WIRELESS GAS MONITORING: A RELIABLE SOLUTION
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Occupational health and safety operations and procedures in the chemical and petrochemical industries have been steadily improving in recent decades. However, there is still a great deal of potential improvement: with workplace automation and plant monitoring, more proactive accident prevention, and intelligent data management in the era of big data.

Chemical and petrochemical plants contain processes and machinery for extraction, refining, storing and transportation of hazardous substances. These plants, therefore, have the potential for areas with a danger of flammable and toxic gas leaks along with oxygen deficiency.

Reliable detection of flammable or toxic gases and vapors can protect employees from life-threatening situations. Due to the diversity of raw materials, intermediates, and end products in the chemical industry, you need gas detectors and sensors to either measure a wide range of hazardous substances or react selectively on a particular substance. In addition, they should also be robust and low-maintenance.

Typically gas sensors are distributed throughout the plant in areas where the gas can accumulate. These wired devices would be connected to one central control panel, which receives the data and takes the appropriate action. Most devices use an analogue 4-20mA signal to transfer this information, but we often face many challenges with a centralized hard-wired solution, especially in large-scale areas. Installation costs of wired systems are often very high, especially when installing harsh environments. Remote areas can also be difficult to cover with adequate protection and areas where a large amount of existing infrastructure; buildings, roads, etc. add complexity or maybe even prevent cable installation.

To overcome these issues
A decentralized solution of the controller stations with lower distances between sensor and controller is one option. Controllers set-up networks via Ethernet, which enable the users to create a tailor-made and extendible architecture.
Decentralised solution with the safety controller REGARD® 7000 in a petrochemical plant
THE USAGE OF WIRELESS TRANSMITTERS REDUCES INSTALLATION WORK AND MATERIAL COSTS SIGNIFICANTLY.

The main requirements a gas detection system has to meet: It has to be reliable, meet the economic targets, and be part of the safety concept. Detailed planning of such a system is needed to fit all requirements, especially when applied to large plants like those found in the chemical and petrochemical industries. Here we face many different types of gases, often harsh environmental conditions with strict legal requirements and, typically, the solutions have to be integrated into existing infrastructure.

Wireless gas detector network supervised with the safety management control station ViewPro7000 – to detect toxic and combustible gases.
Taking these aspects, advancements in new technologies facilitate the design of efficient customer-tailored solutions. Control equipment and digital data transfer leads to better insights into the system, offering more diagnostic information of the transmitter - wired or non-wired. At the controller side, data logging functions, visualization of installed systems, trending, data transfer to other infrastructures increases the quantity and transfer rate of information in a highly scalable and more transparent manner. This helps the customer to accelerate the decision process and provide safer and more efficient safety systems.
GAS DETECTION IN REMOTE AREAS

There are many years of experience with wired technologies and well-established procedures for using them in the plant. But there are limits to do that in a cost-effective manner. In remote and ATEX hazardous areas, cost for hard-wired solutions can increase significantly regarding installation work, operative costs, and time for engineering, planning and mounting of detectors. Although the cost of installing and maintaining is significant, wired solutions are dominating further on the installations.

But there is also the need for higher productivity, higher safety in the field, and lower costs.

WIRED AGAINST NON-WIRED SOLUTION

<table>
<thead>
<tr>
<th>Expenses</th>
<th>Wired Solution</th>
<th>Non Wired Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation/Engineering</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Material</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Detectors</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>
WIRELESS

There are plenty of reasons that an industrial plant may not have a sufficient level of gas detection. Perhaps the area is too large, maybe the environment makes cabling difficult, or perhaps the installation cost of traditional fixed gas detectors is simply too high. Enter Wireless. Wireless gas detection provides outstanding project cost savings, accurate measurement and exceptionally low power consumption. It can be integrated into legacy systems without installing new or additional cabling and doesn’t need the same level of planning as cabled systems.

Reliable data flow, easy to use and low energy consumption are necessary to make wireless communication practical for the customer.

The Dräger Polytron® 6100 WL EC wireless detector for the detection of toxic gases is certified for use in functional safety applications according to IEC 61508 for a safety integrity level of SIL 2. It is applicable for safety and monitoring applications. The device is available in two versions: Battery powered with a Lithium-thionyl chloride power module and a line powered option.

The detector enables with short latency, a transmitting rate of 2 sec and a battery lifetime of average 2 years, due to the low energy consumption with an average value of 0.5 W. The Polytron 6100® WL EC is fully integrable (supports) into the ISA100 Wireless network.

ISA100.11a is a bidirectional digital network that allows secure transmission of production parameters and diagnostic data between the field devices and the control system.

The ISA 100 standard allows two standard topologies:

a) A star topology in which the detector sends information directly to a backbone router, often called an Access point. This translates the ISA protocol into other formats like Profinet or Modbus to transmit the information to the central control system.

b) A mesh topology in which the transmitter can either send its information directly to the access point, like in a star topology, or can act as a repeater, receiving signals from other devices and forwarding to the backbone router.