Interferometer	Refractivity of gas-air or vapor-air mixture as compared to dry air is measured by comparison of interference fringes or Fraunhofer lines when light is passed through mixture	Grab	12 to 127	100,000 to 1,000,000	Nonselective Sensitivity depends on refractivity of gas or vapor. CO_2 and moisture interfere and must be removed Apparatus made in both portable and laboratory types
Spectrum Absorption 1 Ultraviolet	Gases or vapors mixed with air are passed through a tube with an ultraviolet light source at one end and a photo-electric cell at the other, absorb light, and diminish cell response which is registered by a calibrated meter.	Grab or Continuous	0 001 to 10	0 01 to 1	Sensitive to several gases and vapors Maximum sensitivity for mercury vapor Water vapor and CO_2 do not interfere Field instruments for mercury, trichlorethylene, perchlorethylene have been developed.
2 Infrared	Gases or vapors mixed with air, are passed through a tube with a source of infrared (heated filament) at one end and a thermopile for recording absorption of infrared at the other end, absorb the infrared rays, and diminish amount of heat reaching thermopile. This is registered by a calibrated galvanometer or ammeter. Differential pressure unit is also used.	Grab or Continuous	1		Sensitive to all heteroatomic gases and vapors May be made selective by the development of screening filters Field infrared unit is available for CO and CO_2 British manufacturer can supply instrument for any heteroatomic gas specified
3 Mass Spectrum	Separates according to mass gaseous ions formed in an evacuated system Abundance of each ionic species is measured electrically by electrometer tube and amplifier	Grab or Continuous	1	5,000	Applicable to all gases and vapors but requires expensive and elaborate equipment only adapted for laboratory handling of samples collected on silica gel and revaporized or grab samples
Thermal Conductivity	Gas or vapor mixture is passed over a heated wire Change in heat loss of wire to surrounding gas mixture is registered by change in wire resistance measured on a balanced Wheatstone bridge.	Grab or Continuous	25	100,000	Nonselective Water, vapor and carbon dioxide interfere and must be removed Greatest application in field is to high concentrations such as in flue gas analyzers
Vapor Pressure	Gas or vapor-air mixture is passed over a cooled condensing surface in a confined chamber. The chamber is then evacuated and the condensed gas allowed to evaporate and its pressure measured. Ice-water, dry ice-acetone or liquid air mixtures may be used depending upon contaminant sampled.	Grab or Continuous	10	10,000	Selective Only high concentrations, 1000 ppm or greater, can be obtained by grab samples Liquid air is too difficult to obtain and handle for field use. Contaminants must be miscible with water Sensitivity depends on contaminant sampled and amount of air sampled in continuous method.
Gas Chromatograph	Adsorbs gas or liquid injected into a carrier gas stream of helium, hydrogen, nitrogen, or argon on a temperature-controlled adsorbent column.	Grab or Liquid	1	10,000	Selective. Can be used to identify solvents and separate gas mixtures by selective elution.

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