATORS

- Metrohm BOOTH 2637
www.metrohmusa.com

USED/PRE-OWNED EQUIPMENT

- Conquer Scientific BOOTH 4618
conquer-scientific.com
- International Equipment Trading Ltd.
www.ielttd.com
- BrandTech Scientific BOOTH 1312
www.brandtech.com
- KNF Neuberger BOOTH 2211
www.knfusa.com
- VACUUBRAND BOOTH 1310
www.vacuubrand.com

WATER PURIFICATION & FILTERS/FILTRATION

- Aries FilterWorks BOOTH 1047
www.arieswater.com
- ELGA BOOTH 1804
www.elgalabwater.com
- END Millipore BOOTH 2017
www.emdmillipore.com
- Labconco BOOTH 1116, 1117
www.labconco.com
- Thermo Fisher Scientific BOOTH 2523
www.thermoscientific.com

LabManager®

THE BIG BUT NOT SO EASY QUIZ



NOT AT PITTCON? Play online at www.LabManager.com/PittconQuiz.com
Contest available March 9 - 11, 2015

1 THE EDITOR-IN-CHIEF OF LAB MANAGER IS..

- A PAMELA AHLBERG
- B PAMELA ANDERSON

2 GORILLAS AND POTATOES HAVE TWO MORE CHROMOSOMES THAN HUMANS DO.

- A TRUE
- B FALSE

3 LOCATED IN ALLENTOWN, PA, THIS COMPANY IS A LEADING WATER BATH MANUFACTURER.

- A JACUZZI
- B JULABO

FIND US AT LABX MEDIA GROUP BOOTH 4417

4 WHICH OF THE FOLLOWING RUNS FASTER?

- A OLYMPIC SPRINTER
- B HIPPOPOTAMUS

5 WHAT IS THE ONLY LETTER NOT APPEARING ON THE PERIODIC TABLE?

- A LETTER J
- B LETTER W

6 THIS ANALYTICAL INSTRUMENT WAS DEVELOPED IN 1936 AT THE REQUEST OF THE CALIFORNIA FRUIT GROWERS EXCHANGE.

- A ANALYTICAL BALANCE
- B pH METER

ANSWERS 1A, 2A, 3B, 4B, 5A, 6B

LabManager®
THE INDEPENDENT
GUIDE
TO PITTCON
2015
CONFERENCE & EXPO
New Orleans, LA



Proton Onsite offers safe, affordable and high performance onsite hydrogen, nitrogen and zero air generators. Our products utilize PEM, membrane or PSA technology to solve various LC and GC lab market requirements. Manufactured in a wide range of space saving stackable systems, our on-site gas generators enable our customers to get the gas they need, when and where they need it.



Built to Last - Here to Talk. German crafted with local service and expertise. Julabo USA is your specialist if it comes to all your needs regarding liquid temperature control between -90° to +350°C.



We offer a variety of liquid handling systems as well as centrifuges, thermal cyclers, spectrophotometers, plate readers, sample prep, and cell technology equipment. Our consumables consist of plates, tubes and tips. Services include calibration and repair, IQ/OQ, and pipette calibration. New Brunswick ULT freezers, platform shakers, CO2 incubators, and New Brunswick and DASGIP bioprocess equipment is also offered.



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NOT AT PITTCON? NOT A PROBLEM.

Play online at LabManager.com/PittconQuiz
Contest available March 9 - 11 2015.



ADAM EQUIPMENT'S NIMBUS BALANCE

Nimbus analytical and precision balances from Adam Equipment feature a compact footprint and easy operation. With readabilities from 0.1 mg to 0.1 g, capacities from 80g to 22kg, plus USB and RS-232 connections, the Nimbus provides a streamlined weighing experience for discerning professionals worldwide.

Innovative design enables a compact footprint, so the Nimbus occupies minimal space on the laboratory bench. The Nimbus base is formed from a single piece of extruded aluminum, offering stability and highly repeatable results. Solid metal construction throughout the balance provides the durability to withstand chemicals and rigorous daily use.



An optimized weighing sensor contains fewer parts than a traditional force motor balance, improving the balance's lifespan. Efficient mechanics plus improved electronics provide more consistent readings. With numerous weighing units including a customizable unit, Nimbus capably handles parts counting, percentage weighing, density measurement for liquids or solids, and dynamic/animal weighing. Intuitively designed navigation buttons are large and color-coded, helping users operate the balance with minimal training. Convenient text prompts are visible on the dis-

play, reminding users of the current function/ weighing mode.

The Nimbus boasts comprehensive communication capabilities, so it is ideal for use with Adam DU software, which is used to efficiently gather and analyze information from multiple balances. Data collection and transmission are optimized with the Nimbus's USB and RS-232 interfaces, while a third interface allows for an optional remote display.

Nimbus analytical balances with 0.1 mg readability have a glass-enclosed weighing chamber, which disassembles quickly for cleaning. Nimbus precision balances with 0.001 g readability have a round glass shield to help minimize effects of air movement.

Nimbus balances can be easily calibrated using external weights. Whether performing basic data printing or advanced communication with a LIMS system, the Nimbus can meet the requirements. GLP printouts are available with

time, date and other essential information. Laboratory users can learn about the Nimbus range through a new series of informational and instructional videos that demonstrate setup and operation of the many features and functions offered by the Nimbus.

About Adam Equipment

For more than 40 years, Adam Equipment has designed and manufactured precision balances and scales for professionals worldwide in the laboratory, medical, education, industrial, food, animal/veterinary and jewelry markets. Adam is committed to offering an extensive selection of weighing equipment with best-in-class value. Headquartered in the United Kingdom, the company has strategically established offices in the United States, South Africa, Australia and China to provide product support and speedy delivery to distributors. For more information about the company and its products, go to www.adamequipment.com.



Using the USB or RS232 connection, results from Nimbus balances can be compiled and graphed with Adam DU software.



Adam Equipment
info@adamequipment.com
 203-790-4774



Scan to visit the Nimbus video page, or visit <http://bit.ly/1x3fohQ>.

PURELAB® Chorus

The **PURELAB® Chorus** range of laboratory water systems offers customers the ability to customize a system to fully optimize to best fit their application, budget and the configuration of their laboratory – all without compromising on water quality or the visual appeal of the unit. PURELAB® Chorus systems are well suited in laboratories with limited laboratory space and that must retain precise control over dispensing methods and storage options. The PURELAB® Chorus range includes three water purification systems specifically designed to deliver the necessary water quality at the required through-flow – Chorus 1 for ultrapure Type I+/-, Chorus 2 for pure Type II, and Chorus 3 for general pure grade Type III water.

PURELAB® Chorus 1 produces the highest inorganic water purity available by applying advanced PureSure® deionization, which removes even trace amounts of those ions that could otherwise interfere with ultrasensitive analysis methods such as HPLC, Inductively Coupled Plasma (ICP) Atomic Emission Spectrometry or ICP Mass Spectrometry. Constant real-time total organic carbon monitoring provides complete confidence in the organic purity of the water. In

addition, the employment of integrated ultrafiltration/microfiltration, full spectrum UV treatment and full recirculation guarantees the highest organic purity of the water at the point of use, with complete removal of endotoxins, proteins, nucleases and particulates. This makes it ideal for even the most sensitive of applications.

PURELAB® Chorus 2 is the optimal fit for those applications requiring reliable, high purity water with good organic, inorganic and microbial control, but where ultrapure water is not essential. These include electrophysiology, histology and general chemistry.

The PURELAB® Chorus 3, offers the lowest cost of ownership and provides high flow rates of up to 120 liters per hour, all while being simple to operate and easy to maintain. The smart system has an auto rinse function to maintain purity during periods of low use, offers the option of CO2 removal and is designed to allow flow rate to be easily upgraded to meet future demands. As such, it is optimized for all the workhorse applications of the lab, where purity must be effectively balanced against speed to provide the most effective water supply for general use.

Flexibility extending to dispensing and storage

The PURELAB® Chorus systems work seamlessly with ELGA's Halo dispensing solutions, all of which can be positioned independently from the water purification system for maximal flexibility and ensure that valuable laboratory space is used effectively. The flow is adjustable from drop-by-drop up to two liters per minute, allowing users to fill their containers as slowly or as fast as is needed. ELGA's unique portfolio of storage reservoirs completes the range, offering 1.5, 30 and 60 liters of compact storage, all designed to reduce the risk of downtime during periods of heavy use, without impacting on water quality.



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DEVELOPMENT OF A METHOD TO BETTER QUANTIFY LEVELS OF THE PERSISTENT ORGANIC POLLUTANTS IODINATED X-RAY CONTRAST MEDIA AND ARTIFICIAL SWEETENERS FOUND IN WATER.



Waldemar Ens MSc., IWB Water Laboratory, Basel, Switzerland; Alison Wake MSc, Genevac Ltd, Ipswich UK.

Abstract

Persistent organic pollutants (POPs) can cause long term damage to the environment. Two classes of organic molecules have come to the attention of regulators and water treatment authorities in recent years; iodinated X-Ray contrast media (XCM) and artificial sweeteners (AS). These molecules, by design, have a high degree of stability. Aware of the increased abundance of these molecules in waste water, the IWB Water Laboratory set out to develop a robust, simple method to analyse levels of these molecules in water from the river Rhine, ground water and drinking water.

Introduction

Solid-phase extraction (SPE) combined with liquid chromatography (LC)-electrospray ionization (ESI)-tandem mass spectrometry (MS/MS) is the leading analytical methodology for the determination of XCM and AS. However, SPE methods can suffer from poor recovery, are time consuming, and expensive.

The aim of this study was to develop a simple, sensitive, and robust method for the quantification of seven XCM and three AS to regularly monitor the presence of these compounds at all stages of the drinking water production process.

Method Development

To achieve the required degree of separation High Performance Liquid Chromatography (HPLC) was used, coupled to an AB Sciex 5500 QTRAP MS.

In order to gain higher sensitivities, a 10-fold sample concentration step using a Genevac EZ-2 plus centrifugal vacuum evaporator was selected for sample preparation.

Using the EZ2 Plus Evaporator many samples can be loaded, and dried under vacuum automatically with a predefined method that required no operator attention.

- 10ml water samples, with added internal standard, were evaporated in a Genevac EZ2 Plus evaporator at a maximum temperature of 54 °C.
- The precipitate was reconstituted in 1 mL of eluent before submitting for LC-MS/MS analysis.

Results

A 10-point calibration curve was found to be linear over a working range of 10–500 ng/L for XCM and 10–1600 ng/L for AS. The coefficients of determination were higher than 0.999 for all compounds. LOQs below 10 ng/L could be achieved for all compounds.

The precision of 10 replicates was excellent with relative SD values ranging between 3 and 6 % for the lower working range limit and 1 and 3 % for the upper.

Sample preparation recovery was similar for all compounds with an excellent average recovery of 90±4 % and an average RSD of 2 % for triplicate injections.

Mean recoveries from five independent measurement series were between 78 and 113 %. In particular, for the three most important compounds, diatrizoic acid, iopamidol, and acesulfame, recoveries were found to be almost 100 % with relative standard deviations ≤5%

Conclusions

A sensitive LC-MS/MS method has been developed which allows the simultaneous quantification of seven XCM and three AS in water. The developed method supports increased sample throughput, is easier to perform and cheaper than comparable methods using SPE enrichment.

Validation confirmed the sample preparation and analytical method to be robust, repeatable and consistent with high linear working range, high sensitivity, and a standard deviation across all samples of <6%. The method has been accepted into routine use.

References

Development, validation, and application of a novel LC-MS/MS trace analysis method for the simultaneous quantification of seven iodinated X-ray contrast media and three artificial sweeteners in surface, ground, and drinking water. Waldemar Ens, Frank Senner, Benjamin Gygax & Götz Schlotterbeck. Analytical and Bioanalytical Chemistry. May 2014, Volume 406, Issue 12, pp 2789-2798.



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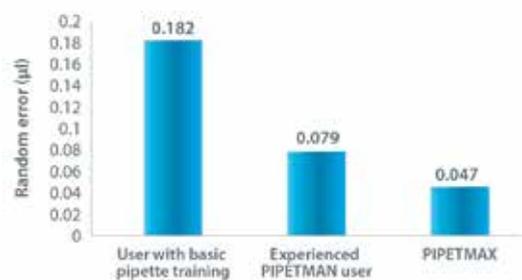
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OPTIMIZING WORKFLOW WITH 96- & 384-WELL MICROPLATES

INTEGRA has introduced a Three Position Stage for its VIAFLO 96 and VIAFLO 384 handheld benchtop pipettes.

The new accessory expands available stage positions for microplates, reservoirs and tips on a VIAFLO 96 or VIAFLO 384 from 2 to 3 thereby enhancing workflow in a wide range of applications. Beneficially the Three Position Stage also features an indexing function to allow access to 384-well plates using a 96-channel pipetting head.

For plate replication applications - having a tip rack on the left position, the source plate on the middle position and the target plates on the right position of the Three Position Stage enables the user to replicate the source plate with minimal plate handling effort. Changing tips and target plates can be done without moving the source plate, eliminating the risk of spills.

When undertaking compound dilutions or screening - the Three Position Stage enables accurate and rapid addition of reagent and compounds from 2 different sources (reservoir and plate) to one target screening plate.

Easily installed on a new or existing VIAFLO 96 or VIAFLO 384 the new accessory reduces the need for plate handling thereby minimising errors and improving workflow.

The VIAFLO 96 / 384 offers high sample throughput without a robot. It is a handheld benchtop pipette, capable of 96- and 384-well pipetting with a choice of various pipetting heads. The VIAFLO 96 benchtop electronic pipette offers an affordable solution to increase productivity when working with microplates. It closes the gap between traditional manual



pipettes and robotic systems, allowing for accurate and reproducible 96-channel pipetting. The VIAFLO 384 is a more advanced system, which can work with both 96- and 384-channel pipetting heads to maximize productivity. It features the same footprint and intuitive user concept as VIAFLO 96.

For further information on the Three Position Stage for the VIAFLO 96/384 please visit www.integra-biosciences.com/sites/microplate_dispensers.html or contact INTEGRA Biosciences in Europe / Asia on telephone +41-81-286-9530 / email info@integra-biosciences.com or in North / South America on telephone +1-603-578-5800 / email US@integra-biosciences.com.

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preparation, sterilization and cell cultivation. The company is committed to creating innovative solutions which fulfil the needs of its customers in research, diagnostics and quality control within the life science markets and medical industry. Today, INTEGRA innovative laboratory products are widely used all around the world. More than ninety distribution-partners form a worldwide sales network providing responsive and competent services to customers. These distribution partners are supported by a highly motivated and experienced team of specialists at the company headquarters in Zizers, Switzerland and Hudson, NH, USA. INTEGRA is an ISO 9001 certified company.

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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 Titrand.

The system's strict separation of gas-carrying system and electronic area ensure safe operation. Gases 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



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

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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.



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Our award-winning line of circulating baths introduces a multitude of features new to the market, including touch screen displays, the patent-pending Swivel 180™ rotating controller technology and LidDock™ lid docking system. Not only do these circulating baths enhance work flow and ease of use, they bring with them a new design aesthetic and are perfect for freezing or thawing or cooling equipment such as spectrophotometers, rotary evaporators, and Peltier devices.

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- reservoir sizes from 6 to 75 liters

General purpose water baths provide heating required for thawing plasma or frozen samples or even warming culture media. With the see-through gable cover, flasks and other tall sample vessels are accommodated, while the lid tilts out of the way, allowing condensate to drain back into the bath.

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

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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.

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HOW NEW ICP-OES SPECTROMETER TECHNOLOGIES SUBSTANTIALLY CUT OPERATING COSTS

Inductively coupled plasma optical emission spectrometry (ICP-OES) is used for elemental analysis of everything from soil and sludge to water and wastewater, plus various industrial process materials. In evaluating ICP-OES instruments, environmental contract laboratories may prioritize sensitivity and speed. Industrial research laboratories may emphasize stability and analytical precision. However, both agree on the importance of controlling costs.

Problem: most ICP-OES instruments incur various operational and maintenance expenses that dramatically increase total cost of ownership. Fortunately, some newer enhancements to traditional spectrometer technologies can significantly reduce costs — while improving performance.



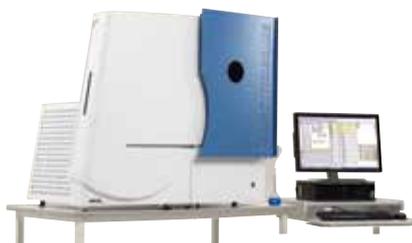
The trouble with traditional ICP-OES instruments

Conventional ICP-OES designs incur up to several thousand dollars in purge gas expense annually. Expensive external chillers invite leaks, demand frequent maintenance and downtime, and may require early replacement at up to \$5000 per unit. Commonly used echelle optics can cost valuable time, as they exhibit spectral interference and stray light that

make it harder to analyze line-rich spectra; display lower resolution above 300 nm; experience reduced sensitivity due to multiple reflective surfaces; suffer wavelength drift due to changing ambient pressures; and offer poorer trace concentration measurements in radial plasma view modes. Altogether, these issues can triple a lab's cost of ownership.

Substantial savings with SPECTROBLUE

The SPECTROBLUE ICP-OES analyzer from SPECTRO Analytical Instruments surpasses conventional designs to deliver consistent, rapid — and less expensive — results. Its innovative engineering overcomes the problems outlined above, enabling high throughput with drastically lower costs of operation.



Eliminate gas purging

SPECTROBLUE's unique sealed optical system is permanently argon-filled, recirculating gas through a small purifier cartridge good for at least 2 years. The user can start and stop the instrument at will. Results: highly stable analysis and excellent low UV performance without purge waiting or delays at startup. Eliminating an estimated 600 cubic meters of purge gas per year saves up to \$3800 annually.



Save thousands in gas purging consumables.

Eliminate external cooling

The SPECTROBLUE analyzer comes from a line of the only spectrometers that use patented integral air-cooling technology instead of costly separate chillers. So they have less need for maintenance or downtime; save higher energy costs; eliminate leaks and corrosion; are less prone to breakdown; and avoid expensive early replacement.



Save thousands more without costly, complicated coolers.

Attain strong sensitivity and stability

SPECTROBLUE utilizes a unique optics approach known as Optimized Rowland Circle Alignment (ORCA) technology, taking full advantage of 15 CCD linear array detectors and covering the wavelength range from 165 to 770 nm. It enables simultaneous capture of a sample's complete spectrum within 4 seconds.

In all three SPECTROBLUE versions — axial, radial, or twin-interface models — ORCA optics create a direct, high-luminance optical path that limits light loss and "stray light" while maximizing spectral separation and information throughput. These and other engineering innovations improve sensitivity and stability, allow the system to more easily process line-rich spectra, boost measurement accuracy, and reduce expensive rework.

For more details, see our white paper at bit.ly/spectroblue



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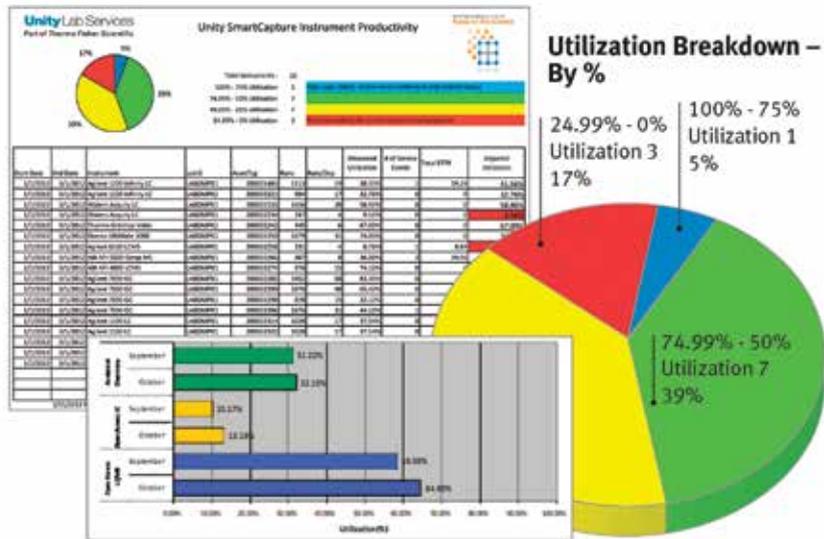
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- Redeploy instruments from areas of low utilization to high utilization to balance workload and reduce downtime risk
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LAB MANAGER ONLINE

We look back at our web content since December's issue and look forward to what's in store for March's upcoming issue.

1 Helping Scientists, Helping the World

We check in with how Seeding Labs, a group that facilitates donations of surplus lab equipment to scientists who need it, is doing and its plans for the future. CEO Nina Dudnik shares all of that, along with the story of how Seeding Labs got started. If you have surplus equipment, this article also shows how you can go about donating it.

Read more at labmanager.com/helpingscientists

2 Trending on Social Media: Personalized Pipettes

This past month, *Lab Manager's* top article on Facebook was our December 2014 Product Focus on pipettes. This article reached 6,768 people, receiving 135 likes and 27 shares. Author Mike May explores ways you can personalize the look and feel of your pipettes, the latest options from vendors, and the various benefits of personalization, such as easier identification of pipettes.

Read more at labmanager.com/personalpipettes

3 Most Popular Webinar

As of Jan. 16, our most anticipated webinar on LabManager.com was "Implementation of Routine Contaminant Screening to Ensure Higher Confidence in the Modern Food Laboratory." If you work in a food lab, be sure to check out this archived webinar, which took place Jan. 27. You'll learn how to decrease your analysis time with modern food safety analysis workflows for fast contaminant screening and more.

Read more at labmanager.com/topjan15webinar

NEXT ISSUE ➔

Patent Reform Under a new patent system, R&D managers will be on the hot seat—both to evaluate the commercial potential of innovation much earlier and to maintain secrecy. Managers will need to become "strategic thinkers" and essential players in an organization's strategic conversations.



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PowderSafe™ Type A Enclosure

PowderSafe™ Type A enclosures provide a safe and effective weighing environment for toxic compounds. Engineered specifically for balances, PowderSafe™ Type A enclosures protect the operator by capturing particulate in HEPA filtration without sacrificing balance stability. These compact, ductless enclosures are factory leak tested, certified and shipped fully assembled for simple installation.



Features:

- AirSafe™ automatic safety controller
- Audible/visible filter and airflow alarms
- Portable HEPA filtration — NO DUCTWORK REQUIRED
- SafeChange™ technology for pre-filter change-out
- Solid 3/8" polypropylene base
- Tested with 3- and 4-place balances
- Leak tested and certified before shipment
- Quiet operation < 49dB
- 360° visibility

PowderSafe™ Type B Enclosure

Seamless polypropylene construction provides the mass and vibration resistance crucial for accurate powder weighing, while AirSafe™ automatic safety controller monitors airflow and filter condition. HEPASafe™ technology allows filters to be safely and easily bagged-out under negative pressure.



Features:

- AirSafe™ automatic safety controller provides variable airflow volume
- Continuous filtration monitoring
- High mass - solid polypropylene construction
- Effectively weigh to 5 decimal places
- Real-time airflow display on LCD
- HEPASafe™ filter change-out system
- No installation cost



PowderSafe™ Type B has been independently tested and verified for operator protection by SafeBridge Consultants, Inc.®

PowderSafe™ Type C Enclosure

AirClean® Systems Type C PowderSafe™ ductless balance enclosures incorporate the airflow dynamics and HEPASafe™ features of the PowderSafe™ Type B with the user-friendly features and chemical fume containment capabilities of an AirClean® Systems ductless fume hood. Thermally fused polypropylene construction makes the PowderSafe™ Type C enclosure perfect for weighing powders or solvents.

Features:

- AirSafe™ automatic safety controller
- Horizontal laminar airflow pattern
- Chemically impervious construction
- HEPASafe™ filter change-out
- High mass — solid polypropylene construction
- Vapor-proof fluorescent light
- Ductless — no installation required



Polypropylene Free-Standing Ductless Enclosure

AirClean® Systems E-Series polypropylene free-standing ductless enclosures are designed to accommodate applications that require additional vertical height not found in standard benchtop hoods. Full access design allows equipment to be easily inserted or removed from the enclosure, making the E-Series perfect for use with mixers, mills, grinders, reactors, or other tall equipment.

Features:

- AirSafe™ automatic safety controller
- Seamless polypropylene construction for excellent chemical resistance. The result: NO RUST
- Wide range of bonded activated carbon and HEPA filters for containment of virtually any toxic vapor, fume, gas, or particulate
- No ductwork or installation required. All AirClean® Systems hoods are shipped fully assembled and arrive ready to use
- Integral vapor-proof fluorescent light
- Filter stacking options for a variety of applications



PowderSafe™ Bulk Handling Enclosure

The PowderSafe™ Bulk Handling enclosure is an economical and space-saving alternative to larger walk-in enclosures. With a unique drum access port incorporated into the base of the enclosure, the drum can be raised and sealed to the access port, effectively extending the enclosure's containment area into the drum. Designed to provide a turbulence-free airflow environment, PowderSafe™ Bulk Handling enclosures move air in a horizontal pattern to maximize containment while minimizing sample loss and balance instability.



Features:

- Dark blue base for ease of cleaning
- Disposal port for weighing vessels
- HEPASafe™ filter change-out
- AirSafe™ automatic safety controller
- Bulk container access port cover
- Vapor-proof fluorescent light
- No installation required
- White epoxy coated stand with leveling feet

Walk-In Free-Standing Ductless Enclosure

AirClean® Systems polypropylene walk-in enclosures are an effective containment solution for fumes or particulate released from equipment during manipulation or bulk handling applications. A variety of enclosure widths, depths and sash options maximize operator access without compromising safety.



Features:

- Multiple depth options
- AirSafe™ automatic safety controller
- Polypropylene construction — seamless design
- Bonded carbon and HEPA filter stacking options for a variety of applications
- Vapor-proof fluorescent light
- No ductwork required



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