

### Potential industries and applications for oxygen detection:

- Mining
- Steel Mills
- Power Generation
- Chemical Manufacturing
- Hospitals/Medical Facilities
- Manufacturing Plants

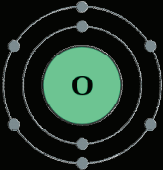
**Oxygen (O)** is a highly reactive Period 2 element with the atomic number 8. It readily forms compounds (notably oxides) with almost all other elements.

At standard temperature and pressure, two atoms of the element bind to form di-oxygen (O<sub>2</sub>), a colorless, odorless, tasteless diatomic gas with the formula O<sub>2</sub>. By mass, oxygen is the third most abundant element in the universe after hydrogen and helium and the most abundant element by mass in the Earth's crust. Diatomic oxygen gas constitutes 20.8% of the volume of air.

The oxygen level in normal fresh air is approximately 21% volume. Reduced oxygen levels can cause dizziness or fainting. If levels are too low, serious brain damage or death may occur. In some underground environments such as mines, low oxygen conditions can be formed either by displacement of the oxygen by another gas, or by consumption of the oxygen in the area by a chemical or biological process.

An oxygen monitor can help to prevent injury or death by providing an early warning of reduced oxygen concentration. Typically, if the oxygen level drops below 19.5% volume (the OSHA-mandated level) a low-oxygen alarm is triggered, and personnel can be evacuated until the problem is properly investigated and resolved.

## Oxygen (O<sub>2</sub>)



General	
Systematic Name	Oxygen
OtherNames	dioxygen
MolecularFormula	O, O <sub>2</sub>
Appearance	a colorless, odorless, tasteless diatomic gas
CASNumber	7782-44-7
Properties	
MolecularMass	15.9994(3)g·mol <sup>-1</sup>
VapourDensity	1.429g/L @ 0 °C
MeltingPoint	-218.79°C, -361.82°F
BoilingPoint	-182.95°C, -297.31°F
Hazards	
ACGIH-TLV	
Time Weighted Value (TWV)	Short Term Exposure Limit (STLV)
N/A	N/A
OSHA-PEL	
Permissible Exposure Limit- Time Weighted Average (TWA)	Permissible Exposure Limit (PEL)
N/A	N/A
NIOSH	
Permissible Exposure Limit- Time Weighted Average	Immediately Dangerous to Life or Health
N/A	N/A

### Industrial Applications

#### Steel Production

The smelting of iron ore into steel consumes 55% of commercially produced oxygen. In this process, O<sub>2</sub> is injected through a high-pressure lance into molten iron, thereby removing sulfur impurities and excess carbon as the respective oxides, SO<sub>2</sub> and CO<sub>2</sub>. The reactions are exothermic, with the temperature increasing to 1,700°C.

#### Chemical Industry

Another 25% of commercially produced oxygen is used by the chemical industry. Ethylene is reacted with O<sub>2</sub> to create ethylene oxide, which, in turn, is converted into ethylene glycol, the primary feeder material used to manufacture many products, including antifreeze and polyester polymers (the precursors of many plastics and fabrics).

#### Other Applications

Most of the remaining 20% of commercially produced oxygen is used in medical applications, metal cutting, welding, as an oxidizer in rocket fuel, and in water treatment. Oxygen is used in oxyacetylene welding, in which acetylene and O<sub>2</sub> are burned to produce a very hot flame. In this process, metal up to 60 cm thick is heated with a small oxyacetylene flame and then quickly cut by a large stream of O<sub>2</sub>. Larger rockets use liquid oxygen as an oxidizer, which is mixed and ignited with the fuel for propulsion.



**Conspec's CN Series** is an economical choice for oxygen gas monitoring. The CN Series is a simple "smart" gas detector. An industry-standard 4-20mA analog output signal. Can be connected to any existing PLC, DCS, or EMS system.

**Specifications:**

**Mechanical**

Enclosure	NEMA 4x
Dimensions	4.5"x5"x4"
Weight	1 ¼ lbs.
Mounting	4 holes
Conduit Entry	One (3/4" cable grip)

**Environmental**

Operating Temperature	-4°F - 120°F (-20°C - 50°C)
Temperature Compensation	Full Temperature Range
Operating Humidity	10% - 90% RH Non-condensing

**Electrical**

Operating Voltage	12-24VDC
Cable Requirements	3 Conductor 18 AWG Suggested
Current Consumption	50mA full-scale
Output Signal	Linear 4-20mA, RS-485 (optional)

**System**

Sensor Ranges	0-25% Vol., 0-100% Vol.
Sensor Type	Electrochemical
Keypad	9-Button Infrared Remote Control
Modes	2 (Normal & Calibration)
Display	Two-Line, 8-Character Alphanumeric LCD Display
Status LEDs	3 LEDs, 4 Status
Alarms	2 User-Defined



**Conspec's CX Series** is an economical choice for oxygen gas monitoring. The CX Series is a simple "smart" gas detector designed for use in hazardous or classified locations. An industry-standard 4-20mA analog output signal. Can be connected to any existing PLC, DCS, or EMS system.

**Specifications:**

**Mechanical**

Enclosure	Explosion Proof UL Listed Class 1 Div. 1 or 2 Groups B, C & D
Dimensions	4.5"x5"x4"
Weight	4 lbs.
Mounting	Conduit Mounted
Conduit Entry	One (3/4" cable grip)

**Environmental**

Operating Temperature	-4°F - 120°F (-20°C - 50°C)
Temperature Compensation	Full Temperature Range
Operating Humidity	10% - 90% RH Non-condensing

**Electrical**

Operating Voltage	12-24VDC
Cable Requirements	3 Conductor 18 AWG Suggested
Current Consumption	50mA full-scale
Output Signal	Linear 4-20mA, RS-485 (optional)

**System**

Sensor Ranges	0-25% Vol., 0-100% Vol.
Sensor Type	Electrochemical
Keypad	9-Button Infrared Remote Control
Modes	2 (Normal & Calibration)
Display	Two-Line, 8-Character Alphanumeric LCD Display
Status LEDs	3 LEDs, 4 Status
Alarms	2 User-Defined



**Conspec's new Smart Head Gas Monitoring System** monitors, records, remembers, warns and advises if it needs replacement.

**Conspec's Smart Head Single Channel Monitor and Smart Head Multi-Channel Controller** are smarter than your average monitors because they are digital yet simpler and more reliable.

**Specifications:**

**Mechanical**

Enclosure	NEMA 4x
Dimensions	7.5"x5"x3"
Weight	3 ½ lbs.
Mounting	Plate-Mounted, 6 holes for suspension, grooves for slot mounting
Conduit Entry	One (3/4" cable grip)

**Environmental**

Operating Temperature	-4°F-120°F (-20°C - 50°C)
Temperature Compensation	Full Temperature Range
Operating Humidity	10% - 90% RH Non-condensing

**Electrical**

Operating Voltage	12-24VDC
Cable Requirements	4 Conductor 18 AWG Suggested
Current Consumption	50mA full-scale
Output Signal	RS-485; 4 Open Collector Digital Output, Linear 4-20mA (Single Channel only); HART (Optional).

**System**

Sensor Ranges	0-25% Vol., 0-100% Vol.
Sensor Type	Electrochemical
Keypad	4-Button Keypad or Infrared Remote Control
Modes	2 (Normal & Calibration)
Display	3.5" LCD Display
Status LEDs	4 LEDs, 4 Status
Alarms	3 User-Defined