PART 9

Ventilation Rules of Thumb

9.01 Outdoor Air

A. *1990 BOCA Code* 5 CFM/Person Minimum

B. *1993 BOCA Code* Based on ASHRAE Standard 62-1989

C. *1988 SBCCI Code* 5 CFM/Person Minimum

D. *1988 UBC Code* 5 CFM/Person Minimum

E. *ASHRAE Standard 62-1989* (Minimum Outdoor Air):

1.	Range	15–60 CFM/Person
2.	Most Common Range	15–35 CFM/Person, Based on type of Occupancy
3.	Average Range	15–20 CFM/Person
4.	Smoking Lounges	60 CFM/Person
5.	Outdoor Background Level	350 ppm CO_2 Avg.
6.	*ASHRAE Standard 62* Recommends	1000 ppm CO_2 max.
7.	OSHA & U.S. Air Force Proposing	650 ppm CO_2 Max.
8.	Human Discomfort Begins	800–1000 ppm CO_2
9.	Long-Term Health Effects	>12,000 ppm CO_2

F. Outside Air Intake and Exhaust Locations:

1. *1990 and 1993 BOCA:*
   a. Intakes or exhausts—10 feet from lot lines, buildings on same lot or center line of street or public way
   b. Intakes—10 feet from any hazardous or noxious contaminant (plumbing vents, chimneys, vents, stacks, alleys, streets, parking lots, loading docks). When within 10 feet, intake must be a minimum of 2 feet below any source of contaminant.
   c. Exhausts—shall not create a nuisance or be directed onto walkways.
2. *1988 SBCCI:*
   a. Intakes—10 feet from any hazardous or noxious contaminant (plumbing vents, chimneys, vents, stacks, alleys, streets, parking lots, loading docks). When within 10 feet, intake must be a minimum of 2 feet below any source of contaminant.
3. *1988 UBC:*
   a. Intakes—10 feet from any hazardous or noxious contaminant (plumbing vents, chimneys, vents, stacks, alleys, streets, parking lots, loading docks). When within 10 feet, intake must be a minimum of 3 feet below any source of contaminant.
4. *Guidelines for Construction and Equipment of Hospital and Medical Facilities*—AIA Committee on Architecture for Health and U.S. Department of Health and Human Services:
   a. Fresh air intakes shall be located at least 25 feet from exhaust outlets of ventilating systems, combustion equipment stacks, medical-surgical vacuum systems, plumbing vents, or areas that may collect vehicular exhaust or other noxious fumes. Prevailing winds and/or proximity to other structures may require greater clearances.
   b. Plumbing and vacuum vents that terminate at a level above the top of the air intake may be as close as 10 feet.
   c. The bottom of outdoor air intakes serving central systems shall be as high as practical, but at least 6 feet above ground level, or if installed above the roof, 3 feet above roof level.
   d. Exhaust outlets from areas that may be contaminated shall be above roof level and arranged to minimize recirculation of exhaust air into the building.

G. Outside Air Requirements–*ASHRAE Standard 62-1989*–are shown in the following table:

TYPE OF SPACE	OUTDOOR AIR CFM/PERSON
Offices	20
Banks, Court Houses, Municipal Buildings, Town Halls	20
Police Stations, Fire Stations, Post Offices	20
Precision Manufacturing	20
Computer Rooms	20
Restaurants	20
Kitchens	15
Cocktail Lounges, Bars, Taverns, Clubhouses, Night Clubs	30
Hospital Patient Rooms, Nursing Home Patient Rooms	25
Hospital General Areas	15
Medical Centers, Medical and Dental Clinics, Dental Offices	20
Residential (CFM/Room)	30
Apartments (CFM/Room)	30
Motel and Hotel Public Spaces	20
School Classrooms	15
Dinign Halls, Lunch Rooms, Cafeterias, Luncheonettes	20
Libraties, Museums	20
Retail, Department Stores (CFM/Sq.Ft.)	0.2 - 0.3
Beauty Shops, Barber Shops	25
Drug, Shoe, Jewelry and Other Specialty Shops	15
Supermarkets	15
Malls, Shopping Centers	15
Jails	20
Auditoriums, Theaters	15
Churches	15
Bowling Alleys	25

9.02 Indoor Air Quality (IAQ)—*ASHRAE Standard 62-1989*

A. Causes of Poor IAQ:

1. Inadequate Ventilation—50% of all IAQ problems due to lack of ventilation
2. Poor Intake/Exhaust Locations
3. Inadequate Filtration or Dirty Filters
4. Intermittent Airflow
5. Poor Air Distribution
6. Inadequate Operation
7. Inadequate Maintenance

B. IAQ Control Methods:

1. Control Temperature and Humidity
2. Ventilation—Dilution
3. Remove Pollution Source
4. Filtration

C. IAQ Factors:

1. Thermal Environment
2. Smoke
3. Odors
4. Irritants—Dust
5. Stress Problems (Perceptible, Non-Perceptible)
6. Toxic Gases—Carbon Monoxide, Carbon Dioxide
7. Allergens—Pollen
8. Biological Contaminants—Bacteria, Mold, Pathogens, Legionella, Micro-organisms, Fungi

9.03 Effects of Carbon Monoxide

A. Effects of Various Concentrations of Carbon Monoxide with Respect to Time are shown in the following table:

HOURS OF EXPOSURE	CONCENTRATION OF CARBON MONOXIDE IN PPM ±		
	BARELY PERCEPTABLE	SICKNESS	DEADLY
0.5	600	1000	2000
1.0	200	600	1600
2	100	300	1000
3	75	200	700
4	50	150	400
5	35	125	300
6	25	120	200
7	25	100	200
8	25	100	150

B. Carbon Monoxide Concentration vs. Time vs. Symptoms are shown in the table on page 79.

C. Carbon monoxide is lighter than air (specific gravity is 0.968).

9.04 Toilet Rooms

A. Recommended Design Requirements:

1. 2.0 CFM/Sq.Ft.
2. 10 AC/Hr.
3. 100 CFM/Water Closet and Urinal

B. *ASHRAE Standard 62-1989* 50 CFM/Water Closet and Urinal

C. *1990 & 1993 BOCA Codes* 75 CFM/Water Closet and Urinal

CONCENTRATION OF CO IN THE AIR	INHALATION TIME	TOXIC SYMPTOMS DEVELOPED
9 PPM	Short Term Exposure	ASHRAE recommended maximum allowable concentration for short term exposure in living area.
35 PPM	8 Hour	The maximum allowable concentration for a continuous exposure, in any 8 hour period, according to federal law.
200 PPM	2 - 3 Hours	Slight headache, tiredness, dizziness, nausea; Maximum CO concentration exposure at any time as prescribed by OSHA
400 PPM	1 - 2 Hours	Frontal headaches
	After 3 Hours	Life Threatening
	---	Maximum PPM in flue gas (on a free air basis) according to EPA and AGA
800 PPM	45 Minutes	Dizziness, nausea, and convulsions
	2 Hours	Unconscious
	2 - 3 Hours	Death
1,600 PPM	20 Minutes	Headache, dizziness, nausea
	1 Hour	Death
3,200 PPM	5 - 10 Minutes	Headache, dizziness, nausea
	30 Minutes	Death
6,400 PPM	1 - 2 Minutes	Headache, dizziness, nausea
	10 - 15 Minutes	Death
12,800 PPM	1 - 3 Minutes	Death

D. *1988 SBCCI Code* **2.0 CFM/Sq.Ft.**

E. *1988 UBC Code* **5.0 AC/Hr.**

F. Toilet Room Ventilation:

1. For toilet rooms with high fixture densities (stadiums, auditoriums), the 75 CFM/Water Closet and Urinal dictates.
2. For toilet rooms with ceiling heights over 12 feet, the 10 AC/Hr dictates.
3. For toilet rooms ceiling heights 12 feet and under, the 2.0 CFM/Sq.Ft. dictates.
4. If toilet rooms are designed for 100 CFM/Water Closet and Urinal, all three major U.S. codes and the 10 AC/Hr. can be met.
5. Note that sometimes women's toilet rooms will contain less fixtures. If both men's and women's toilet rooms are essentially the same size, use the larger (men's) CFM for both toilet rooms when using the CFM/Water Closet and Urinal method.

9.05 Electrical Rooms

A. 2.0 CFM/Sq.Ft.

B. 10 AC/Hr.

C. 5 CFM/KVA of Transformer.

D. Electrical Room Design Guidelines:

1. Generally, electrical equipment rooms only require ventilation to keep equipment from overheating. Most electrical rooms are designed for 95°F. to 104°F; however, consult electrical engineer for equipment temperature tolerances. If space temperatures below 90°F. are required by equipment, air conditioning of the space will be required.
2. If outside air is used to ventilate the electrical room, the electrical room design temperature will be 10°F. to 15°F. above outside summer design temperatures.
3. If conditioned air from an adjacent space is used to ventilate the electrical room, the electrical room temperature can be 10°F. to 20°F. above the adjacent spaces.

9.06 Mechanical Rooms

A. 2 CFM/Sq.Ft.

B. Cleaver Brooks 10 CFM/BHP:

1. 8 CFM/BHP Combustion Air
2. 2 CFM/BHP Ventilation
3. 1 BHP = 34,500 Btuh

C. Mechanical Equipment Room Design Guidelines:

1. Generally, mechanical equipment rooms only require ventilation. Most mechanical rooms are designed for 95°F. to 104°F; however, verify mechanical equipment temperature tolerances. If space temperatures below 90°F. are required by mechanical equipment, air conditioning of the space will be required.
2. If outside air is used to ventilate the mechanical room, the mechanical room design temperature will be 10°F. to 15°F. above outside summer design temperatures.
3. If conditioned air from an adjacent space is used to ventilate the mechanical room, the mechanical room temperature can be 10°F. to 20°F. above the adjacent spaces.

D. *ASHRAE Standard 15-1992:*

1. See *ASHRAE Standard 15-1992* for complete refrigeration system requirements.
2. Scope:
   a. To establish safeguards of life, limb, health, and property.
   b. Defines practices that are consistent with safety.
   c. Prescribes safety standards.
3. Application. The standard applies to all refrigerating systems and heat pumps used in institutional, public assembly, residential, commercial, industrial, and mixed use occupancies and to parts and components added after adoption of this code.
4. Refrigerant Classification is shown in the table on page 81.
5. Requirements for Refrigerant Use:
   a. Requirements for refrigerant use are based on probability that refrigerant will enter occupied space and on type of occupancy (institutional, public assembly, residential, commercial, industrial, and mixed use).
   b. The total amount of refrigerant permitted to be installed in a system is determined by the type of occupancy, the refrigerant group, and the probability that refrigerant will enter occupied space.
   c. Refrigerant systems, piping, and associated appurtenances shall not be installed in or on stairways, stair landings, entrances, or exits.

	SAFETY GROUP	
HIGHER FLAMMABILITY	A3	B3
LOWER FLAMMABILITY	A2	B2 Ammonia
NO FLAME PROPAGATION	A1 R-11, R-12, R-22, R-134a	B1 R-123
	LOWER TOXICITY	HIGHER TOXICITY

d. Refrigeration system components shall not interfere with free passage through public hallways and limitations on size are based on refrigerant type.

6. Service Provisions:
   a. All serviceable components of refrigerating systems shall be safely accessible.
   b. Properly located stop valves, liquid transfer valves, refrigerant storage tanks, and adequate venting are required when needed for safe servicing of equipment.
   c. Refrigerant Systems with more than 6.6 Lbs. of Refrigerant (except Group A1) require stop valves at:
      1) Suction inlet of each compressor, compressor unit, or condensing unit.
      2) Discharge outlet of each compressor, compressor unit, or condensing unit.
      3) The outlet of each liquid receiver.
   d. Refrigerant Systems with more than 110 Lbs. of Refrigerant require stop valves at:
      1) Suction inlet of each compressor, compressor unit, or condensing unit.
      2) Discharge outlet of each compressor, compressor unit, or condensing unit.
      3) The inlet of each liquid receiver, except for self-contained systems or where the receiver is an integral part of the condenser or condensing unit.
      4) The outlet of each liquid receiver.
      5) The inlet and outlet of condensers when more than one condenser is used in parallel.
7. Installation Requirements:
   a. Air ducts passing through machinery rooms shall be of tight construction and shall have no openings in such rooms.
   b. Refrigerant piping crossing an open space that affords passageway in any building shall not be less than 7′-3″ above the floor.
   c. Passages shall not be obstructed by refrigerant piping.
   d. Refrigerant piping shall not be placed in or pass through any elevator, dumbwaiter, or other shaft containing moving objects or in any shaft that has openings to living quarters or to main exits.
   e. Refrigerant piping shall not be placed in exits, lobbies, or stairways, except that such refrigerant piping may pass across an exit if there are no joints in the section in the exit.
   f. Refrigerant piping shall not be installed vertically through floors from one story to another except as follow:

1) Basement to first floor, top floor to mechanical equipment penthouse or roof.
2) For the purpose of interconnecting separate pieces of equipment. The piping may be carried in an approved, rigid and tight, continuous fire-resistive pipe, duct, or shaft having no openings into floors not served by the refrigerating system or carried exposed on the outer wall of the building.

8. Refrigeration Equipment Room Requirements:
   a. Provide proper space for service, maintenance, and operation.
   b. Minimum clear head room shall be 7′-3″.
   c. Doors shall be outward opening, self closing, fire rated, and tight fitting. No other openings shall be permitted in equipment rooms (except doors) that will permit passage of refrigerant to other part of the building.
   d. Group A1 refrigerants require an oxygen sensor located in the equipment room set to alarm when oxygen levels fall below 19.5 volume percent.
   e. Group A2, A3, B1, B2, and B3 refrigerants require a refrigerant vapor detector located in the equipment room set to alarm and start the ventilation system when the level reaches the refrigerant's toxicity level.
   f. Periodic test of alarm and sensors are required.
   g. Mechanical rooms shall be vented to the outdoors.
   h. Mechanical ventilation shall be capable of exhausting the air quantity determined by the formula in Part 5, Equations. The exhaust quantity is dependant on the amount of refrigerant contained in the system.
   i. No open flames that use combustion air from the machinery room shall be installed where any refrigerant other than carbon dioxide is used.
   j. There shall be no flame producing device or continuously operating hot surface over 800°F permanently installed in the room.
   k. Refrigeration compressors, piping, equipment, valves, switches, ventilation equipment, and associated appurtenances shall be labeled in accordance with *ANSI/ASME A13.1.*

9.07 Combustion Air

A. *1990 BOCA Code:*

1. Inside Air: 1 Sq.In./1000 Btuh.
2. Outside Air:
   a. 1 Sq.In./4000 Btuh without Horizontal Ducts.
   b. 1 Sq.In./2000 Btuh with Horizontal Ducts.
3. 1 opening high and 1 opening low for both paragraphs 1 and 2 above. Area listed is for each opening.
4. Mechanical Ventilation: 1 CFM/3000 Btuh.

B. *1993 BOCA Code:*

1. Inside Air:
   a. 40 Cu.Ft. of Room Volume/1000 Btuh.
   b. 1 Sq.In./1000 Btuh; 100 Sq.In. Minimum.
2. Outside Air:
   a. 1 Sq.In./4000 Btuh with out Horizontal Ducts.
   b. 1 Sq.In./2000 Btuh with Horizontal Ducts.
   c. 1 Sq.In./4000 Btuh for Floor, Ceiling, or Vertical Duct openings.
3. 1 opening high and 1 opening low for both paragraphs 1 and 2 above. Area listed is for each opening.
4. Mechanical Ventilation: 1 CFM/3000 Btuh

C. *1988 SBCCI Code:*

1. Solid Fuels 2 Sq.In./1000 Btuh; 200 Sq.In. Min.
2. Liquid & Gas Fuels:
   a. Confined Spaces:
      1) Inside Air: 1 Sq.In./1000 Btuh; 100 Sq.In. Min.
      2) Outside Air:
         a) 1 Sq.In./4000 Btuh with out Horizontal Ducts.
         b) 1 Sq.In./2000 Btuh with Horizontal Ducts.
   b. Unconfined Spaces:
      1) Outside Air: 1 Sq.In./5000 Btuh.
3. 1 opening 12″ above finished floor and 1 opening 12″ below top of space applies to all fuels and spaces. Area listed for each opening.

D. *1988 UBC Code:*

1. Confined Spaces:
   a. Inside Air: 1 Sq.In./1000 Btuh Each Opening.
   b. Outside Air:
      1) 1 Sq.In./4000 Btuh with out Horizontal Ducts.
      2) 1 Sq.In./2000 Btuh with Horizontal Ducts.
2. Unconfined Spaces:
   a. Outside Air: 1 Sq.In./5000 Btuh.
3. 1 opening 12″ above finished floor and 1 opening 12″ below top of space applies to all spaces. ½ area high, ½ area low.

E. *1992 NFPA 54–National Fuel Gas Code:*

1. Confined Spaces:
   a. Inside Air: 1 Sq.In./1000 Btuh; 100 Sq.In. Min.
   b. Outside Air:
      1) 1 Sq.In./4000 Btuh; Direct communication with outside.
      2) 1 Sq.In./4000 Btuh with Vertical Ducts.
      3) 1 Sq.In./2000 Btuh with Horizontal Ducts.
2. Unconfined spaces:
   a. Tight Buildings: As specified for confined spaces.
   b. Leaky Buildings: Infiltration may be adequate.
3. 1 opening 12″ above finished floor and 1 opening 12″ below top of space. Area listed for each opening.
4. Louvers and grilles—¼″ mesh screens minimum; Wood louvers 20–25% free area; Metal louvers 60–75% free area.

9.08 Hazardous Locations

A. Hazardous location requirements for electrical and electronic equipment are defined in the *1996 National Electrical Code* (*NEC*), Articles 500 through 505.

B. Hazardous Classifications:

1. Class I: Class I locations are spaces or areas which contain flammable gases or vapors.
   a. Class I locations are subdivided into four groups based on type of flammable gases or vapors:
      1) Group A: Acetylene.

2) Group B: Hydrogen, Ethylene Oxide, Propylene Oxide.
3) Group C: Ethyl Ether, Ethylene.
4) Group D: Acetone, Ammonia, Butane, Gasoline, Propane.

b. Class I locations are also subdivided into 2 divisions:
1) Class I, Division 1:
a) Locations where ignitable concentrations of flammable gases or vapors can exist under normal operating conditions; or
b) Locations where ignitable concentrations of flammable gases or vapors may exist frequently because of repair or maintenance operations or because of leakage; or
c) Locations where breakdown or faulty operation of equipment or processes might release ignitable concentrations of flammable gases or vapors, and might cause simultaneous failure of electric equipment.
2) Class I, Division 2:
a) Locations where volatile flammable liquids or flammable gases are handled, processed, or used, but in which the liquids, vapors, or gases will normally be confined within closed containers or closed systems where they can escape only in case of an accidental rupture or breakdown of such containers or systems; or
b) Locations where ignitable concentrations of gases or vapors are normally prevented by positive mechanical ventilation, and have the potential to become hazardous through failure or abnormal operation of the ventilating equipment; or
c) Locations that are adjacent to Class I, Division 1 locations, and to which ignitable concentrations of gases or vapors might occasionally be communicated unless such communication is prevented by adequate positive pressure ventilation from a source of clean air, and effective safeguards against ventilation failure are provided.

2. Class II: Class II locations are spaces or areas which contain combustible dusts.
3. Class III: Class II locations are spaces or areas which contain easily ignitable fibers or flyings.

C. Hazardous Location Protection Techniques:

1. Purged and Pressurized Systems: Spaces and equipment are pressurized at pressures above the external atmosphere with non-contaminated air or other non-flammable gas to prevent explosive gases or vapors from entering the enclosure.
2. Intrinsically Safe Systems: Electrical circuits are designed so that they do not release sufficient energy to ignite an explosive atmosphere.
3. Explosionproof Equipment: Explosionproof equipment is designed and built to withstand an internal explosion without igniting the surrounding atmosphere.
4. Nonicendive Circuits and Components: Circuits designed to prevent any arc or thermal effect produced, under intended operating conditions of the equipment or produced by opening, shorting, or grounding of the field wiring, is not capable, under specified test conditions, of igniting the flammable gas, vapor, or dust-air mixture.
5. Oil Immersed Equipment: The arcing portions of the equipment are immersed in an oil at a depth that the arc will not set off any hazardous gases or vapors above the surface of the oil.
6. Hermetically Sealed Equipment: The equipment is sealed against the external atmosphere to prevent the entry of hazardous gases or vapors.
7. Dust-Ignitionproof Equipment: Dust-ignitionproof equipment is designed and built to exclude dusts and, where installed and protected, will not permit arcs, sparks, or heat generated or liberated inside the enclosure to cause ignition of the exterior accumulations or atmospheric suspensions of a specified dust on or in the enclosure.
8. Classification versus Protection Techniques is shown in the following table:

PROTECTION TECHNIQUE	CLASS I, DIVISION 1	CLASS I, DIVISION 2	CLASS II	CLASS III
PURGED AND PRESSURIZED	X	X	X	X
INTRINSICALLY SAFE SYSTEMS	X	X	X	X
EXPLOSIONPROOF EQUIPMENT	X	X	X	X
NONINCENDIVE CIRCUITS AND COMPONENTS	N/A	X	X	X
HERMETICALLY SEALED EQUIPMENT	N/A	X	X	X
OIL IMMERSED EQUIPMENT	N/A	X	X	X
DUST-IGNITIONPROOF EQUIPMENT	N/A	N/A	X	X

Notes:
1. X = Appropriate to the classification.
2. N/A = Not acceptable to the classification.

D. Ventilation Requirements:

1. Ventilation, natural or mechanical, must be sufficient to limit the concentrations of flammable gases or vapors to a maximum level of 25% of their Lower Flammable Limit/Lower Explosive Limit (LFL/LEL).
2. Minimum Ventilation Required: 1.0 CFM/Sq. Ft. of floor area or 6.0 air changes per hour, whichever is greater. If a reduction in the classification is desired, the airflow must be 4 times the airflow specified above.
3. Recommendation: Ventilate all hazardous locations with 2.0 CFM/Sq. Ft. of floor area or 12 air changes per hour minimum with half the airflow supplied and exhausted high (within 6 inches of the ceiling or structure) and half the airflow supplied and exhausted low (within 6 inches of the floor).
4. Ventilation rate a minimum of 4 times the ventilation rate required to prevent the space from exceeding the maximum level of 25% LFL/LEL using fugitive emissions calculations.
5. Ventilate the space so that accumulation pockets for lighter than air or heavier than air gases or vapors are eliminated.
6. Monitoring of the space is recommended to assure that the 25% LFL/LEL is not exceeded.

E. Hazardous Location Definitions:

1. Boiling Point. The temperature at which the vapor pressure of a liquid equals the atmospheric pressure of 14.7 pounds per square inch absolute.
2. Combustible Liquids. Liquids having flash points at or above 100 F. Combustible liquids shall be subdivided as Class II or Class III liquids as follows:
   a. Class II. Liquids having flash points at or above 100°F. and below 140°F.
   b. Class IIIA. Liquids having flash points at or above 140°F. and below 200°F.
   c. Class IIIB. Liquids having flash points at or above 200°F.
3. Explosion. An effect produced by the sudden violent expansion of gases, which can be accompanied by a shockwave or disruption, or both, of enclosing materials or structures. An explosion might result from chemical changes such as rapid oxidation, deflagration, or detonation; decomposition of molecules, and runaway polymerization; or physical changes such as pressure tank ruptures.
4. Explosive. Any chemical compound, mixture, or device, the primary or common purpose of which is to function by explosion.

5. Flammable. Any material capable of being ignited from common sources of heat or at a temperature of 600 F. or less.
6. Flammable Compressed Gas. An air/gas mixture that is flammable when the gas is 13% or less by volume or when the flammable range of the gas is wider than 12% regardless of the lower limitation determined at atmospheric temperature and pressures.
7. Flammable Liquids. Liquids having flash points below 100°F. and having vapor pressures not exceeding 40 pounds per square inch absolute at 100°F. Flammable liquids shall be subdivided as Class IA, IB, and IC as follows:
   a. Class IA. Liquids having flash points below 73°F. and having boiling points below 100°F.
   b. Class IB. Liquids having flash points below 73°F. and having boiling points above 100°F.
   c. Class IC. Liquids having flash points at or above 73°F. and below 100°F.
8. Flammable Solids. A solid, other than a blasting agent or explosive, that is capable of causing a fire through friction, absorption of moisture, spontaneous chemical change, or retaining heat from manufacturing or processing, or which has an ignition temperature below 212°F. or which burns so vigorously and persistently when ignited as to create a serious hazard.
9. Flash Point. The minimum temperature in °F. at which a flammable liquid will give off sufficient vapors to form an ignitable mixture with air near the surface or in the container, but will not sustain combustion.
10. Noncombustible. A material that, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors when subject to fire or heat.
11. Pyrophoric. A material that will spontaneously ignite in air at or below 130°F.