Solutions for the Middle East

CROWCON

The H_2S Challenge

In the Middle East, hydrogen sulphide (H_2S) is a significant threat, especially in gas production, and increasingly in oil production, as extraction of heavier oil becomes more common.

The detection of and protection from H_2S has become a high-profile safety issue at well heads, yet the sensors typically used in gas detection systems at these locations are not sufficient to meet the needs of the environment.

The fluctuation in temperatures and humidity causes the performance of the two main types of detection sensors to falter and fail. These conditions cause Electrochemical Sensors to dry out while Metal Oxide Semiconductors (MOS) become affected by moisture and the acidic conditions of the sand.

The result is costly due to continuous sensor failure and downtime, and a significant gap in protection among the oil and gas fields of the Middle East against H_2S.

Crowcon has the answer – **the XgardIQ with H2S sensor!**

High Temperature H_2S and the XgardIQ

The solution for H_2S protection in hot Middle Eastern climates

The XgardIQ already provides significant safety benefits over conventional gas detectors. However, this is further enhanced with the inclusion of the H_2S sensor in the range, providing a high spec detector head for a high spec sensor.

No hot-work permit required

Sensor recalibration on conventional fixed-point gas detectors usually requires physical disassembly of the transmitter. XgardIQ sensor modules can be quickly and simply "hot swapped" without a hot-work permit, either for replacement with a new pre-calibrated replacement module, or for temporary removal to a safe area for calibration.

Avoiding the need for a hot work permit can reduce delays in your production by hours, or even days.

Remote sensor assembly

XgardIQ detector optional accessories now feature a remote sensor assembly, allowing the gas sensor to be located where gas leaks are most likely to be detected earliest – areas like air ducts, tanks, channels and storage locations.

Meanwhile, the XgardIQ transmitter with its display screen and push-button controls, is located where it's easy and safe to access – up to 15m away.

This remote sensor assembly not only allows you to further improve your site safety, but also reduces time spent conducting routine maintenance.

Compatible for a variety of gases

XgardIQ is compatible with sensor modules for a variety of gases, including flammable, toxic and oxygen. This means all of the gas hazard on-site can be detected using the same type of detector.

It also auto-configures to the appropriate gas type, range, unit, and alarm levels – the details of which are stored in the smart sensor module. Along with its bright OLED display, non-intrusive calibration and simple functionality, XgardIQ helps minimize a site's training needs.

Product

XgardIQ High Temperature H_2S

Sensor module part number	XIQ-HT (0-100ppm)
Temperature range	-30oC to +70oC
Sensor Lifetime (Minimum)	12 months shelf life + 2 year operation
T90 response	<40 seconds
Stabilisation time	<120 seconds
Calibration interval	Calibration every 12 months, bump test every 6 months

Detecting hydrocarbon liquid fuel and gas fires, fast

Introducing Fgard IR3 Flame Detector

- **Reduced false alarms**
- **No condensation**
- **Less than 5 second response time**
- **60 metre flame detection range**

Personal, portable and temporary area monitors

Single and multigas solutions for the monitoring of oxygen, flammable and toxic gases

Device	Clip SGD	Gasman	T4	T3
Capability:	1 gas	1 gas	1 – 4 gases	1 – 4 gases
Target gases:	CO, H_2S, O_2	C_2H_4O, Cl_2, ClO_2, CO, CO_2*, $COCl_2$, F_2, H_2, HCN, HF, H_2S, NO, NO_2, NH_3, O_2, O_3, PH_3, SO_2, flammables	CO, H_2S, O_2, flammables	CO, CO_2*, H_2S, HCN, NH_3, O_2, O_3, SO_2
Sensing technologies:	Electrochemical	Electrochemical, pellistor, infrared, MPs and LLO2*	Electrochemical, pellistor, flammables, MPs and LLO2	Electrochemical, pellistor, infrared*
Sampling:	Diffusion	Diffusion	Diffusion and optional hand aspirator pump	Diffusion
Approvals:	ATEX, IECEx, cCSAus, UL	ATEX, IECEx, CSA	ATEX, IECEx, UL, INMETRO, MED	ATEX, IECEx, CSA
Customer value:	2 year fixed life delivers low cost of ownership	Full function, rugged & compact. Extensive range of target gases	Delivers compliance, offering unique TWA resume functionality	Top mount display for ease of viewing

Device	Gas-Pro	Gas-Pro TK	Detective+
Capability:	1 – 5 gases	1 – 4 gases	1 – 4 gases
Target gases:	Cl_2, ClO_2, CO, CO_2, H_2S, NH_3, NO, NO_2, O_2, O_3, SO_2, flammables, VOC	CO, H_2S, O_2, flammables (%LEL & %vol)	AsH_3, C_2H_4O, Cl_2, ClO_2, CO, CO_2, F_2, H_2, H_2S, HCL, HCN, HF, NH_3, NO, NO_2, O_2, PH_3, SO_2, flammables, VOC
Sensing technology:	Electrochemical, pellistor, infrared, PID	Electrochemical, pellistor, infrared	Electrochemical, pellistor, infrared
Sampling:	Diffusion and optional built in pump	Diffusion and optional built in pump	Diffusion and optional built in pump
Approvals:	ATEX, IECEx, UL, INMETRO, MED	ATEX, IECEx, UL, INMETRO, MED	ATEX, IECEx (being clarified)
Customer value:	CSE & PEC modes guide users through defined processes	Inert atmosphere monitoring including Tank Check mode	Perimeter monitoring wired or wireless, raised sensors prevent water ingress

* Safe area use (not hazardous area certified)
Where 'flammables' are listed multiple calibrations are usually available (e.g. butane, propane, pentane) please check the website for further details

Fixed detectors

Field mounted gas detection solutions for the protection of plant and personnel

Device	Xgard	Xgard Bright	TXgard IS+
Enclosure:	Stainless steel, Aluminium alloy, Nylon	Aluminium Alloy	Nylon
Display:	No	Yes	Yes
Target gases:	Br_2, C_2H_4O, Cl_2, ClO_2, CO, CO_2, $COCl_2$, F_2, H_2, H_2S, HCL, HCN, HF, NH_3, NO, NO_2, O_2, O_3, SO_2, flammables (pellistor & IR)	CO, H_2S, O_2, CO_2, flammables (Pellistor, IR and MPS)	Cl_2, ClO_2, CO, $COCl_2$, H_2, H_2S, HF, HCN, NH_3, O_2, O_3, SO_2
Sensing technology:	Electrochemical, pellistor, infrared, PID	Electrochemical, pellistor, IR and MPS	Electrochemical
Output:	mA, mV	mA, Hart, RS-485	mA
Relay:	No	Yes	No
Approvals:	ATEX, IECEx, UL	ATEX, IECEx, UL (pending)	ATEX, IECEx, UL
Customer value:	Comprehensive options providing cross-site compliance from a single platform. Any gas, any industry, any where	Delivering reduced installation and maintenance costs. Display for easy interfacing. Comes with MPS sensor option for calibration-free detection of flammables	Delivering reduced installation and maintenance costs.

Device	Xgard IQ	IRmax	Fgard IR3 Flame Detector
Enclosure:	Stainless Steel	Stainless Steel	Stainless Steel or Aluminium
Display:	Yes	Yes (optional)	No
Target gases:	Cl_2, CO, H_2S, HF, NH_3, O_2, O_3, SO_2, flammables (pellistor & IR)	Flammables	N/A
Sensing technology:	Electrochemical, pellistor, infrared	Infrared	Triple IR flame detection
Output:	mA, Hart, Fieldbus, RS-485	mA, Hart, RS-485	mA, HART
Relay:	Yes	No	Yes
Approvals:	ATEX, IECEx	ATEX, IECEx	ATEX, IECEx, SIL2, FM, PESO, Inmetro (pending)
Customer value:	Remote and hot swap sensor options ensure optimal sensor placement and reduced maintenance times. Suited for high-temperature applications	Remote or localised display options ensure optimal sensor placement and reduced maintenance times	Reliable fast flame detection with triple IR

Controllers

Device	Gasmaster	GM Addressable Controllers	Vortex
Channel input:	1-4 input	1-128 input	1-12 input
Input:	mA, mV, Fire	mV, mA, RS-485	mA, mV, fire
Output:	mA, RS-485	mA, RS-485, TCP IP	RS-485, Profibus
Event logging:	Yes	Yes	Yes
Battery backup:	Yes	Yes	Yes
Relay option:	Yes	-	Yes
Customer value:	Large display delivers user friendly system status and maintenance functionality	Addressable solution reducing installation cabling requirements delivering reductions in time and cost	Flexible control package for single or multi-controller requirements

Device	Gasmonitor Plus	Gasflag
Channel input:	1-16 input	Single
Input:	mA, mV, fire	4-20 mA sink or source (selectable)
Output:	mA	None
Battery backup:	Yes	None
Relay option:	Yes	Yes
Customer value:	Rack based system offers the ability to engineer complex systems from standard controllers	A simple controller when only one detector head is required

Engineered Fixed and Sampling systems

Bespoke gas detection systems. Engineered to your needs.

Resolve your specific problems with our tailor-made solutions.
Because one size doesn't fit all.

- **Custom-built** gas detection systems
- **50+ years'** bespoke systems experience
- **Collaborative** design process
- **EFS team** solely focused on bespoke solutions
- **All industries and applications**

Sensitron Products

SMART S-MS 3A	SMART S-MS MED	SMART 3G-C2
SIL2 Gas Detector with HART	MED-approved SIL2 Gas Detector	SIL2 Gas Detector
The SMART S-MS 3A is a SIL2 certified fixed gas detector designed to meet the toughest industrial standards. The detector is made for the requirements of heavy industries and comes with the option of aluminium or stainless steel enclosure and Optional HART and 3-relay card. The device is SIL2 Hardware and SIL3 Software certified. • Made for heavy industries • Range of personalisation options • Safety Integrity Level (SIL) certification	The SMART S-MS MED is designed specifically for use in marine environments and is certified by the Lloyd's Register in accordance with MED/3.54 Regulation. The device is SIL2 certified and has options for both catalytic and infrared sensors for the detection of flammable gases. • Standard 4-20 mA and RS output3-relay output • Certified by Lloyd's register • SIL2 Hardware and SIL3 Software certified	The SMART3G-C2 fixed gas detector has sensor options for detecting more than 50 toxic, flammable and refrigerant gases. It is ideal for a variety of industrial applications and harsh environments. The LED light ring ensures immediate visual indication of the detector status. The device also features ongoing system self-diagnosis and optional RS485 interface for Modbus communication. • Optional relay output and RS485 interface • Optional interface for ATEX II2GD approval • Ongoing system self-diagnosis • Wide range of sensor options

SMART 3G-D2	SMART 3G-D3	SMART 3G-GrI
SIL2 Gas Detector with Display	SIL2 Gas Detector for Zone 2	Group I Gas Detector for Mines
The SMART3G-D2 fixed gas detector has sensor options for detecting more than 50 toxic, flammable and refrigerant gases. It is ideal for a variety of industrial applications and harsh environments. The device features non-intrusive calibration and a 4-digit back-lit display for the gas concentration reading, 5 mode status LED and a high visibility multi-colour LED light ring. • Standard 4-20mA and 3 relay output • Optional RS485 interface for Modbus communication • Stainless Steel and remote sensor options • Non-intrusive one-man calibration	Designed to meet with industrial requirements, the SMART3G-D3 is capable of monitoring toxic and flammable contents in areas classified as zone 2. The device also has optional Modbus communication support, non-intrusive calibration and a 4-digit display with 5 mode status LEDs. • Standard 4-20mA and 3 relay output • Optional RS485 interface for Modbus communication • 4-digit display and 5 mode status LEDs	The SMART 3G-GrI detector is designed for use in mines, tunnels and ATEX areas classified as Group I. The optional display enables non-intrusive, one-man calibration along with optional 3 relay output and RS485 interface. • SIL2 certified • Optional display enabling non-intrusive one-man calibration • ATEX Group I certified for mines and tunnels • Optional 3 relay output and RS485 interface

SMART P	SMART 3NC	SMART 3-R	PL4+
EN-approved Gas Detectors for Car Parks	Point gas Detector for Safe Areas	Refrigerant Gas Detector	SIL1 Addressable Control Panel
The SMART P detectors have been designed to fulfil the latest European Standard on gas detection in car parks, with the capability to detect CO, NO2 and petrol vapours. The P-2 is a dual sensor detector able to measure CO along with either NO2 or petrol vapours and both devices offer RS485 communication as standard. • Standard RS485 communication • Ongoing system self-diagnosis • Easy sensor replacement • P55 rated	The SMART3 NC is a point gas detector for safe areas with a number of features for easy operation and maintenance such as ongoing system self-diagnosis, seamless installation and maintenance via handheld keypad and options for relay output and Modbus communication. • Standard 4-20mA and optional 3 relay output • Optional RS485 interface for Modbus communication • Ongoing system self-diagnosis • IP55 rated	The SMART 3-R and 3-R Lite refrigerant gas detectors have options for the detection of more than ten refrigerant gases, with the SMART 3-R also capable of detecting over ten flammable and toxic gases. The devices are designed for use in machinery/plant rooms and laboratory settings and feature both audible and visual indications of detector status • Multicolour LED ring • Internal buzzer for audible warning • Ongoing system self-diagnosis • Standard 12-24 Vdc power supply	The PL4+ control panel is a cost effective solution for small systems of up to 8 gas detectors. The enclosure is IP65 rated and the device has the option of battery backup to ensure continued function in power outages. • ATEX and SIL1 approved • Up to 8 inputs • 1 open RS485 (EIA-485)

Multiscan++S2	Multiscan++PK	Multiscan++MED	Multiscan 8+
SIL2 Addressable Control Panel	EN-Approved Control Panel for Car Parks	MED-approved SIL2 Control Panel	SIL1 Addressable Control Panel
The Multiscan++S2 is a SIL2 certified, advanced multifunction gas detection control panel designed to meet the need for highly flexible systems. The system can manage and monitor up to 256 gas detectors and has a range of self-testing facilities to take place to detect and localise possible failures. • ATEX and SIL2 certified • Up to 256 inputs • Up to 2 closed RS485 (EIA-485) galvanic isolated loops	The Multiscan++PK gas detection control panel supports a maximum 256 detectors and has been designed with car parks in mind. It is compliant with the EN 50545-1 standard, which defines the requirements for the detection of CO and NO2 in car parks and tunnels. • Up to 16 inputs (both 4-20 mA and loop daisy-chained) • 1 open RS485 (EIA-485)	The Multiscan++MED control panel has the capability to manage and monitor up to 64 gas detectors and has been purposely designed and certified to meet with the requirements of the marine industry, certified by the Lloyd's Register in accordance with MED/3.54 Regulation. • Marine, ATEX and SIL2 certified • Up to 2 closed RS485 (EIA-485) galvanic isolated loops • Up to 64 inputs	The Multiscan 8+ is an innovative and flexible gas control unit, capable of monitoring gas detectors connected with both 4-20mA transmission and addressable bus. It is ideal for small plants with its capability to manage and monitor up to 16 detectors and is complete with battery backup option to ensure continued function in power outages. • ATEX and SIL1 approved • Up to 16 inputs (both 4-20 mA and loop daisy-chained) • 1 open RS485 (EIA-485)

CROWCON CONNECT

Gas Insights, **Safer Lives**

- Taking control of **your data**
- Keeping track of **your safety**
- Connecting you with **your device**

www.crowconconnect.com

Sensor Technologies

The next generation of sensor technologies

Reduce cost of ownership without compromise with our new long-life Oxygen sensor.

- Industry's first 5-year warranty
- Lead-free for RoHS compliance
- Reduced sensor replacement
- Lower cost of ownership
- Reduced environmental impact

Accurately detect numerous hazardous gases in one Molecular Property Spectrometer™ (MPS) sensor for better safety and more operational efficiency.

- Sensor Poisoning is solved
- TrueLEL™ multi-gas accuracy
- Zero calibration for 5 years
- Hydrogen ready
- Increased battery life
- Zone 0 certified

Case Study

Supplying High Temperature H2S Detection in the Middle East

The background

Haven Fire and Safety, a Crowcon distributor, was commissioned by the Abu Dhabi National Oil Company (ADNOC) and its partner firm Total to provide a complete fire and gas system for the Ruwais Diyab unconventional gas concession in Abu Dhabi.

Haven Fire and Safety is a leading fire protection, engineering, supply and service company that provides a 'one stop shop' solution for its clients. The firm has bases throughout the United Arab Emirates (UAE) and operates across the Gulf region, serving a wide customer base in multiple sectors.

ADNOC is among the world's leading energy producers. Founded in 1971, ADNOC is committed to finding innovative approaches and technologies to meet the demands of an ever-changing energy market; the Ruwais Diyab concession is an example of this.

The requirement

Haven was asked to provide a complete fire and gas system for the Ruwais Diyab project, an unconventional gas exploration and development programme spanning more than 6,000 km2. The system called for sensors to detect hydrogen sulphide (H2S).

H2S is an extremely toxic gas that can be lethal at just 0.1%. It is common in the Middle East, with high levels reported in Oman, Muscat and the UAE, and ADNOC was keen to protect its workers.

The project site is in the Middle East, where H2S is an increasingly significant threat within gas production. However, the climate of the region makes it among the most challenging environments for any kind of electronic equipment, including gas detectors. At Ruwais Diyab, temperatures can range from 10°C to 65°C with wide fluctuations in relative humidity (RH).

Standard electrochemical sensors find it hard to cope with these conditions, because a combination of high temperature and low humidity dries out the electrolyte, impairing sensor performance and necessitating frequent sensor replacement which can be costly in terms of labour, time and money.

Metal oxide semiconductor (MOS) sensors have been touted as an alternative, because they do not have an electrolyte, but these also have drawbacks. They are prone to 'falling asleep' when they have not encountered gas for a while and must be protected by a sinter which can delay the sensor's response. Also, moisture can gather behind the sinter and impair sensor performance.

Despite their relatively high cost, MOS sensors have not provided the level of H2S protection that is needed in Middle Eastern gas fields. Therefore, Haven and Crowcon had to find a better solution for the Ruwais Diyab project.

The approach

Crowcon's new high temperature (HT) H2S sensor for the XgardIQ has been designed to improve on electrochemical sensor technology, even in tough environmental conditions like those of the Middle East. The new sensor includes innovative adaptations to prevent evaporation, including a more hygroscopic electrolyte, which avoids the drying-out problem seen in conventional electrochemical sensors, and reduced pore size to restrict water entry.

The XgardIQ HT sensor for H2S is based on reliable and well-proven electrochemical technology but unlike traditional models can operate reliably in temperatures of up to 70°C even in harsh conditions. It has a life expectancy of up to 24 months and short response time.

The XgardIQ is a SIL-2 certified, intelligent and versatile gas detector that works with all of Crowcon's sensor technologies, including the HT H2S. It has non-intrusive calibration with no need for a hot-work permit or special tools (which save on downtime), and auto-sense and auto-configure functions.

The outcome

Haven and Crowcon proposed the installation of 27 XgardIQ HT H2S detectors within Haven's fire and gas system for the Ruwais Diyab unconventional gas concession in the UAE, and an order was duly placed. Crowcon's solution to the climate-related challenges of H2S detection in the Middle East, along with Haven's one-stop service, provided a superb solution in a tough environment.

Case Study

Upstream Oil and Gas Producer in the Middle East

A major upstream oil and gas company in the Middle East has chosen Crowcon's Gas-Pro PID portable gas monitors to help protect employees from the risks of volatile organic compounds (VOCs).

Background

Upstream oil and gas operations must contend with many hazardous gases, which may be explosive, toxic, or both. Typical hazards include methane, hydrogen sulphide, carbon monoxide and even oxygen where it occurs at high concentrations. Personal protection equipment therefore includes portable multi-gas meters that must be carried by everyone working in the affected areas.

Health and safety requirements are tightening up even further in some markets, with regulators increasingly calling for protection against a range of VOCs. These may not be as common as the main hazardous gases, but they could be a hazard when they do escape. Checking for VOCs demands an upgrade in personal protection equipment.

Requirement

Over 3,500 employees and 8,000 contractors work on the customer's refinery and they have each had to carry a personal gas detector for many years. But a recent health and safety inspection identified an additional risk to personnel of exposure to VOCs, which were not included in the range of gases that the existing monitors were screening for. VOCs include a wide range of organic chemicals such as benzene, many of which can be harmful.

The customer realised that it needed an alternative monitoring solution and asked Crowcon's local distributor for help. The local firm had been supporting the customer successfully using Crowcon gas monitors for years. In addition, the aim was to find a solution with similar usage characteristics so that personnel would not need significant retraining in order to switch to the new monitors. This made Crowcon monitors an obvious choice.

Approach

The customer's previous favoured solution was the Crowcon Tetra 3 diffusion-based portable multi-gas monitor, which checks for methane, hydrogen sulphide, carbon monoxide and oxygen. The lightweight, compact and robust monitor features single-button operation and a top-mounted, easy-to-read backlit display.

The new solution is Crowcon's Gas-Pro PID monitor. Gas-Pro PID can use Photo Ionization Detection technology to detect hundreds of VOCs in addition to the other gases, so it is ideal for protecting people working in any environment that could expose them to solvents, glues or paints, as well as the VOCs that can be present around upstream oil and gas facilities. With its dual-coloured display, the monitor alerts the user with a 95db audible alarm and dual-coloured visual alarm bars. It also features the same single-button operation and easy-to-read display as the previous monitors.

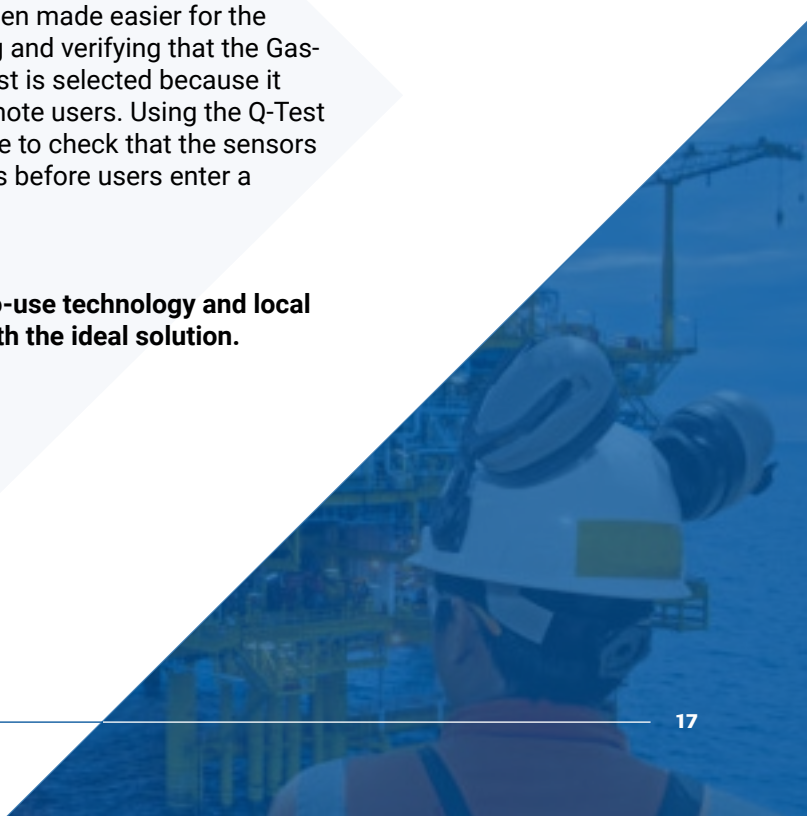
One important feature of the Gas-Pro PID in this application is the ability to download the gas reading at the end of each shift, enabling the process operator to create a record of exposure that can demonstrate to health and safety officers that any risk to personnel is being effectively managed.

Outcome

The company opted to trial Crowcon's Gas-Pro PID monitors and initially bought four units. Six months later, it followed up with 30 more. These are being used by personnel acting as supervisors in the first instance, but the plan is eventually to roll out the upgraded technology to everyone.

In addition to the monitors, bump testing has been made easier for the customer by including a Q-Test for bump testing and verifying that the Gas-Pro PID monitors are working properly. The Q-test is selected because it requires no power and therefore suitable for remote users. Using the Q-Test means that a bump test takes less than a minute to check that the sensors are responding correctly to a known value of gas before users enter a hazardous area.

In summary, a combination of versatile, easy-to-use technology and local continuity of service provided this customer with the ideal solution.



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