Subject Index

A

Adsorption, 101, 203
Aeromicroflora, 66
Air
   indoor (see Contaminants; Sampling; Workplace atmospheres)
   pollutants (see Contaminants)
   quality assurance of pollutant measurements, 14, 87
   sampling (see Sampling)
   velocity, 203
Air conditioning, 46
Airborne allergens and infections, 66
Airborne microorganisms, 24, 66
Allergens, 66
American Society of Heating, Refrigerating, and Air Conditioning Engineers standards, 57
Analytical methods, 21, 35, 176, 190, 203
Asbestos, 24
ASTM Standards
   D 1357-82: 12
   D 1605-60 (1979): 12
   D 3609-79: 110, 135
   D 3686-84: 12
   D 4240-83: 24
   D 4490-85: 177
   E 122-72: 10
Atmospheric sampling (see Sampling; Workplace atmospheres)

B

Bacteria, 66
Biological aerosols, 24, 66
Building performance, 46
Building sickness, 22
Bulk sampling, 166

C

Calibration
   accuracy assessment, 81
   detector tubes, 176
   frequency considerations, 14
   isocyanate sampling, 190
   laser absorption spectrometry, 121
   OSHA method for analysis of hexamethylene diisocyanate, 203
   overview, 21, 35
   permeation devices, 110
   precision assessment, 81
   principles and general approaches, 14, 132
   reactive gases, 132
   solid sorbent samplers, 149
   standards, 16, 92, 132
   systems, 110, 132
   U.S. Army’s Industrial Hygiene Sampling Guide, 166
Carbon dioxide, 24, 47
Carbon monoxide, 24, 47, 87
Charcoal tube air sampling, 149
Chemical industry, 141
Chemical reaction systems, 110, 176
COGAS, 110
Colorimetric detection devices (see Detector tubes)
Column-switching valve, 203
Comfort factors, 46
Computer Operated Gas Analysis System (COGAS), 110

Contaminants
  allergens, 66
  asbestos, 24
  bacteria, 66
  biological aerosols, 24, 66
  carbon dioxide, 24, 47
  carbon monoxide, 24, 47, 87
  diisocyanates, 190
  formaldehyde, 25
  gases, organic, 101
  gases, reactive, 110
  hexamethylene diisocyanate, 203
  hydrochloric acid, 121
  isocyanates, 190
  lead, 87
  microbiological, 24, 66
  nitrogen dioxide, 25, 87, 121
  ozone, 26, 87, 137
  particulate matter, 25, 87
  pesticides, 26
  polyaromatic hydrocarbons, 26
  polyurethane, 190, 203
  protozoa, 66
  quality assurance of ambient air measurements, 14, 87
  radon, 26
  sulfur dioxide, 26, 87, 110
  toxic materials, 166, 176
  viruses, 66
  volatile organic compounds, 26
Cost-benefit analysis, 11

Diffusion systems, 110
Diisocyanates, 190
Dilution techniques, 110, 134
DuPont accuracy estimation method, 176

E
Electron capture detectors, 102
Environmental Protection Agency (EPA), 87

F
Filter cassettes, 203
Filters, impregnated, 203
Flame ionization detectors, 102
Flow rate, 203
Formaldehyde, 25
Fungi, 66

G
Gas analysis, 103, 110
Gas chromatography, 103
Gas diffusion, 110
Gas permeation, 110, 135
Gaseous mixtures, 101
Gases, reactive, 132
Gaussian distributions, 8
Glass-fiber filters, 203

H
Health factors, 46
Heating, 28, 46
Hexamethylene diisocyanate, 203
High-performance liquid chromatography, 203
Human factors, 46
Humidity, 28
Hydrochloric acid, 121
Hygiene, industrial (see Industrial hygiene; Workplace atmospheres)
INDEX 223

I
Impregnated filters, 203
Indoor air quality monitoring (see also Contaminants; Sampling; Workplace atmospheres), 21, 35, 46, 66
Industrial hygiene (see also Workplace atmospheres)
Isocyanates, 190
monitoring in chemical industry, 141
solid sorbent samplers, 149
U.S. Army’s Sampling Guide, 166
Infections, 66
Instruments (see Samplers)
Intercalibration, 14
Isocyanates, 190

K
Kolmogorov test, 8

L
Laser absorption spectrometry, 121
Lead, 87
Legionnaires’ disease, 67
Linear relationships, 14

M
Marcali solution, 203
Mass balance equation, 39
Methods evaluation, 66, 190
Microbiological contaminants, 24, 66
Mobile laboratories, 41
Monitoring (see Sampling)

N
National Institute of Occupational Safety and Health (NIOSH), 21, 176, 194
National Performance Audit Program, 98
Nitrogen dioxide, 25, 87, 121

O
Occupational Safety and Health Administration (OSHA), 190, 203
Office buildings (see Workplace atmospheres)
Outliers, 7
Ozone, 26, 87, 137

P
Particulate matter, 25, 87
Parts-per-billion mixtures, 101
Passive monitors, 21
Permeation devices, 110, 135
Pesticides, 26
1-(2-pyridyl) piperazine, 203
Poisson distributions, 9
Pollutant measurements (see Quality measurements; Sampling; Workplace atmospheres)
Pollutants (see Contaminants)
Polyaromatic hydrocarbons, 26
Polyurethane, 190, 203
Pontiac fever, 67
Precolumns, 203
Protozoa, 66

Q
Quality assurance of measurements, 14, 87
Quality measurements, indoor air (see Sampling; Workplace atmospheres)

R
Radon, 26
Reverse phase, 203
S

Sampling and Calibration for Atmospheric Measurements

**Samplers**
- adsorbent tubes, 203
- Andersen, 71
- calibration, 5, 14, 81
- centrifugal separation, 70
- charcoal tubes, 149
- collection media, 72
- column-switching valve, 203
- detector tubes, 149, 176, 203
- diffusion systems, 110
- electron capture detectors, 102
- electrostatic precipitation, 70
- filters, 69, 203
- flame ionization detectors, 102
- gravitational methods, 68
- impaction, 71
- impingers, 71, 190, 203
- intercalibration, 14
- outliers, 7
- overview of instruments, 21
- passive monitors, 21
- permeation devices, 110, 135
- selection, 35
- solid sorbent, 149
- standards, 66
- trace gas calibration systems, 101, 110, 121
- volumetric methods, 69

**Sampling**
- accuracy, 81, 176
- biological aerosols, 66
- bulk, 166
- cost-benefit analysis, 115
- data analysis, 81
- designs, 5
- DuPont accuracy estimation method, 176
- errors, 5, 146
- filtration, 69, 203
- gas analysis, 103, 110
- gas diffusion, 110
- gas permeation, 110, 135
- gaseous mixtures, 101
- gases, reactive, 132
- Gaussian distributions, 8
- general principles, 5
- high-performance liquid chromatography, 203
- impingement, 71, 190, 203
- indoor air (see Contaminants; Sampling; Workplace atmospheres)
- industrial hygiene monitoring, 141, 149, 166, 190
- Kolmogorov test, 8
- laser absorption spectrometry, 121
- linear relationships, 14
- Marcali solution, 203
- mass balance equation, 39
- media, 190
- methods evaluation and validation, 66, 149, 190
- plans, 5
- Poisson distributions, 9
- precision, 81
- quality assurance of measurements, 14, 87
- random, 9
- segregated materials, 9
- specificity, 176
- statistical considerations, 5, 146
- stratified materials, 9
- systematic, 9
- toxic materials, 166, 176
- trace measurements, 101, 121
- tunable diode laser absorption spectrometry, 121
- ultra-trace measurements, 101, 121
- uncertainty estimate, 81
- U.S. Army's Industrial Hygiene Sampling Guide, 166
- workplace atmospheres (see Workplace atmospheres)
- Sick buildings, 46
- Solubility, 110
- Solvent desorption, 149
Specificity, 176
Spray painting, 203
Stability of gaseous mixtures, 101
Standard Reference Materials (National Bureau of Standards), 92
Standardization, 14
Statistical error, 146
Sulfur dioxide, 26, 87, 110
Survey questionnaire, 47

T
Thermal environment, 28, 46
Tight building syndrome, 46
Toxic materials, 166, 176
Trace gas calibration systems, 101, 110, 121
Trace measurements, 101, 121
Tunable diode laser absorption spectrometry, 121

U
Ultra-trace measurements, 101, 121
Uncertainty estimate, 81

V
Ventilation, 23, 28, 46
Viruses, 66
Volatile organic compounds, 26

W
Workplace atmospheres
air conditioning, 203
air movement, 28, 203
building performance, 46
building sickness, 22
comfort factors, 46
health factors, 46
humidity, 28
industrial hygiene monitoring, 141, 149, 166
overview, 21
quality measurements, 35, 46
sick buildings, 46
solid sorbent samplers, 149
thermal environment, 28, 46
tight building syndrome, 46
ventilation, 23, 28, 46