

Portable Gas Detection

MSA Gas Detectors Display 20.8% Standard Oxygen Reading



Technical Bulletin

Users of MSA gas detectors frequently inquire as to why MSA gas detectors display standard oxygen level at 20.8%, as many competitors use standard 20.9% reading. In practical application, this minimal difference has no real effect upon worker safety and health or safety program administration. However, MSA believes that 20.8% reading is a better representation of oxygen levels encountered in the workplace across industries and global geographic regions.

Atmospheric O₂ Content vs. Effective O₂ Concentration

Oxygen's atmospheric content hold steady at approximately 20.95% of atmospheric volume.* Although oxygen volume is constant, that constant does not take atmospheric pressure effects or humidity into account. Oxygen levels in air change with humidity and with temperature; as humidity levels increase, water molecules displace oxygen molecules, reducing oxygen concentration in air. Humidity's effect is greater at higher temperatures as more water vapor is present in air. Water vapor concentration varies from trace amounts found in dry deserts to 4% in very wet areas, but is often found to be in 1-3% range. We often find breathing to be more difficult while within humid conditions due to lower oxygen concentration in air.

Global Considerations

Considering average global temperature** and humidity levels, oxygen 20.8% reading is a more practical calibration value. As MSA products are used in most countries and conditions, 20.8% standard reading is more accurate. Although this nomenclature is used and will remain in use by MSA, the difference between 20.8% and 20.9% standard oxygen reading has no practical impact upon worker health and safety. This difference in display policy has no bearing upon instrument performance and should not be used as a basis for portable gas detector evaluation.



*Absolute and Relative Gas Concentration: Understanding Oxygen in Air, Bruce Bugbee and Mark Blonquist
**NASA Goddard Institute for Space Studies