

THE ABC'S OF GASES IN THE INDUSTRY

Ammonia: NH_3	n-Butane*: C_4H_{10}
<p>Colorless gas with a pungent suffocating odor</p> <p>STEL: 35 ppm TWA: 50 ppm IDLH: 300 ppm LEL: 15% by volume Ionization Potential: 10.18 eV</p> <ul style="list-style-type: none"> Fertilizer Plants Fish & Meat Packing Plants Industrial Refrigeration and Cold Storage Semiconductor Industry Water and Wastewater Treatment Plants Munitions <p><i>Refer to AP-201 for further information</i></p>	<p>Colorless gas with a gasoline-like odor</p> <p>STEL: 1 ppm TWA: OSHA 5 ppm LEL: 1.6% by volume</p> <ul style="list-style-type: none"> Aerosol Propellant Filling Docks Feed stock for Chemical Processes Storage Tanks and Filling Docks
Benzene: C_6H_6	Carbon Dioxide: CO_2
<p>Colorless liquid with aromatic odor</p> <p>STEL: 2.5 ppm TWA: 0.5 ppm LEL: 1.2%</p> <ul style="list-style-type: none"> Refineries Oil & Gas Distribution Feed Stock for Chemical Production Solvent Distribution Centers Gas Stations 	<p>Colorless, odorless gas</p> <p>STEL: 30,000 ppm TWA: OSHA 5000 ppm IDLH: 40,000 ppm</p> <ul style="list-style-type: none"> Breweries and Wineries Carbonated Beverage Bottling Plants Dry Ice Plants, Food Processing Plants, Fruit Storage and Ripening Chambers Greenhouses, Indoor Air Quality Studies, and Ventilation Control Mushroom Farms Stack Gas Oil Well Injection

Carbon Monoxide: CO	Chlorine: Cl₂
Colorless, odorless gas - most abundant toxic gas STEL: ppm TWA: OSHA 50 ppm LEL: 12.5% IDLH: 1200 ppm <ul style="list-style-type: none"> • Furnaces • Gasoline Generators/Engines • Grain Storage Silos • Lumber Drying Kilns • Mining and Metals • Parking Garages 	Green-yellow gas with a pungent, irritating odor STEL: 0.3 ppm TWA: OSHA 0.1 ppm IDLH: 5 ppm <ul style="list-style-type: none"> • Mining & Metals Industry • Nuclear Reactors • Pulp & Paper Mills • PVC Plastics Manufacturing • Semiconductor Water Etching Facilities • Swimming Pool Chlorinization Plants • Water Treatment Plants • Chlorine Gas Manufacturing
n-Hexane*: C₆H₁₄	Hydrogen*: H₂
Colorless liquid with a gasoline-like odor TWA: OSHA 500 ppm LEL: 1.1% IDLH: 1100 ppm <ul style="list-style-type: none"> • Electric Generation • Gas Stations • Peanut Oil Extraction Plants • Solvent Distribution Centers 	Colorless gas No exposure limits – Simple asphyxiant <ul style="list-style-type: none"> • Battery Charging Stations • Semiconductor Plants for Water Furnaces • Underground Vaults Containing Transformers • Vegetable Oil Hydrogenation Plants
Hydrogen Cyanide: HCN	Hydrogen Sulfide: H₂S
Colorless gas with a bitter, almond-like odor TWA: OSHA 10 ppm LEL: 5.6% IDLH: 50 ppm <ul style="list-style-type: none"> • Plating and Mining • Nylon Manufacturing 	Colorless gas with a strong odor of rotten eggs TWA: OSHA 20 ppm LEL: 4.0% IDLH: 100 ppm <ul style="list-style-type: none"> • Leather Tanneries and Paper Mills • Mining and Metals Industry • Oil Fields and Refineries • Sewage Treatment Plants • Sewer Maintenance
Methane: CH₄	Nitric Oxide: NO
Colorless, odorless gas – odorized with mercaptans Primary component of natural gas No exposure limits – Simple asphyxiant LEL: 5% <ul style="list-style-type: none"> • Oil & Gas Distribution & Refining • Mining Industry 	Colorless gas TWA: NIOSH/OSHA 25 ppm IDLH: 100 ppm <ul style="list-style-type: none"> • Semiconductor Plants • Mining

Nitrogen Dioxide: NO ₂	Oxygen Deficiency: O ₂
Reddish-brown with a pungent odor STEL: 1 ppm TWA: OSHA 5 ppm IDLH: 20 ppm <ul style="list-style-type: none"> Boilers and Furnaces Diesel Emissions Semiconductor Plants Mining Industry 	Colorless, odorless gas <ul style="list-style-type: none"> Cargo Holds and Storage Tanks Grain Storage Silos With Inerted Atmospheres Liquid Nitrogen Storage LN2 Cooled Laser Facilities LN2 Cooled Telescope Sewer Maintenance Sewer Treatment Facilities Underground Vaults (Utilities)
Propane*: C ₃ H ₈	Sulfur Dioxide: SO ₂
Colorless, odorless gas TWA: OSHA 1000 ppm LEL: 2.1% IDLH: 2100 ppm (LEL) <ul style="list-style-type: none"> Aerosol Propellant Filling Lines Feed stock for various Chemical Processes Propane-powered Forklifts Storage Tanks & Filling Docks 	Colorless gas with a pungent odor STEL: 5 ppm TWA: NIOSH 2 ppm IDLH: 100 ppm <ul style="list-style-type: none"> Circuit Board Etching Diesel Emissions Paper Mills Sulfur Processing Plants (SO₂) Water Treatment
Volatile Organic Compounds (VOCs) Refer to the NIOSH Pocket Guide for specific chemical hazards	
<ul style="list-style-type: none"> Airline Maintenance Facilities (Jet fuel - refer to AP-200) Consultant Engineering Leaking Underground Storage Tanks Petrochemical Manufacturing Aerospace Manufacturing Automotive Manufacturing (paint booths—refer to AP-204) High Tech Electronics Manufacturing Pharmaceutical Manufacturing Chemical Printed Circuit Board Fabrication Transportation (spills from tankers, cars) Printing (lithography and flexography) Fiberglass reinforced plastics (refer to AP-205) Hazardous Waste Facilities 	<ul style="list-style-type: none"> Coating (cans, coils, and fabrics) Forest products Component manufacturing (parts spray-painting, resin components, adhesive components, misc. metalworking) Regulatory agencies (OSHA, EPA, DOT) Military (base closures) Marine Chemists (ships and barges) Emergency Response/HazMat teams (refer to AP-203) Fire Departments: Arson Investigation TSD (Treatment, Storage & Disposal) Municipal/Public Works Federal, State and Municipalities Coke oven off gases (refer to AP-206)

*Denotes Combustible Gas