



 **CROWCON**
Detecting Gas **Saving Lives**

Meet the next generation of flammable gas detection

December 2020

Introduction

Crowcon has introduced the first molecular property spectrometer™ (MPS™) flammable gas sensor for a fixed gas detector. Crowcon's XGard Bright with Nevada Nanotech MPS sensor provides advanced technology that removes the need to calibrate and provides a 'True LEL' for reading for fifteen flammable gases but can detect all flammable gases in a multi-species environment, resulting in lower ongoing maintenance costs and reduced interaction with the unit. This reduces risk to personnel, and avoids costly downtime. The MPS sensor is also immune to sensor poisoning.

The MPS™ sensor delivers key features which provide real world tangible benefits to operator and site operations:

No calibration

When implementing a fixed head detector it is common practice to service on a recommended schedule defined by manufacturer. This entails ongoing regular costs as well potentially disrupting production or process in order service or even gain access to detector or multiple detectors. There may also be a risk to personnel when detectors are mounted in particularly hazardous environments.

The Xgard Bright with MPS™ sensor technology does not require calibration. This in turn reduces the interaction with the detector resulting in a lower total cost of ownership over the sensor life cycle and reduced risk to personnel and production output to complete regular maintenance.

Multi species gas - 'True LEL'™

Many industries and applications use or have as a by product multiple gases within the same environment. This can be challenging for traditional sensor technology which can detect only a single gas that they were calibrated for and can result in inaccurate reading and even false alarms which can halt process or production.

The challenges faced in multi gas species environments can be frustrating and counterproductive. The MPS™ sensor can accurately detect multiple gases at once and instantly identify gas type. The MPS™ sensor has a on board environmental compensation and does not require a correctional factor. Inaccurate readings and false alarms are a thing of the past.

No sensor poisoning

In certain environments traditional sensor types can be under risk of poisoning. Detectors in environments where poisons or inhibitors may be encountered, regular and frequent testing is the only way to ensure that performance is not being degraded.

Sensor failure due to poisoning can be a frustrating and costly experience. The technology in the MPS™ sensor is not affected by contaminates in the environment. Processes that have contaminates now have access to a solution that operates reliably with fail safe design to alert operator to offer a peace of mind for personnel and assets located in hazardous environment.

Hydrogen (H₂)

The usage of Hydrogen in industrial processes is increasing as the focus to find a cleaner alternative to natural gas usage in this sector. Detection of Hydrogen is currently restricted to pellistor sensor technology due to Infra Red sensors inability to detect Hydrogen. When faced with challenges highlighted above in poisoning or false alarms, the current solution can leave operator with costly and regular servicing as well false alarm challenges.

The MPS™ sensor provides a far better solution for Hydrogen detection. The challenges faced with traditional sensor technology are completely removed. A long life hydrogen sensor that does not require calibration throughout the life cycle of the sensor, without the risk of poisoning or false alarms can significantly save on total cost of ownership and reduces interaction with unit resulting in peace of mind and reduced risk for operators leveraging MPS™ technology.

All of this is possible thanks to MPS™ technology, which is probably the biggest breakthrough in gas detection for several decades.

In this whitepaper we explore the capabilities of MPS™, and compare its performance with that of conventional sensor technologies, with a view to helping readers choose the best flammable gas detector for their environment.

What is MPS™ and why should I consider it?

Molecular property spectrometer (MPS™) gas detection was developed at the University of Nevada and is currently the only gas detection technology able to detect multiple flammable gases, including hydrogen, simultaneously, very accurately and with a single sensor.

MPS™ enhances accuracy, speed of detection – no correction factor needed

Conventional flammable gas monitors use either infra-red (IR) or pellistor technology –however, hydrogen cannot be detected by IR and so until now, pellistor detectors have been the only option for fixed hydrogen detectors.

Most conventional systems require at least two pellistors to monitor multi-species environments, and with both IR and pellistor monitoring only the readings generated for the calibrated gases can be relied upon.

However, conventional detectors may read other gases incidentally, but these readings are frequently inaccurate. In some cases, this inaccuracy leads to false alarms that disrupt processes and may halt operations.

In contrast, the Xgard Bright with MPS™ sensor accurately detects and identifies several flammable gases at once. The MPS sensor has on-board environmental compensation capability, which means it does not need a compensation factor. Inaccurate readings and false alarms are therefore a thing of the past.

The MPS sensor in the Xgard Bright works quickly, simultaneously monitoring multiple gases with a single sensor and giving an accurate indication of the level of flammable gas(es) faster than IR or pellistor detectors generally can. The MPS sensor can report 0–100% LEL in up to 15 gases (further gas species being characterised) with great accuracy: a capability known as ‘True LEL™’ reading. In contrast, pellistors and IR typically detect just one gas with accuracy, that gas being the calibrated gas. Incidental readings of other gases can be highly misleading, as we have seen.

With Xgard Bright with MPS™, all readings for all flammable gases are True LEL and no correction factor is required.

The ability of the MPS™ sensor to quickly and accurately detect dangerous levels of gas permits a swift response, protecting workers and enhancing safety.

True LEL™ is the gold standard in flammable gas detection

The ability of the Xgard Bright’s MPS™ sensor to read multiple flammable gases quickly and more accurately than conventional technologies is clearly a great advantage. Not only does it reduce the level of false alarms (which in turn reduces cost), it also provides prompt warning of real danger and thus allows a fast response with more chance of saving people and/or assets from harm.

Xgard Bright’s MPS sensor technology is ideal for use in areas likely to generate multiple gas hazards because it does not need to be recalibrated to detect specific gases, and has no need for cross-calibration factors. This makes it much more straightforward to deploy than standard detectors (which only detect one, calibrated, gas accurately) and reduces the need for training and multiple device management.

Xgard Bright with MPS™ does not need calibration and requires minimal maintenance, self-monitors and reports sensor problems automatically

When fixed IR and/or pellistor systems are used to monitor flammable gas, it is normal for the manufacturer to recommend a maintenance schedule, which includes servicing, calibration and bump testing.

These measures are vital to ensure the continuous safe functioning of a gas monitor. If a sensor has degraded or become damaged – for example, through contamination or ‘sensor poisoning’ – it may not work properly, or at all. Regular testing and calibration is the only way to ensure ongoing safety.

However, all of these measures incur cost. At the very least they involve downtime or disruption; often items such as testing gas are also required. Maintenance can also be dangerous, for example when personnel must enter a dangerous environment to calibrate the gas monitor installed there.

The Xgard Bright’s MPS™ sensor technology is poison- and drift-resistant; it does not require calibration during its life cycle (around 5 years), nor does it require bump testing. That means less downtime, less expense and less risk to the workforce. The company no longer has to pay for the labour involved in calibration, nor for calibration gas.

Most importantly, everybody knows that the MPS™ sensor is stable and accurate for years at a time – the Xgard Bright’s MPS sensor has an extensive lifespan, generally beyond 5 years.

What is more, the MPS™ sensor is self-monitoring and self-testing, and it will automatically alert the user if a problem occurs.

MPS™ copes with challenging environments, does not suffer sensor poisoning

Some places are very challenging for pellistor and/or IR sensors. For example, extremes of temperature, pressure and humidity in settings such as offshore, industrial or desert environments can damage sensors and render them useless very quickly. In some settings, environmental toxins and contaminants can 'poison' sensors, severely compromising their performance.

The only way to prevent harm from such sensor poisoning is to enforce regular, frequent and thorough testing and to replace sensors whenever required. As we have seen, this can be both a costly and dangerous process.

The Xgard Bright with MPS™ sensor, however, is inherently immune to poisoning. It has inbuilt compensation for temperature, pressure and humidity and does not drift, decay or suffer poisoning.

Sensor failure due to poisoning can be a frustrating and costly experience, so this capability can generate substantial savings when the MPS™ sensor is deployed in harsh environments. The technology in the MPS™ sensor is not affected by environmental contaminants, so sensor poisoning can be consigned to history – it is now possible to detect multiple flammable gases, even in harsh environments, using just one sensor that does not require calibration and has an expected lifespan of at least 5 years.

XGard Bright with MPS™ sensor: ideal for hydrogen monitoring

Hydrogen is increasingly used in industrial processes as pressure grows for enterprises to replace natural gas with cleaner alternatives. However, hydrogen is not easy to detect: IR can't identify it, so until now the only option has been pellistor detection.

However, as we have seen, pellistor detectors – while accurate and useful in many environments – can prove costly in terms of servicing and false alarms, particularly in harsh conditions and wherever sensor poisoning is prevalent.

Now, there is an alternative for hydrogen detection. The use of MPS™ sensor technology removes the problems of poisoning and inaccurate readings, and any need to install multiple pellistors in multi-species settings.

The XGard Bright's MPS™ sensor is an optimal solution for the detection of hydrogen, even in challenging environments. It is a long-lived hydrogen sensor that does not require calibration during its life, cannot be poisoned and is so accurate that it dramatically reduces the risk of false alarms. This sensor also self-monitors and automatically reports any problems with its own operation, giving greater peace of mind as well as reduced cost of ownership. What is more, the accuracy and calibration-free nature of the unit greatly enhances workforce and plant safety.

Conclusions

The XGard Bright with MPS™ sensor incorporates the most important innovation in sensor technology to be seen in recent decades, and is a ground-breaking new option in fixed gas detection. Its key features include:

- True LEL™ reading for multiple flammable gas hazards, detected simultaneously and highly accurately with a single sensor
- No need for calibration or bump testing during the sensor's life
- Sensor is self-monitoring and will automatically report any problems with its own functioning
- Ideal alternative to pellistor detectors in harsh environments, wherever sensor poisoning may occur
- Ideal for hydrogen detection in all settings

The benefits of the Xgard Bright with MPS™ sensor technology include:

- Lower cost of ownership throughout the device's life
- Fast, accurate reading of multiple gas hazards with True LEL™ enhances safety, optimises speed of response
- Training needed on just one device for multiple gas hazards: reduces complexity, which enhances safety
- No need for calibration means device is stable and reliable for 5 years plus, no need to pay for calibration or send workers into risky environments to maintain devices
- Can detect multiple flammable gas hazards with a single sensor, including unexpected or mixed hazards.

For more information about the XGard Bright with MPS™ sensor, please visit crowcon.com