Arrow Safety

MONTHLY SAFETY NEWSLETTER

DECEMBER 2020

AIR MONITORING 101

By Drew Hinton, President/CEO of Arrow Safety, LLC

Air monitoring has certainly come a loooong way in recent years! Could you imagine still using a Davy lamp to determine if a flammable atmosphere is present? For those of you not familiar with this ancient gem, the Davy lamp was invented back in 1815 for miners to use as a means of detecting methane gas. As the flame grew bigger, it would alert the miners that the ambient methane levels were increasing. Thankfully with today's gas detection technology, we can detect flammable atmospheres WITHOUT introducing a potential ignition source (such as the flame from the Davy lamp). However, a meter is only as good as the person that's using it. Without understanding how the meter operates, it's essentially a $1,000 paper weight!

Davy Lamp

<u>Air Sample Collection Methods</u>

All portable gas meters operate by one of two principles: (1) pass-by/diffusion or (2) pump-through. With diffusion-style meters, the air samples are obtained on the front of the meter itself (you will typically be able to see the small filters covering the meter's sensors). This type of meter works best as a form of personal gas detection, often clipped to a worker's harness or clothing. However, it's important to ensure the meter is facing away from the worker's body so that you're not blocking the meter's inlets.

The second style of meter has an internal pump and can draw the ambient air samples into the meter. This makes it very beneficial for confined space and HAZMAT operations since you can attach

tubing to the meter and obtain readings from up to 75 feet away. One of the most important things to understand, however, is the maximum amount of tubing that can be attached. This specification is specific to the each meter and can be found in the operating (user's) manual. If the manual states that the maximum amount of tubing that can be attached is 75 feet and you attach 80 feet, you will more than likely get false meter readings since the pump is not strong enough to pull the air samples that far.

Response Times

There have been many "rules of thumb" thrown out across the industry when it comes to how long a meter takes to provide an accurate reading. I've heard anything from 1 second per foot of tubing attached to 3 seconds per foot of tubing attached. With that being said, there are two things that are for certain – (1) your meter's readings are NOT instantaneous and (2) there is no such thing as a "rule of thumb" here. Response times are meter specific, and just like everything else, found in the operating (user's) manual in the technical specifications section (often near the back of the manual).

Most meters will provide you with something called a "T90 response time, which is extremely important to understand. A T90 response time is going to be specific to each individual sensor, which means you are going to have to look at each sensor to determine the differences. The T90 response time is essentially how long it takes your meter to obtain a sample and provide a 90% accurate reading on the meter's display. On a typical 4-gas meter that monitors for oxygen (O_2), carbon monoxide (CO), hydrogen sulfide (H_2S), and combustibles/explosives (LEL), you may have T90 response times ranging anywhere from 5 seconds to 60 seconds – and that's without any tubing attached! While that may sound like a long time to wait, just imagine having an MSA FiveStar meter back in the early 2000s that measured ammonia where the T90 responsive time was **310 seconds**! Yep, that's over **5 minutes to obtain 90% of the final reading** – YIKES! Moral of the story here – **know how long your meter takes to respond**. If your meter has a T90 response time of 30 seconds, that means you could potentially be 30 seconds into

MSA Passport FiveStar Personal Alarm

a hazardous atmosphere before your meter catches up and alerts you to the situation. If you're adding tubing to the meter, then you need to add additional time to the T90 response time based on the pump's overall capacity.

Cross Sensitivities

Even though your particular meter may only have four (or five) sensors, it can still detect hundreds of other chemicals. Cross sensitivity refers to a sensor's ability to be affected by a gas(es) other than its target gas. Many meter sensors are electrochemical sensors, which rely on an electrochemical reaction in order to determine the presence of a given chemical. However, since many chemicals share the same properties, your meter may mistake one chemical for another and give you a false reading. For example, many CO sensors will have a cross sensitivity to hydrogen, meaning the CO sensor will be showing that CO is present when, in all reality, you have hydrogen in the environment. Where might you find these cross sensitivities you ask? Well, if you said the operating (user's) manual, then you are correct! Most newer gas meters will have a list of "interfering gases" that will cause cross sensitivity issues, so again, look in the technical specifications section of the manual for more information on this.

Honeywell RAE Systems QRAE 3

Final Thoughts

Gas meters are sophisticated pieces of equipment, but they don't have to be complicated. Understanding your meter and how it operates can be the difference in being adequately protected or dangerously exposed. If you're not sure about something, review your operating (user's) manual. If you still have questions, reach out to the manufacturer and they will be glad to help. I once heard a fellow colleague say that if you can operate a smartphone, you can operate a gas meter and I believe that to be 100% true! Know your meter, the meter's capabilities, and the meter's limitations – it may just save your life one day.

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Two-Unit Rapid Deployment Kit (RDK) for AreaRAE – ONLY from All Safe Industries!

If you're on a community or regional hazardous materials (HAZMAT) team, then area monitoring is something that needs to be considered at every HAZMAT scene. AreaRAE meters have been a popular choice among first responders across the country for many years and now All Safe Industries® is creating a two-unit rapid deployment kit (RDK) to suit your needs! These kits, which are made in-house exclusively by All Safe Industries, are the perfect addition to your HAZMAT trailer or response apparatus. Choose between the various AreaRAE Pro and AreaRAE Plus models, as well as the additional Wi-Fi option to make communicating with your meters that much easier!

For more information or to order the two-unit RDK for AreaRAE, visit their website or contact them today by calling 888-972-3389 or by emailing them at info@allsafeindustries.com.

FREE VIRTUAL TRAININGS/WEBINARS

- **Topic**: Preventing Noise-Induced Hearing Loss
- **Host(s)**: Drew Hinton, CSP, CHMM, EMT - President/CEO of Arrow Safety
- **Date/Time:** December 7, 2020 at 10:00 AM CST
- **Length**: 1 hour
- **Registration Link:** https://bit.ly/2JpDhhq

- **Topic**: Ergonomics Risk Factors – Are Your Employees at Risk?
- **Host(s)**: Tim Pottorff, MSc, CIE, ARM – Principal/Owner at QP3 ErgoSystems
- **Date/Time:** December 11, 2020 at 10:00 AM CST
- **Length**: 1 hour
- **Registration Link:** https://bit.ly/3fPgirW

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If you have any questions about how Arrow Safety can help your organization, contact us and we'll be glad to help! **New customers get 10% off any service!**

Drew Hinton, CSP, CHMM, EMT
President/CEO
Arrow Safety, LLC
218 Zoe Drive
Glasgow, KY 42141
P: (270) 670-4718
E: drew@arrowsafetyus.com
www.arrowsafetyus.com

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