

Warm air (continued)  
mechanical heating systems  
(continued)  
fans, 392, 463  
filters, 392  
furnace, 391  
heavy duty, 392  
selection, 463  
humidification, 397  
large systems, 453  
registers and grilles, 450  
standard combinations, 451,  
452  
panel heating, 463  
radiators, 370

Washer, washers, 741  
air, 1, 741

Water  
analysis, 902  
atmospheric cooling equip-  
ment, 741, 751  
characteristics, 902  
classification, 902  
coils, 751, 1027  
control temperature service,  
1031  
cooled  
condenser, 816  
corrosion treatment, 901  
demand, 1013  
faucets, 1014, 1019  
fittings, loss, 1018, 1019.  
fixtures, 1014  
fixture units, 1014  
formed deposits, 901  
heater  
coal-fired, 1026  
solar, 1033

Water (continued)  
heating, 896, 1026  
load, 1023  
make-up, 784  
maximum main temperature,  
744  
meters, 1018, 1019  
mineralized, 902  
properties of, 40  
services, 1013  
storage capacity, 1023  
supply piping, 1013, 1014, 1022,  
1030  
arrangement, 1031  
temperature control, 1031  
thermodynamic properties of,  
40  
treating chemicals, 901, 919  
well temperatures, 746  
Water vapor, 25, 32, 40, 198  
saturation pressure, 25, 40  
specific enthalpy, 4  
specific volume, 10, 40  
surface condensation, 199

Welding, 585

Wet-bulb temperature (see  
Temperature), 9, 26, 756, 757  
Wet return, 8, 469

Wind, winds  
forces, 213  
due to stack effect, 213  
natural draft equipment, 751  
selection of, velocity, 234, 280

Window, windows  
coefficients of transmission,  
197  
leakage, 215  
solar radiation through, 286  
ventilators, 570  
Winter  
air conditioning system, 629  
comfort zone, 124  
freezing equipment, 764  
Wound rotor motor, 863  
Wrought-iron pipe, 585  
Wrought-steel pipe, 585

## Y

Year-round air conditioning  
system, 629  
air flow in, 629  
control methods, 631  
design procedure, 643  
equipment arrangement, 630  
installation, 630  
location of apparatus, 642  
selection, 640

## Z

Zone control, 630  
Zone of evaporative regulation,  
115

Zoning, 630  
control, 630, 844  
recycling, 631  
reheat, 631  
volume control, 663

## CHAPTER 1

## TERMINOLOGY

Glossary of Physical and Heating, Ventilating, Refrigerating  
and Air Conditioning Terms Used in the Text:



**Absolute Zero:** The zero from which absolute temperature is reckoned. Approximately  $-273.2^{\circ}\text{C}$  or  $-459.8^{\circ}\text{F}$ .

**Absorbent:** A sorbent which changes physically or chemically, or both, during the sorption process.

**Absorption:** The action of a material in extracting one or more substances present in an atmosphere or mixture of gases or liquids; accompanied by physical change, chemical change, or both, of the sorbent.

**Acceleration:** The time rate of change of velocity, i.e., the derivative of velocity with respect to time. In the cgs system the unit of acceleration is the centimeter per (second) (second); in the fps system the unit is the foot per (second) (second),  $a = \frac{dv}{dt}$ .

**Acceleration Due to Gravity:** The rate of gain in velocity of a freely falling body, the value of which varies with latitude and elevation. The international gravity standard has the value of 980.665 cm per (sec) (sec) or 32.174 ft per (sec) (sec) which is the actual value of this acceleration at sea level and about 45 deg latitude.

**Adiabatic:** An adjective descriptive of a process such that no heat is added to, or taken from, a substance or system undergoing the process.

**Adsorbent:** A sorbent which does not change physically or chemically during the sorption process.

**Adsorption:** The action, associated with surface adherence, of a material in extracting one or more substances present in an atmosphere or mixture of gases and liquids, unaccompanied by physical or chemical change. Commercial adsorbent materials have enormous internal surfaces.

**Aerosol:** An assemblage of small particles, solid or liquid, suspended in air. The diameters of the particles may vary from 100 microns down to 0.01 micron or less, e.g., dust, fog, smoke.

**Air Cleaner:** A device designed for the purpose of removing airborne impurities such as dusts, gases, vapors, fumes and smokes. (Air cleaners include air washers, air filters, electrostatic precipitators and charcoal filters.)

**Air Conditioning:** The simultaneous control of all, or at least the first three, of those factors affecting both the physical and chemical conditions of the atmosphere within any structure. These factors include temperature, humidity, motion, distribution, dust, bacteria, odors and toxic gases, most of which affect in greater or lesser degree human health or comfort. (See *Comfort Air Conditioning*.)

**Air, Dry:** In psychrometry, air unmixed with, or containing no, water vapor.

**Air, Saturated:** A mixture of dry air and saturated water vapor, all at the same dry-bulb temperature.

**Air, Standard:** Air with a density of 0.075 lb per cu ft and an absolute viscosity of  $1.22 \times 10^{-5}$  lb mass per (ft) (sec). This is substantially equivalent to dry air at 70 F and 29.92 in. (Hg) barometer.

**Air Washer:** An enclosure in which air is drawn or forced through a spray of water in order to cleanse, humidify, or dehumidify the air.

**Anemometer:** An instrument for measuring the velocity of a fluid.

**Aspect Ratio:** In air distribution outlets, the ratio of the length of the core of a grille, face or register to the width.

In rectangular ducts, the ratio of the width to the depth.

**Atmospheric Pressure:** The pressure due to the weight of the atmosphere. It is the pressure indicated by a barometer. *Standard Atmospheric Pressure* or *Standard Atmosphere* is the pressure of 76 cm of mercury having a density of 13.5951 grams per cu cm, under standard gravity of 980.665 cm per (sec) (sec). It is equivalent to 14.696 lb psi or 29.921 in. of mercury at 32 F.

**Baffle:** A surface used for deflecting fluids, usually in the form of a plate or wall.