MSA
The Safety Company

Hazard Safety Solutions for the Pharmaceutical, BioPharma, and Life Sciences Industries

Knowing the Environment, Recognizing the Hazards, and Offering Solutions

SAFEGUARDING
PEOPLE, PLACES & THE PLANET

Hazard Safety Solutions for the Pharmaceutical, BioPharma, and Life Sciences Industries

Modern pharmaceutical research laboratories and manufacturing facilities are some of the most complex, demanding, and hygienic process and production environments on earth. Lives depend on the quality of the innovative research under way and the resulting pharmaceutical medicines consumed daily by people wordwide.

These life-saving treatments, however, frequently require the use of hazardous gases and fluids, which are potentially toxic, combustible, or flammable under the wrong conditions. Our mission at MSA is to help pharmaceutical, biopharma, and life sciences companies protect the safety of employees, equipment, facilities, and the surrounding communities from tragic accidents.

As the industry safety leader, MSA is an innovator in saving lives. We never rest when it comes to protecting people at work through the development of leading-edge technologies, precision long-life sensors, and intelligent systems designed to anticipate, warn, and alert you to unsafe working conditions.

MSA gas and flame detectors are installed in nearly all types of pharmaceutical facilities around the globe. From laboratories to small prototype plants to full-scale manufacturing facilities with cold storage and climate-controlled distribution warehouses, MSA understands the importance of the pharmaceutical industry's FDA sanitary processes and environmental regulations.

Pharmaceutical Process Safety Threats & Solutions

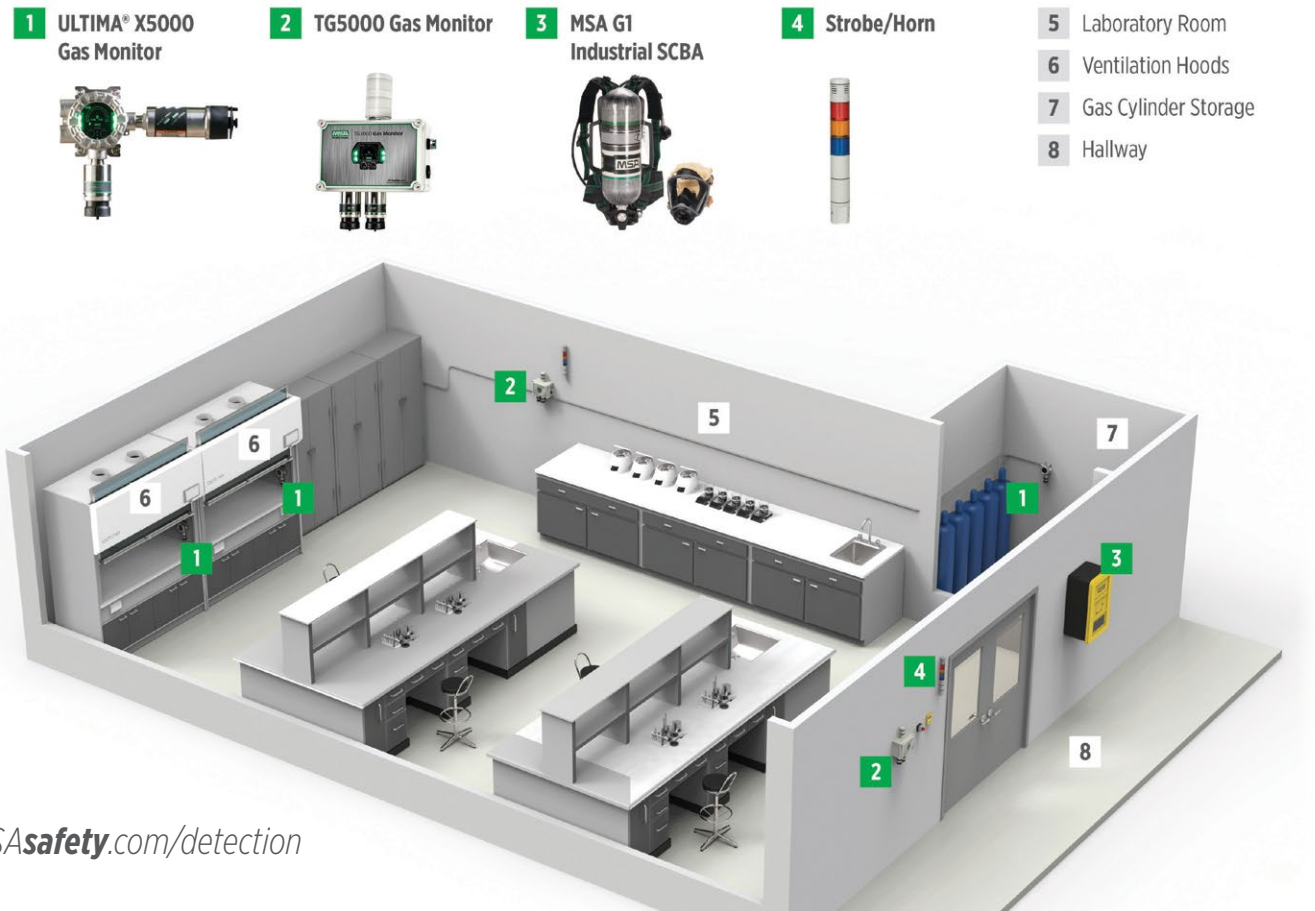
Areas To Monitor: Laboratories and Process Lines

Oxygen Depletion Monitoring

Oxygen (O_2) depletion gas monitoring ensures breathing air is not displaced by a process gas, such as nitrogen (N_2), argon (Ar), solvents, or ammonia (NH_3) and various other refrigerants. For example, gas leak accidents have occurred involving the blanketing of reactors, vessels, or centrifuges where gas line leaks have displaced breathable air. The ULTIMA® X5000 and TG5000 Gas Monitors, along with the SENTRY io® Controller, provide O_2 monitoring that alarms in the 0-25% range with the first alarm at 19.5% O_2. Unlike most electrochemical sensors on the market, the MSA XCell® O_2 Sensor uses a non-consuming chemical reaction and has a typical life of more than four years. This non-consuming chemical reaction also means that the sensor can have a much longer shelf-life. With its dual sensor capability, the ULTIMA X5000 and TG5000 Gas Monitors can detect both O_2 deficiency and combustible gas to the lower explosive limit (LEL).

Areas To Monitor: Laboratories, vessels, reactors, centrifuges, tank storage areas

Gas Detection for a Pharamceutical Laboratory



Methylene Chloride (CH_2Cl_2) Solvent

The solvent methylene chloride, also known as dichloromethane, has an OSHA toxic STEL of 125 ppm, TWA of 25 ppm, IDLH of 2300 ppm, and its lower explosive limit (LEL) is 13% by volume (130,000 ppm). The best safety monitoring solution is a gas detector that addresses both the toxicity and the explosion hazard. For example, a 10% LEL setpoint using a standard catalytic bead sensor to detect combustible gas would be 13,000 ppm and would not provide monitoring at OSHA required toxicity levels. Installing MSA's photoacoustic infrared Chemgard® Monitor detects this solvent down to 3 ppm to meet the requirements for both the toxic and combustible gas hazards.

Common Solvent Hazards

Solvents are used in a variety of processes found in the pharmaceutical industry. They are typically used to clean equipment and include: ethanol, isopropyl alcohol, toluene, pyridine, acetonitrile, acetone, and ethyl acetate. Depending on the process and concentration, they typically are a combustible gas or flame hazard and can become toxic gas hazards affecting employee respiratory health.

Acetonitrile

Acetonitrile is a solvent that dissolves organic compounds. It is used in the production of insulin and antibiotics. This solvent also helps to separate and purify compounds in a mixture performed by high performance liquid chromatography (HPLC) systems. Other uses include as a reagent, for reaction or as an extraction solvent.

Ethanol

Ethanol is applied as a solvent in the manufacturing process of tablets, powders, and antibiotics. Application examples include use with an active pharmaceutical ingredient (API) and as an excipient and as a topical disinfectant and preservative in various pharma preparations.

Isopropyl Alcohol (IPA)

This common type of alcohol is used primarily as a disinfectant, (wipe down) in pharma grade clean areas. It also finds application as a sterilizing agent in the preparation of medicinal tablets and creams or with chromatography for separation processes.

Carbon Dioxide (CO_2)

Carbon dioxide is encountered in multiple applications in the pharmaceutical industry. MSA's rugged ULTIMA X5000 CO_2 Gas Monitor provides precision monitoring at temperatures as low as -40°C (-40°F). For example, CO_2 is flowed to refrigerated culture cell incubators to maintain and optimize temperature, moisture (percent relative humidity), and pH. This gas is also present in fluid chromatography, as well a byproduct of industrial and medical lasers. Dry ice is another potential source of CO_2 exposure, which is used to preserve specimens and maintain sanitary surfaces.

Hazard Safety Solutions for the Pharmaceutical, BioPharma, and Life Sciences Industries

Refrigerants

Pharmaceutical manufacturing and research and development (R&D) facilities require highly controlled environmental conditions. The nature of their products requires strict contamination-free processing regulated by agencies world-wide, and in accordance with recognized current Good Manufacturing Practices (cGMP) requirements.

Laboratories are climate controlled and generally require facility chiller systems to condition the working areas for personnel and experiments. Freezer rooms and other product storage areas are climate controlled to maintain the integrity and stability of specimens and reagents. Manufacturing process recipes require precise temperature cooling and humidity control of product ensuring high yield and smooth production flow.

MSA's advanced Chillgard® 5000 Refrigerant Leak Monitor and remote display offers multi-point monitoring that includes a library of 38 common refrigerant gases. Utilizing photoacoustic infrared (PAIR) technology, it is the industry's most sensitive and selective device of its kind that meets ASHRAE 15 and other safety, environmental, and building code requirements.

Areas To Monitor: HVAC, Freezers, Chillers, Cold Storage, Warehouses

Gas Detection for a Chiller Room

1 Chillgard® 5000 Refrigerant Leak Monitor

2 Chillgard 5000 Remote Display

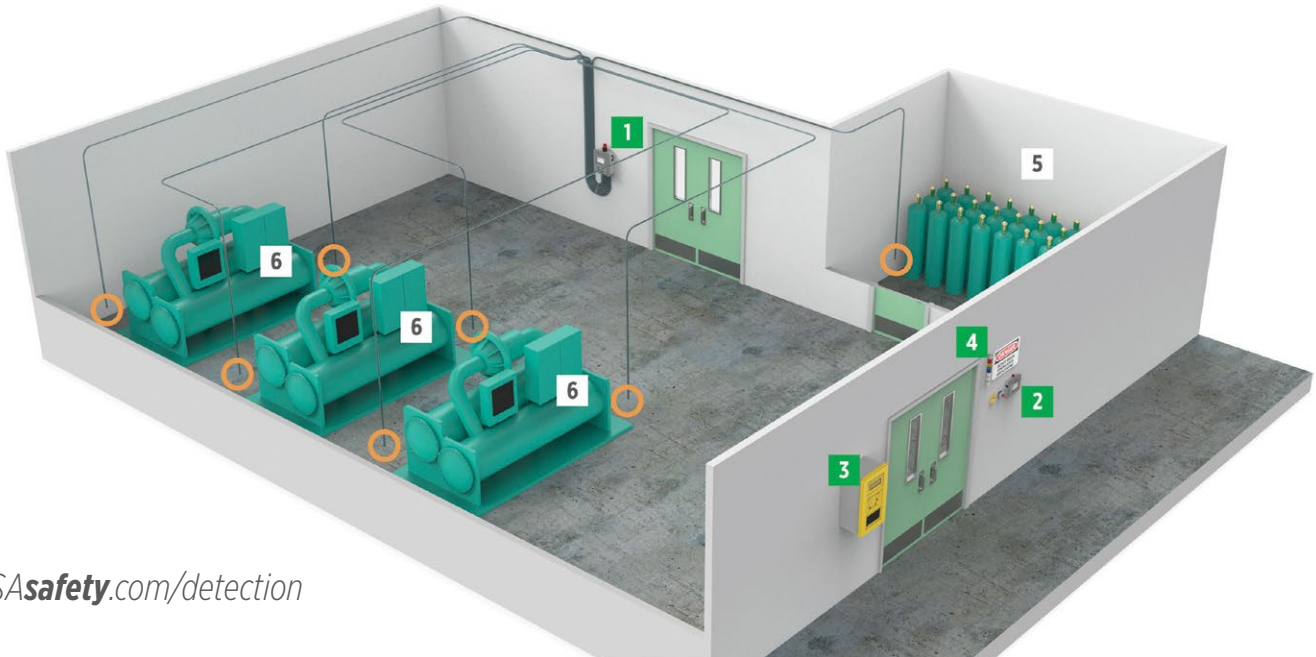
3 MSA G1 Industrial SCBA

4 Strobe/Horn

5 Refigerant Storage

6 Chiller

Sample Point

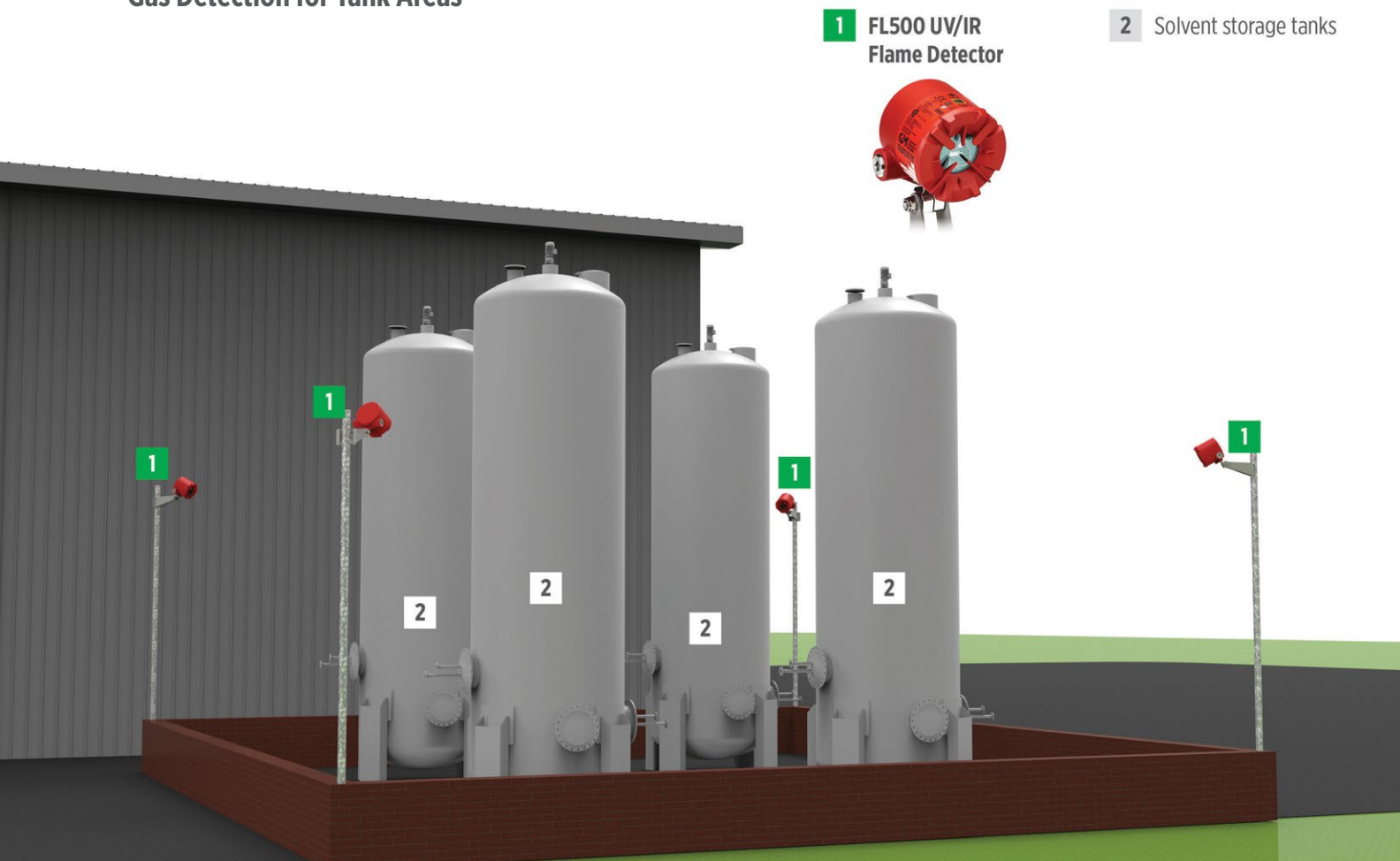


Gas and Solvent Tank Lockers, Equipment Areas, and Tank Farms

Many solvents, specialty gases, and tank blanketing gases are a triple threat. They can be toxic, combustible (LEL), and flame hazards depending on their area of use and storage or proximity to other equipment and each other. MSA provides a comprehensive solution to fixed gas and flame safety with its reliable ULTIMA X5000 Gas Sensors combined with its highly-intelligent General Monitors® FL4000H MSIR and FL500 UV/IR Flame Detectors.

Areas To Monitor: Tank Rooms, Lockers, Equipment Areas and Tank Farms

Gas Detection for Tank Areas



Hydrogen (H_2) Gas in Back-Up Power Battery Rooms

Back up power systems maintain temperature-controlled specimen storage areas and sensitive electronics during power outages at pharmaceutical plants. These back-up systems are frequently battery powered and subject to over-heating or outgassing combustible gases such as hydrogen (H_2).

Once such a fire event begins in a battery room, it is almost unstoppable for all practical purposes. Early detection is, therefore, critical to prevent catastrophic fires and the loss of electric power. MSA's ULTIMA X5000 and TG5000 Gas Monitors can detect these gases in advance of an actual fire event and alert plant operators to dangerous fire precursor conditions.

Areas To Monitor: Battery Rooms or Buildings

Gas and Flame Safety Solutions You Can Count On

MSA's fixed gas and flame detection systems offer you an unmatched record of safety in the world's most hazardous industries. Our products meet safety and environmental standards from around the world. They are highly reliable and scalable to meet your present and future requirements to grow with your needs from R&D laboratories to prototype production sites to full-scale facilities and beyond to internet-based safety monitoring of multiple locations.

With our deep industry experience, the MSA team of scientists, engineers, and technicians understands the risks and challenges involved in the pharmaceutical, biopharma, and life science industries. We know how to protect you and your people so you can concentrate on life-saving medicines and work with confidence while our gas and flame detectors, controllers, and systems are on the job as your safety partner.

ULTIMA® X5000 Gas Monitor

The ULTIMA X5000 Gas Monitor is the future of gas detection for oxygen, toxic, and combustible gases. MSA XCell Gas Sensors with TruCal Technology offer calibration cycles up to 24 months (local calibration respected). The gas transmitter's advanced, OLED display is easy to read and the unique touch-screen interface makes it simple to navigate. Bluetooth wireless technology allows a mobile device to act as an HMI screen and calibration/setup controller.

TG5000 Gas Monitor

The TG5000 Gas Monitor is an effective and economical solution to detecting combustible and toxic gases, as well as oxygen deficiency/enrichment. The TG5000 Monitor helps personnel to work safely in pharmaceutical environments offering a variety of sensor and configuration options.

SENTRY io® Controller

Monitor up to 16 gas and flame detectors with the highly accurate wall-mounted SENTRY io Controller. The controller's large, touchscreen HMI supports intuitive operation with its menu-driven approach. SmartStart guides users through the setup process and EZ-ID helps populate details of HART-enabled MSA detectors saving valuable programming time. Remote monitoring and notifications available as a subscription.

Chemgard® Gas Monitor

The Chemgard Photoacoustic Infrared Gas Monitor with photoacoustic infrared (IR) sensing technology provides precise, low-cost, high-performance monitoring for many gases such as hydrocarbons, solvents, alcohols, CO_2, CO, and additional toxic gases. It is extremely stable and highly selective to the gas of interest, and can operate for months with virtually no zero drift. This monitor offers detectability as low as 0.5 ppm for certain applications.

FL500 UV/IR Flame Detector

The General Monitors® FL500 UV/IR Flame Detector monitors for radiation emitted by a flame in both the ultraviolet (UV) and infrared (IR) spectral ranges. This UV/IR combination provides a fast response time and increased false alarm immunity against sources of radiation for reliable protection from either hydrocarbon or hydrogen-based fires. The detector provides optimal coverage for applications where a shorter detection range is required over a large coverage area.

HazardWatch® FX-12 System

The HazardWatch FX-12 System accommodates up to 12 points of input/output devices and allows users to configure system logic. It is highly scalable, making it suitable for small systems to large plant-wide applications. The system's controller hardware configuration and software have been tested by Factory Mutual to verify NFPA 72® compliance.

Chillgard® 5000 Refrigerant Leak Monitor

The Chillgard 5000 Refrigerant Leak Monitor provides the earliest level of detection of costly refrigerant gas leaks in mechanical equipment rooms. Sampling system with patented photoacoustic infrared (PAIR) technology detects leaks as low as 1 part per million (ppm). Intuitive, touchscreen user interface makes it easy to operate. Predictive maintenance and diagnostics keep you operational.

Chillgard® 5000 Remote Display

The Chillgard 5000 Remote Display provides gas monitor information before room entry where potentially hazardous gas levels may exist. It mimics the Chillgard 5000 Refrigerant Leak Monitor readings for gas concentration, alarm status, and calibration.

Remote Monitoring and Notifications

The FieldServer FGFD ProtoAir Gateway gives you the flexibility to stay connected to your field devices when you're away from the facility or to keep watch on unmanned facilities. Every ProtoAir FGFD Gateway is pre-configured with MSA's FGFD products before delivery to seamlessly enable Cloud communications to one or many MSA products.

MSA—The Safety Company

Established in 1914, MSA Safety Incorporated is the global leader in the development, manufacture, and supply of safety products that protect people and facility infrastructures. Many MSA products integrate a combination of electronics, mechanical systems, and advanced materials to protect users against hazardous or life-threatening situations. The company's comprehensive product line is used by workers around the world in a broad range of markets, including the oil, gas, and petrochemical industry, the fire service, the construction industry, mining, and the military. MSA's core products include self-contained breathing apparatus, fixed gas and flame detection systems, portable gas detection instruments, industrial head protection products, firefighter helmets and protective apparel, and fall protection devices. With 2021 revenues of $1.4 billion, MSA employs approximately 4,800 people worldwide. The company is headquartered north of Pittsburgh in Cranberry Township, PA, and has manufacturing operations in the United States, Europe, Asia, and Latin America. With more than 40 international locations, MSA Safety is ready to support your safety needs globally. For more information visit MSA's web site at www.MSAsafety.com.

Our Mission

MSA's mission is to see to it that men and women may work in safety and that they, their families, and their communities may live in health throughout the world.

MSA: SAFEGUARDING PEOPLE, PLACES & THE PLANET.

MSA operates in over 40 countries worldwide. To find an MSA office near you, please visit ***MSAsafety.com/offices***.

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