

Cryogenic gases such as hydrogen, argon, nitrogen, helium, oxygen, and carbon dioxide are the most commonly transported, manipulated and stored liquid industrial gases used in food and beverage, pharmaceutical and laboratory applications at cryogenic temperature. The rapid expansion of these liquids when they warm and become gaseous means that they can quickly fill a room with a colorless, odorless gas putting people and sites at risk.

## Gas Detection Concerns

- Carbon dioxide is both toxic and an asphyxiant
- Nitrogen and helium are asphyxiants
- Oxygen at increased levels can greatly accelerate the burning process
- Hydrogen is highly flammable
- Argon: odorless and colorless, at high concentrations can replace oxygen and become asphyxiant.

At Teledyne Gas & Flame Detection, we have both portable and fixed gas solutions which can help you make your process safer for your employees. And at the same time, these devices can notify your facility that a gas leak is occurring which might indicate disruption of a critical process.

## Applications:

### Food & beverage industry



- Deep-freezing*
- Packaging*
- Greenhouses enrichment*
- Breweries*

### Chemical / petrochemical industry



- COV cryogenic condensation*
- Cryogenic cleaning*
- Dehydration through cryogenic freezing*

### Aerospace industry



- Space launcher liquid propellant*

### Medical / pharmaceutical industry



- Cryopreservation of cells*
- Medical treatment*

## Cryogenic gases main risks

### Toxicity of carbon dioxide

Carbon dioxide is both an asphyxiant as well as a toxic gas meaning that a specific CO<sub>2</sub> detector is needed to detect leaks. The toxic effects of CO<sub>2</sub> are listed below.

5 000 ppm (0.5%)	15 000 ppm (1.5%)	30 000 ppm (3%)	50 000 ppm (5%)	75 000 ppm (7.5%)	100 000 ppm (10%)	300 000 ppm (30%)
Long-term Exposure Limit (LTEL)	Short-term Exposure Limit (STEL)	Shortness of breath	Heavy breathing Sweating Pulse quickens	Drowsiness Headaches Increased blood pressure	Vomiting Unconsciousness	Coma Convulsions Death

### Dangers associated with Oxygen (O<sub>2</sub>)

Two main dangers are associated with oxygen : increase or decrease of oxygen levels in ambient air, anoxia or overoxygenation.



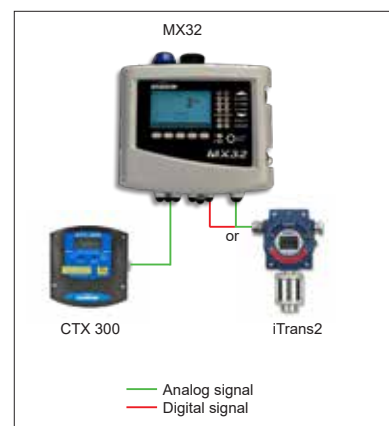
Anoxia : The decrease of oxygen level in ambient air is due to other gases leaks such as CO<sub>2</sub>, nitrogen, helium or argon. This phenomenon is called anoxia and is a serious hazard for people.

High oxygen concentrations enhance combustion and can cause violent explosions.



5%	10%	15%	19%	19.5-23.5%	23.5%
Vomiting, loss of consciousness, death	Abnormal fatigue, decreased muscle coordination	Impaired judgment	Threshold according to OSHA guidelines	Noticeable increase in the fire risk	

## Teledyne Gas & Flame Detection solutions



### Teledyne Gas & Flame Detection products & solutions



MX 32

The MX 32 controller comes with 2 measurement lines to manage alarms and programmable relays, its datalogging capability allows to record events for a duration of up to 18 months.

The registered data is easily exportable. The MX 32 controller records all events in real-time (alarms, faults, alarm resets, calibration etc.). It also provides an automatic backup of the configuration & firmware (viewable through Excel).



iTrans2

The Trans2 is a digital transmitter designed to detect oxygen, combustible and toxic gases.

Intended for use in combination with the MX 32 controller, the Trans2 provides a fast and accurate response. Up to 8 detectors can be connected on the same digital line or distributed on 2 lines.

All transmitter information is received by the controller in less than 1 second.

Non-intrusive operator interface allows one man calibration without opening the enclosure.

### Other key products



AirAware



GD 10



Protégé ZM



CTX 300



700 Series



Alarm system



PS 500