

Index

- A**ir distribution, *see also* HVAC system, Ventilation 7-8, 24-27, 35, 38, 57-71, 82-84, 88, 92-93, 111-115, 121-135, 146, 177, 193, 201-206
- Air handling units, *see also* HVAC system 124-130, 177, 192, 199
- Air pressure, *see* HVAC system, Pressure relationships, and Ventilation
- Airflow, *see also* Pressure relationships and Ventilation 24, 26, 64, 71, 99, 104, 114, 121-122, 125
- Asbestos 63, 147-150, 164-165
- ASHRAE, *see also* Standards, guidelines, and advisories 121, 167
- Guideline 1-1989 139
 - Standard 52-1976 126, 138
 - Standard 55-1981 57, 66, 129, 137
 - Standard 62-1989 8, 14, 28, 34-35, 41, 60, 64-66, 82-87, 115, 126, 136-137
- B**ioaerosols, *see* Biological contaminants
- Biocides 5, 73, 91, 94-95, 132
- Biological contaminants 5, 24, 35-36, 40, 48, 56, 63, 76, 82, 86, 91-95, 102-105, 117-118, 125, 127, 129, 131-132, 135, 138, 141-146, 165
- measuring 105, 117
- Boilers, *see also* HVAC system 87-88, 113, 124, 135
- Building-related illness (BRI) 11, 86, 101, 105
- C**arbon dioxide (CO₂) 36, 49, 57-58, 60-61, 74-76, 87, 110-115
- Carbon monoxide (CO) 10, 37, 56, 58, 75-77, 100, 113, 118, 135
- Chemical Inventory** 23, 26, 72-73, 169, 221
- Chemical smoke 22, 60-61, 68, 75, 77, 110-112
- Chillers, *see also* HVAC system 124, 135, 137
- Cleaning materials 32, 36, 73, 97
- Combustion gases 29, 56, 75, 86, 89, 100, 113
- Complaint area 49, 53-54, 65, 68-69, 76
- Complaints 10-11, 27, 32, 46, 103
- Indoor Air Quality Complaint Form** 15, 32, 169, 181
 - responding to 14-17
- Control systems, *see also* HVAC system 8, 19-21, 23, 26, 31, 34-36, 47, 57, 60, 64-65, 76, 82, 92, 122-126, 128-130, 134-135, 145
- Cooling coils, *see also* HVAC system 35, 67, 97, 123-124, 126, 128
- Cooling towers, *see also* HVAC system 24, 28, 35, 89, 101, 135
- D**ampers, *see also* HVAC system 24, 60, 65, 87, 125, 130, 133
- fire dampers 25, 130
 - mixing boxes (mixed air plenums) 124-126
 - outdoor air dampers 59-60, 125
- Diffusers, *see also* HVAC system 58-61, 67, 82-83, 87-88, 113-114, 133

Ductwork, *see also* HVAC system 36, 61, 73, 91, 102, 127, 131-132

cleaning 36, 61, 73, 91, 102, 127, 131-132

leakage 67, 87, 130

plenum 24-25, 61, 67, 87, 92, 123, 125, 130, 131, 133

return 65, 87, 99, 130, 133

supply 61, 65, 99-100, 114, 123

Dust 23, 25, 32, 67, 72-73, 118, 126, 131, 138

Elevators 68-69, 93

Environmental stressors II, 55-56, 77-78, 85

Environmental tobacco smoke (ETS) 6, 9-10, 24-25, 32, 35, 40-41, 66, 73, 81-82, 90, 116, 118, 166

EPA, *see* Standards, guidelines, and advisories

Ergonomic stressors 55-56, 78, 85

Exhaust air, *see* HVAC system and Ventilation 8-9, 58, 65, 82, 89, 114, 124, 133, 154

Exhaust fumes 53, 72, 100

Fans, *see also* HVAC system 22, 48, 87, 89, 124, 130, 133, 145

Filters, *see also* HVAC system 2, 36, 48, 60-61, 84, 91-92, 123, 126-128, 130, 138

Firecodes 27, 58, 83

Formaldehyde 56, 82, 85, 116-117

Furnishings 34, 40, 72-73, 78, 86, 93, 96, 99, 102, 122, 133, 145

Health and safety 52, 56, 63, 76, 101, 105, 117, 147

committee 16-17, 40, 76

considerations for investigators 52, 56, 63, 76, 101, 105

Humidification, *see also* HVAC system 35, 56, 60, 90, 101, 129, 141

Humidity, *see* Moisture 24, 49, 56, 67, 60, 82, 89, 94, 110-111, 123, 125, 129

HVAC Checklist - Long Form 26, 58, 61, 169, 175, 195-209

HVAC Checklist - Short Form 26, 58, 61-62, 169, 191-194

HVAC system 5, 6-9, 57-59, 62, 79, 86, 89, 111, 121, 123, 154

components 57, 64, 83, 87, 94, 123-137

design types 7-8, 57-59, 61-62, 64-65, 121-123

maintenance 22-23, 62, 67, 91, 122

operation 6, 25, 52, 55-59, 62, 89, 122, 189

zones 47, 58, 76, 82, 112, 121-122, 169

Hypothesis

developing and testing hypotheses 46, 57, 67, 71, 74-75, 78-79, 223

Hypothesis Form 57, 67, 71, 74, 78-79, 169, 223-224

IAQ Incident Log 16, 49, 169, 183

IAQ Management Checklist 42, 169, 171-174

IAQ management plan flowchart 32

IAQ manager 32-33

IAQ profile flowchart 20

IAQ task force 13, 17, 40

Indoor Air Quality Complaint Form 15, 169, 181

Infiltration, *see* Airflow and Pressure relationships

Integrated Pest Management (IPM), *see* Pest control

Intermittent problems 10, 55, 59, 72, 74, 77

Interview, *see* **Occupant Interview**

Investigation

collecting additional information 20, 25-29, 49-74

flowchart 45

forming hypotheses, *see* Hypothesis, developing and testing

outside assistance 20, 40, 45, 47, 63, 105-108, 117

reviewing existing records 20-22, 50, 58

sampling 74-77, 109-119

walkthrough 45, 47-49

Legionnaire's disease 11, 56, 101

Lighting 11, 24-25, 55, 77-78, 85-86

Loading docks 23, 25, 37, 89, 100

Local exhaust, *see also* HVAC system and Pressure relationships 9, 22, 40, 65, 82-83, 90, 92, 94, 97, 99-100, 102, 137

Log of Activities and System Operations 52, 53, 58, 77, 139, 169, 189

Maintenance 24, 31, 34, 36, 67, 97

preventive 23, 36

records 22-23

schedule 23, 34-35, 139

Manometer 36, 58, 68-69, 110

Material Safety Data Sheets (MSDS) 20, 28, 32, 35, 38-40, 73

Measurement

comparing to standards and guidelines 75-76, 87

devices 48, 58, 75, 109-119

developing measurement strategy 48, 74-77

Microbiological contaminants, *see* Biological contaminants

Mildew, *see* Biological contaminants

Mitigation

evaluating approaches 102-103

judging success 75, 103-104

managing projects 103

persistent problems 104

using air cleaning 81, 84-85, 89, 92

using exposure control 81, 85, 93, 96-99

using source control 81-82, 89-101

using ventilation 41, 81-84, 87-100

Mixing boxes, *see also* HVAC system 61, 124-126

Moisture 23-24, 95, 128, 131, 141-146

humidity 24, 60, 120, 122, 137-138, 141-146

waterdamage 24, 73, 94, 128, 131-132, 141-142

Mold, *see* Biological contaminants

Multiple chemical sensitivity (MCS) 12

NIOSH, *see also* Standards, guidelines, and advisories 41, 63, 75, 81, 84, 111, 116, 119, 147-149, 154, 157, 164-165, 167

Noise 11, 55, 77-78, 85-86, 127

Occupants 5, 10-11
 complaints 10, 46, 48, 50, 72, 131
 density 24, 66, 73, 78, 87, 122, 136
Occupant Diary 52, 77, 169, 187
Occupant Interview 50-52, 169, 185
 occupant relations (IAQ management plan) 40
 Odors 8, 24-25, 49, 65
 Outdoor air intake 5, 10, 25, 56, 58, 65, 89, 99-100, 121, 124-125
 Outdoor sources of contaminants 5, 25, 56-57, 72-74, 86, 89, 102, 113, 127

Peppermint oil 69
 Pest control 23, 32, 37-38, 43, 73, 84, 89
 Integrated Pest Management (IPM) 38
 pesticides 23, 32, 37-38, 76, 85, 96, 116
 Pollutant pathways and driving forces 5, 9-10, 50, 54, 69-70, 79, 82, 84, 89, 97, 100, 115, 152
Pollutant and Source Inventory 25-26, 28, 72-74, 169, 213
Pollutant Pathway Form for Investigations 67, 69, 169, 211
Pollutant Pathway Record IAQ Profile 26-27, 33, 169, 175
 Pressure relationships, *see also* Airflow and HVAC system 8-9, 27, 35, 37, 45, 66-68, 71, 82-83, 89, 93, 98, 100-111, 127, 133-134, 144
 negative/positive 8, 26-27, 37, 70, 82-83, 89, 98, 100, 110-111, 127, 132, 141, 154-155
 Preventive Maintenance, *see also* Maintenance 36, 132
 Psychrometer 111, 143
 Psychosocial stressors 11, 55-56, 77-78
 Purchasing 32, 35, 37, 41, 81

Radon 5, 89, 151-152, 167
 Recirculation, *see* Ventilation
 Redecorating/Renovation/Remodeling 21, 32, 34, 40, 55, 66, 73, 86, 99
 Return air, *see* HVAC system and Ventilation
 Roofing 23, 85, 89, 99

Sampling and analysis, *see* Measurement
 Sick building syndrome (SBS) 11, 155
 Smoking, *see* Environmental tobacco smoke
 Sources, *see also* **Pollutant and Source Inventory** and specific sources (by name) 5, 6, 8-9, 26, 28, 35, 48, 72-74, 76, 81-82, 90
 Special use areas 25, 65, 73, 86, 90, 93, 96, 98, 133-134
 Standards, guidelines, and advisories, *see also* ASHRAE, NIOSH 43, 75-76, 167
 Storage practices 23, 25, 37, 73, 97
 Supply air, *see* HVAC system and Ventilation
 Surface contamination, *see also* Biological contaminants 6, 37, 76, 86, 91, 94

Terminal devices, *see* HVAC system
 Testing and balancing 21, 43, 48, 58, 87, 92, 94, 98-99, 103, 123
 Thermal comfort 7, 24, 56-57, 87, 89, 110-111, 121, 133-134, 137, 167
 Thermal mass balance 114-115
 Thermostats, *see also* HVAC system 24, 59-60, 64-65, 67, 111, 122, 134-135, 145

Tools

for IAQ investigations 45, 48-50, 58, 68, 72, 77, 109-119

for IAQ profiles 20, 22

Total volatile organic compounds (TVOCs) 115-116

Tracergas 58, 69, 77, 112-113, 126

Trainingm 31, 33, 41, 117, 139, 167

Trash disposal 23, 37, 89

U

Unit ventilators, *see* HVAC system

Unsanitary conditions 24-25, 38, 65, 67, 72, 94, 117

V

entilation, *see also* Airflow, ASHRAE 62-1989, HVAC system, Pressure relationships 7, 8-10, 24, 65, 83-84, 110, 113, 122, 126, 130-131, 133, 136, 139, 144, 167

air distribution 61, 69, 86-87, 95, 104

outdoor air 24, 65, 82-83, 86-87, 91-92, 96, 99-100, 102, 113-115, 121, 122-125, 135, 145

measuring 87-88

recirculation 82, 92

total air 65, 82-83, 95, 99, 104, 113-114

underventilation 24, 56-57, 60, 66-67, 82-83, 87-88, 112-113

Ventilation Worksheet 169, 179

Vibration 11, 77-78, 85-86

Volatile organic compounds (VOCs) 6, 82, 96, 99, 102, 115-116

W

alkthrough

profile 20-25

investigation 45, 47-49

Water chillers, *see also* HVAC system 137

Water, *see* Moisture

Z

Zone/Room Record 28-29, 61- 62, 169, 177