

TERMINOLOGY AND METRICS

Chapter 1: Design Process

Important Terminology

- benchmarking
- design process
 - pre-design phase
 - schematic design phase
 - conceptual design phase
 - design development phase
- construction phase
- occupancy and operations
- design intent
- design criteria
- validation methods
- hypothesis
- post occupancy evaluation (POE)
- commissioning
- case study
- Vital Signs
- Agents of Change
- code
- standard
- guideline
- prescriptive approach
- performance approach
- life-cycle cost
- passive system
- active system
- hybrid system
- energy efficiency
- green design
- sustainability
- regenerative design
- LEED
- US Green Building Council
- John Lyle
- Woods Hole Research Center (Gilman Orwday Campus)
- William McDonough + Partners
- Malcolm Wells

Important Metrics

No quantitative metrics introduced.

Chapter 2: Environmental Resources

Important Terminology

- global warming
- renewable energy
- non-renewable resource (energy and material)
- low-grade energy
- high-grade energy
- electricity
- embodied energy
- sustainable
- system
- virgin material
- recycled material
- construction
- renovation
- demolition
- control system
- environmental footprint

Important Metrics

- environmental footprint
- carrying capacity

Chapter 3: Sites and Resources

Important Terminology

- heat island
- microclimate
- passive solar heating
 - direct sun
 - indirect sun
- solar envelope
- noise
- reflect
- absorb
- greenhouse effect
 - greenhouse gas
 - CFC (chlorofluorocarbon)
- acid rain
- smog
- windbreak
- ventilation
- water
 - rainwater
 - groundwater
 - potable water
 - waste water
- angle of incidence
- deciduous

Important Metrics

General metrics introduced in this chapter are reinforced in subsequent chapters dealing with applications of the various concepts introduced herein.

Chapter 4: Comfort and Design Strategies

Important Terminology

- ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers)
- ASHRAE Standard 55-2004
- metabolism
- vasoconstriction
- vasodilation
- evaporation
- radiation
- convection
- conduction
- thermal comfort
- dry bulb temperature
- wet bulb temperature
- relative humidity
- air speed
- mean radiant temperature (MRT)
- operative temperature
- draft
- radiant asymmetry
- temperature gradient (vertical temperature differential)
- acclimatization
- bioclimatic chart
- climatic timetable
- cross ventilation
- stack ventilation
 - heat sink
 - toplighting
 - sidelighting
 - Victor Olgyay

Important Metrics

- met (normalized measure of bodily heat output)
- clo (measure of insulative value of a clothing item or ensemble)
- comfort zone (an assemblage of desirable conditions)

Chapter 5: Indoor Air Quality

Important Terminology

- indoor air quality (IAQ)
- sick building syndrome
- contaminants (gaseous, organic, particulate)
 - odors
 - carbon dioxide (CO₂)
 - irritants (particles and gas dispersoids)
 - volatile organic compounds (VOCs)
 - tobacco smoke
 - asbestos
 - respirable particles
 - biological contaminants
 - radon
- outgassing
- Legionnaires' disease
- multiple chemical sensitivity
- environmental illness
- ventilation
- replicance
- Material Safety Data Sheets (MSDS)
- exhaust air
- makeup air
- stack effect
- transpired collector (unglazed)
- breathable wall
- economizer cycle
- indirect evaporative cooling
- air-to-air heat exchanger
- energy recovery ventilator (ERV)
- heat pipe
- energy transfer wheel
 - sensible heat
 - latent heat
- desiccant
- dehumidification
- refrigerant dehumidifier
- air filter
 - high-efficiency particle arrestance (HEPA) filter
 - adsorption
 - activated charcoal
- ultraviolet (UV) radiation
- photocatalytic oxidation
- germicidal
- building management system (BMS)
- LEED (Leadership in Energy and Environmental Design)

Important Metrics

- ACH (air changes per hour)
- cfm (air flow rate, cubic feet per minute)
- olf (a proposed unit of air pollution)
- decipol (a proposed unit of perceived air quality)
- ppm (concentration, parts per million)

Chapter 6: Solar Geometry and Shading Devices

Important Terminology

- solar constant
- insolation
- radiation spectrum
- declination
- altitude angle
- azimuth angle (bearing angle)
- solar time
- clock time
- time zone
- equation of time
- Daylight Saving Time
- true (solar) south
- magnetic south
- analemma
- sunpath projections
 - gnomonic
 - sundial
 - sunpeg chart
 - equidistant
 - horizontal projection sunpath chart
 - rectilinear
 - vertical projection sunpath chart
 - stereographic
 - fisheye projection
- skydome
- shading devices
 - fixed
 - movable
 - eggcrate
 - horizontal overhang
 - vertical fin
 - vegetation
- shading mask
- shadow angles
 - vertical shadow angle (HSA)
 - horizontal shadow angle (VSA)
 - profile angle
- Sun Angle Calculator (Pilkington)

Important Metrics

- various solar position angles (degrees)
- solar and civil times (hours)

Chapter 7: Heat Flow

Important Terminology

- National Fenestration Rating Council (NFRC)
- ASHRAE/IESNA Standard 90.1
- connector
- filter
- barrier
- switch
- transformer
- open frame and closed shell envelope approaches
- thermal sailing
- convection
- conduction
- radiation
- evaporation
- condensation
- conductor
- insulator
 - inorganic, organic, and reflective insulations
 - board, batt, loose-fill, and formed-in-place insulations
 - radiant barrier
- thermal properties
 - emittance
 - absorptance
 - k-value (conductivity)
 - C-value (conductance)
 - U-factor (transmittance)
 - R-value (resistance)
 - density
 - specific heat
 - thermal capacity
 - time lag
- sol-air temperature
- thermal gradient
- structural insulated panels (SIP)
- insulating concrete forms (ICF)
- smart windows
- superwindows
- fenestration
 - solar heat gain coefficient (SHGC)
 - shading coefficient (SC)
 - visible transmittance (VT)
 - light-to-solar gain ratio (LSG)
 - low- ϵ coating
 - selective transmission
- shading device (internal, external, integral)
- shading approach (fixed, adjustable—manual, motorized, automatic)
- vapor pressure
- vapor retarder (barrier)
- infiltration
- ventilation
- heat exchanger
- design heat loss
- design heat gain

Important Metrics

- k (conductivity)
- C (conductance)
- R (resistance)
- U-factor (overall coefficient of thermal transmittance)
- ϵ (emittance)
- thermal capacity (heat storage)
- SHGC (solar heat gain coefficient)
- SC (shading coefficient)
- SHGF (solar heat gain factor)
- VT (visible transmittance)
- LSG (light-to-solar gain ratio)
- ACH (air flow volume, in air changes per hour)
- cfm (air flow rate, in cubic feet per minute)

Chapter 8: Designing for Heating and Cooling

Important Terminology

- internal-load dominated
- skin-load dominated
- zone
- daylighting
 - toplighting
 - sidelighting
 - daylight factor (DF)
 - clerestory
 - lightshelf
- solar savings fraction (SSF)
- eutectic salt
- rock bed
- tilt
- azimuth
- cross ventilation
- stack ventilation
- design data
 - mean daily range (MDR, of temperatures)
 - design dry-bulb temperature
 - mean coincident wet-bulb temperature
 - heating degree day
 - cooling degree day
 - cooling degree hour
- efficiency
- annual fuel utilization efficiency
- load collector ratio (LCR)
- building load coefficient (BLC)
- sensitivity curves
- Δt solar (delta t solar)
- sensible heat
- latent heat
- sol-air temperature
- design equivalent temperature difference
- design cooling load factor
- infiltration factor
- ventilation factor
- psychrometric chart
 - dry-bulb temperature
 - wet-bulb temperature
 - relative humidity
 - dew point
 - saturation line
 - humidity ratio
 - density
 - specific volume
 - enthalpy

Important Metrics

- DF (daylight factor)
- cfm (air flow rate, cubic feet per minute)
- HDD (heating degree day)

- CDD (cooling degree day; and hour—CDH)

Chapter 9: HVAC for Smaller Buildings

Important Terminology

- thermostat
- refrigerant
- compressor (rotary, scroll, screw)
- CFC (chlorofluorocarbon)
- HCFC (hydrochlorofluorocarbon)
- lithium bromide
- fan
- unit air conditioner
- absorptance (solar)
- albedo
- emissivity
- solar reflectance index
- evaporative cooler
- fireplace
- wood stove
- pellet stove
- flue
- catalytic converter
- masonry heater
- combustion air
- boiler
- heating capacity
- furnace
- efficiency (and related performance indicators—see Important Metrics)
- baseboard (heating device; also fintube)
- radiator (heating device)
- convector (heating device)
- series loop, one-pipe, two-pipe reverse return (distribution)
- radiant panel
- zone
- duct (ductwork)
- damper
- diffuser, register, grille
- cooling coil
- direct expansion (DX coil)
- unitary system (single package)
- split system
- heat pump (air-to-air, water source, geothermal)
- sensible heat factor

Important Metrics

- ton (12,000 Btuh of cooling)
- SRI (solar reflectance index; dimensionless)
- feet of head (feet of water column)
- AFUE (annual fuel utilization efficiency; dimensionless)
- COP (coefficient of performance; dimensionless)
- EER (energy efficiency ratio; Btuh/Watt)
- IPLV (integrated part load value; dimensionless)
- SEER (seasonal energy efficiency ratio; Btuh/Watt)
- HSPF (heating seasonal performance factor; Btuh/Watt)
- efficiency (dimensionless)

- SHF (sensible heat factor; dimensionless)
- cfm (air flow rate; cubic feet per minute)

Chapter 10: Large Building HVAC Systems

Important Terminology

- all-air system
 - single-zone system
 - VAV (variable air volume) system
 - fan-powered VAV system
 - multizone system (a specific system type--not the same as multiple zone)
 - reheat
 - double-duct system
- all-water system
- air and water system
 - two-pipe system
 - four-pipe system
 - induction (system or unit)
 - fan-coil (system or unit)
 - radiant panel
- heat pump
- boiler (gas, oil, electric; fire tube, water tube)
 - modular boiler
 - pulse boiler
 - breeching
 - stack
 - flue
 - combustion air
- converter (steam-to-water heat exchanger)
- domestic (service) water
- chiller (absorption, centrifugal, reciprocating, dual-condenser)
 - chilled water
- cooling tower
 - condensing water
- pump
- closed-circuit evaporative cooler
- energy recovery equipment (boiler flue economizer, runaround coil, heat pipe, thermal transfer wheel)
- desiccant system
- economizer cycle
- GeoExchange system
- thermal sink
- thermal storage (water storage, ice storage)
- air-handling equipment
 - fan (panel; vaneaxial--fixed, variable-pitch, adjustable-pitch; centrifugal)
 - duct (ductwork)
 - diffuser
 - grille
 - register
- displacement ventilation
- workstation delivery
- air-extract window
- air curtain window
- climate window
- controls (controller, actuator, limit, safety; electric, pneumatic, self-contained; manual, automatic)
- building management system (BMS; also central logic control system)
- direct digital control (DDC)

- terminal (device)
- district heating and cooling
- cogeneration

Important Metrics

- boiler horsepower

Chapter 11: Lighting Fundamentals

Important Terminology

- IESNA (Illuminating Engineering Society of North America)
- CIE (Commission Internationale de l'Eclairage)
- CIBSE (Chartered Institute of Building Service Engineers)
- light (visible radiation)
 - frequency
 - wavelength
 - visible spectrum
 - white light
 - colored light
- infrared (radiation)
- ultraviolet (radiation)
- luminous transmittance (transmittance, transmission factor, coefficient of transmission)
- transmission (diffuse, non-diffuse)
- luminous reflectance (reflectance, reflectance factor, reflectance coefficient)
- reflection (diffuse, specular)
- selective absorption
- luminous intensity
- luminous flux
- photometric power
- luminous efficiency (or, more correctly, efficacy)
- mean spherical candlepower (mscp)
- candlepower distribution curve (CDC)
- inverse square law
- illuminance
- illuminance category
- brightness (subjective brightness, apparent brightness)
- luminance (old photometric brightness)
- luminous exitance (exitance)
- Lambertian surface
- illuminance meter
 - color corrected
 - cosine corrected
- working plane
- luminance meter
- human eye
 - cornea
 - iris
 - pupil
 - lens
 - retina
 - optic nerve
 - fovea
 - cones
 - rods
- foveal vision
- near field (surround)
- far field
- peripheral (vision) area
- visual acuity
- adaptation time
- adaptation level
- photopic vision

- scotopic vision
- contrast
- contrast reduction
- glare
 - direct glare
 - reflected glare
 - veiling reflection
 - discomfort glare
 - disabling glare
- visual comfort probability (VCP)
- equivalent spherical illumination (ESI)
- spherically illuminated
- relative visual performance (RVP)
- video display terminal (VDT)
- offending zone
- batwing diffuser
- sparkle
- diffusion (with respect to shadowlessness)
- visual clutter (visual noise)
- color temperature
- correlated color temperature (CCT)
- black body
- color of illuminant
- hue
- brilliance or value
- saturation or chroma
- tint
- shade
- Munsell Color System
- primary color
- complimentary color
- subtractive color process
- additive color process
- color constancy
- chromaticity
- color rendering index (CRI)

Important Metrics

- Hz (Hertz, frequency)
- nm (nanometer, wavelength)
- transmittance (percentage)
- reflectance (percentage)
- cd (candela, luminous intensity)
- lm (lumen, luminous flux or photometric power)
- lm/W (lumen per watt, luminous efficacy)
- lux (lumen per square meter, illuminance)
- cd/m² (candela per square meter, luminance)
- lm/m² (lumen per square meter, luminous exitance)
- mscp (mean spherical candlepower, equivalent measure of a point light source)
- C (contrast, dimensionless—as a ratio)
- VCP (visual comfort probability, percentage)
- R (contrast reduction, percentage)
- ESI (equivalent spherical illumination, lux)
- RVP (relative visual performance, percentage)
- K (degree Kelvin, an indicator of color temperature and correlated color temperature)

- CRI (color rendering index, integer value)

Chapter 12: Light Sources

Important Terminology

- IESNA (Illuminating Engineering Society of North America)
- CIE (Commission Internationale de l'Eclairage)
- Energy Policy Act (EPACT)
- luminous efficacy (efficiency)
- daylighting
- altitude angle
- azimuth angle
- bearing angle (or solar window azimuth)
- sky conditions
 - solid overcast sky (CIE sky)
 - clear sky, without sun
 - clear sky, with sun
 - partly cloudy sky
- horizontal illumination
- vertical surface illumination
- lamp
 - incandescent lamp
 - general service
 - tungsten-halogen (quartz-iodine)
 - encapsulated lamp
 - MR-16 precision reflector lamp
 - rough service
 - vibration
 - extended-service
 - reflector lamp
 - energy-saving lamp
 - filament
 - incandesce
 - life-cycle cost analysis
 - spectral content
 - initial lumens
 - mean (or design) lumens
 - lumen maintenance
 - solid-state thyristor dimmer (SCR, triac)
 - dimming
 - partial dimming
 - full-range dimming
 - output reduction
- ballast
 - magnetic ballast (magnetic core-and-coil, EM)
 - electronic ballast (EL)
 - power factor corrected (high power factor) ballast
 - dimming ballast
 - multi-level ballast
- energy saving ballast
- ballast factor (BF)
- ballast efficacy (or efficiency) factor (BEF)
- radio frequency interference (RFI)
- electric (gaseous) discharge lamp
 - fluorescent lamp
 - preheat lamp
 - rapid-start (RS) lamp

- standard-output lamp
 - high-output lamp
 - very-high-output lamp
 - instant-start lamp
 - low-energy lamp
 - triphosphor lamp
 - T8 lamp
 - T5 lamp
 - compact fluorescent lamp (CFL)
- high-intensity discharge (HID) lamp
 - mercury vapor
 - metal-halide
 - high-pressure sodium lamp (HPS or SON)
 - non-cycling lamp
 - standby lamp
 - retrofit lamp
 - low-pressure sodium lamp (SOX)
- self-extinguishing lamp
- safety-shielded lamp
- induction lamp
- light emitting diode (LED)
- sulfur lamp
- fiber optics

Important Metrics

- lm/W (lumen per watt, luminous efficacy)
- BF (ballast factor, as a percentage)
- BEF (ballast efficacy factor, as a numeral)

Chapter 13: Lighting Design Process

Important Terminology

- project lighting cost framework
- project energy budget
- task-ambient design approach
- uniform general illumination
- lighting power density
- working (or work) plane
- illumination method
 - general lighting
 - local/supplementary lighting
 - combined general and local lighting
- lighting system
 - indirect
 - semi-indirect
 - direct-indirect
 - general diffuse
 - semi-direct
 - direct
- hot spots
- VDT (visual display terminal)
- luminance (and luminance ratios)
- transilluminated ceiling
- coffer ceiling
- downlights
- lumen method (of calculation)
- point-by-point method (of calculation)
- luminaire
- spacing-to-mounting-height ratio (S/MH) or spacing criteria (SC)
- zonal cavity method
 - room cavity
 - ceiling cavity
 - floor cavity
 - effective reflectance (ceiling and floor cavity)
- illuminance
- unit power density (UPD; or lighting power density)

Important Metrics

- W/ft^2 (lighting power density)
- S/MH (spacing-to-mounting-height ratio, dimensionless)
- SC (spacing criteria; see S/MH)
- UPD (unit power density, watts per square foot)

Chapter 14: Daylighting Design

Important Terminology

- IESNA (Illuminating Engineering Society of North America)
- CIE (Commission Internationale de l'Eclairage)
- daylighting
- toplighting
- sidelighting
 - unilateral
 - bilateral
- aperture
- light pipe
- heliostat
- tubular skylight
- daylight factor (DF)
 - sky component (SC)
 - externally reflected component (ERC)
 - internally reflected components (IRC)
- 2.5H guideline
- 15/30 guideline
- sidelighting and toplighting guidelines
- CIE method (of daylight analysis)
- Graphic Daylighting Design Method
- isolux pattern
- IESNA Lumen Method (of daylight analysis)
- coefficient of utilization
- light loss factors
- physical modeling (of daylighting)
- artificial sky
- heliodon
- lightshelves
- Audubon House

Important Metrics

- DF (daylight factor, as a decimal value or percentage)

Chapter 15: Electrical Lighting Design

Important Terminology

- luminaire
- luminaire efficacy rating (LER)
- coefficient of utilization (CU)
- candlepower distribution curve (luminaire)
- nadir
- shielding angle (cutoff angle)
- apprehended angle
- shielding (for lamp)
- reflector (luminaire)
- diffuser (luminaire)
 - translucent
 - prismatic
 - egg-crate louver
 - fresnel lens
 - batwing distribution
- spacing-to-mounting-height ratio (S/MH) or spacing criteria (SC)
- lighting control
 - automatic
 - open-circuit (static)
 - closed-loop feedback (dynamic)
 - manual
 - combined manual/automatic
 - switching
 - area switching
 - dimming
 - control function
 - control device
 - control system
 - control points
 - programmable controller
 - wireless control
- occupancy sensor
 - passive infrared (PIR)
 - ultrasonic
 - hybrid
- silicon controlled rectifier (SCR)
- system “tuning”
- lumen maintenance
- daylight compensation
- energy management system (EMS)
- building automation system (BAS)
- luminance
 - wall
 - average initial vertical surface
 - average initial ceiling cavity
 - average maintained surface
- luminance coefficients
- lumen method (of calculation)
- zonal cavity method
 - room cavity
 - ceiling cavity
 - floor cavity

- effective reflectance (ceiling and floor cavity)
- illuminance
 - initial average
 - maintained average
 - at a point
- light-loss factor (LLF) [old maintenance factor (MF)]
 - recoverable
 - non-recoverable
 - luminaire ambient temperature
 - luminaire surface depreciation
 - luminaire dirt depreciation
 - voltage
 - components
 - room surface dirt
 - lamp lumen depreciation
 - burnouts
- modular lighting
- isolux chart
- illuminance “cone” chart
- point-by-point calculation
 - direct component
 - reflected component
- inverse square law
- linear source
- area source
- unit power density (UPD)

Important Metrics

- luminaire efficacy rating (LER, lumens per watt)
- coefficient of utilization (CU, lumens per watt)
- W/ft^2 (lighting power density)
- S/MH (spacing-to-mounting-height ratio, dimensionless)
- SC (spacing criteria; see S/MH)
- AFF (above finished floor)
- UPD (unit power density, watts per square foot)
- luminance coefficients (relating output lumens to lumens per square foot)
- [see also the various elements of the zonal cavity method]

Chapter 16: Electric Lighting Applications

Important Terminology

- *Life Safety Code* (NFPA 101)
- OSHA (Occupational Safety and Health Administration)
- CIE (Commission Internationale de l'Eclairage)
- VDT (visual display terminal)
- luminance ratio
- task-ambient design approach
- lighting power density
- integrated/modular ceiling
- means of egress
- emergency lighting
 - baseboard level illuminance
 - central battery system
 - emergency pack (ballast/battery)
 - packaged unit (emergency lighting)
- exit lighting
 - non-illuminated exit sign
 - internally illuminated exit sign
 - self-luminous exit sign
 - non-electrical exit sign
- floodlighting
- street lighting
- light pollution
- light trespass
- remote-source lighting
- remote-source luminaire
- remote illumination systems
- fiber optic lighting
 - axial-mode linear device
 - axial-mode discrete source
 - lateral-mode FO lighting
 - [see the detailed list of fiber optic terminology in Section 16.37]
- refractive index
- hollow light guide (and prismatic)
- light pipe
- light guide
- optical lighting film

Important Metrics

- luminance ratio (comparison of luminous surfaces, dimensionless proportion)
- lighting power density (lighting system load, watts per square foot)
- NC (noise criterion, as related to ballast noise)
- refractive index (a measure of bending of light at a transition between materials, dimensionless)

Chapter 17: Fundamentals of Architectural Acoustics

Important Terminology

- Occupational Safety and Health Administration (OSHA)
- architectural acoustics
- sound
 - source
 - transmission path
 - receiver
- longitudinal wave motion
- wavelength
- frequency (pitch)
 - fundamental frequency
 - harmonic (overtone)
 - pure tone
- octave
 - center frequency
 - octave band
 - half-octave band
 - third-octave band
- magnitude of sound
 - loudness
 - sound power
 - sound power level
 - sound pressure
 - sound pressure level
 - sound intensity
 - sound intensity level
- decibel scale (decibel)
- free-field propagation
 - inverse square law
 - point source
 - spherical waves
 - line source
 - plane waves
- human ear
 - outer ear
 - auditory canal
 - middle ear
 - hammer, anvil, stirrup
 - eardrum (tympanic membrane)
 - inner ear
 - cochlea
 - auditory nerve
- threshold of hearing
- presbycusis
- logarithmic response
- equal loudness level contours (Fletcher-Munson contours)
- weighting (of measurement devices)
 - weighting network
 - A, B, C weighting designations
- integrating sound level meter
- phoneme
- masking
 - pink noise

- noise
- annoyance
- equipment sound (noise) quality
 - neutral
 - hiss
 - rumble
 - vibration
- impulse noise
- vibration

Important Metrics

- Hz (Hertz; the “old” cycles per second)
- fps (feet per second)
- Å (Angstrom)
- Pa (Pascal)
- bar (also μ bar)
- P (sound power, watts)
- PWL (sound power level, decibels)
- p (sound pressure, Pascals)
- SPL (sound pressure level, decibels)
- I (sound intensity, watts per square centimeter)
- IL (sound intensity level, decibels)
- phon (loudness; “self-dimensioned” contours)
- dB (decibel; 10 times the log to the base 10 of a given ratio)
- NC (noise criterion curve; expressed in decibels)
- NCB (balanced noise criterion curve; expressed in decibels)
- RC (room criterion curve; expressed in decibels)
- NR (noise rating curve; expressed in decibels)
- AI (articulation index; integer values representing percentages)
- SIL (speech interference level; dB)
- TWA (time weighted average)
- A, B, C (weighting scale identifiers)

Chapter 18: Sound in Enclosed Spaces

Important Terminology

- ASTM (American Society for Testing and Materials)
- intelligibility
- room acoustics
- noise control
- sound (as being)
 - reflected
 - transmitted
 - absorbed
- absorption
 - coefficient of absorption
 - noise reduction coefficient (NRC)
- total absorption
- reverberation
 - liveness
 - deadness
 - anechoic chamber
- reverberation time
 - optimum reverberation time
- articulation
- sound field
 - near field
 - free field
 - reverberant field
 - far field
 - diffuse
- sound source
- inverse square law
- acoustic materials
 - fibrous materials
 - panel resonators
 - volume resonators
 - Helmholtz resonators
 - “sound blocks”
 - sound-reflecting
 - sound-absorbing
- sound power level
- sound pressure level
- directivity constant (factor)
- room factor
- acoustic characteristics
 - directivity
 - echo (and clear echo)
 - fullness
 - body
 - clarity
 - definition
 - brilliance
 - sound envelopment
 - flutter
 - diffusion
 - focusing
 - creep

- standing waves
 - resonance
- early decay time
- specular reflection
- reflecting panel
- midfrequency
- ray diagram
- sound (reinforcement) system
 - input devices
 - amplifiers and controls
 - loudspeakers
 - woofers
 - horns
 - central
 - distributed
- equalization controls
- delay mechanism
- wavelength

Important Metrics

- α (coefficient of absorption, a ratio or percentage)
- A (total absorption, Sabins—square feet or square meters)
- λ (wavelength, inches)
- Tr (reverberation time, seconds)
- PWL (sound power level, dB)
- SPL (sound pressure level, dB)
- Q (directivity factor or constant, integer number)
- R (room factor, square feet or square meters)
- NRC (noise reduction coefficient, a ratio or percentage)

Chapter 19: Building Noise Control

Important Terminology

- ASTM (American Society for Testing and Materials)
- NEMA (National Electrical Manufacturers Association)
- ANSI (American National Standards Institute)
- FHA (Federal Housing Administration)
- absorption
- absorptive materials
 - panel resonator
 - volume (cavity, Helmholtz) resonator
 - suspended unit absorbers
 - acoustic tile
 - perforated metal-faced units
 - acoustic panels
 - acoustic plaster
 - sound blocks
 - wall panels
 - resonator sound absorber
 - carpeting
 - drapery
- acoustically transparent
- airborne sound
- structure-borne sound
- impact noise
- sounding board effect
- sound transmission
- transmission loss
 - mass law
 - octave
 - field or random incidence
 - stiffness
 - rigidity
 - resonance dips
 - critical frequency
- noise reduction
- background noise level
- reverberance
 - live (reverberant)
 - dead
- anechoic chamber
- sound attenuator
- sound barrier
- sound isolation
- apparent sound isolation
- compound barrier (cavity wall)
- sound transmission class (and contours)
- sound lock
- diffraction
- point source
- amplitude
- Maekawa's equation
- flanking
- path of least acoustic resistance
- speech privacy (enclosed space)

- normal privacy
 - confidential privacy
- speech privacy (open office spaces)
 - transitional (minimal, marginal) privacy
 - normal privacy
 - confidential privacy
- articulation index
- articulation class
- masking sound (noise?)
- masking noise system
 - signal generator
 - equalizer
 - amplifier
 - controls
 - distribution system
 - speakers
- random noise
- pink noise
- white noise
- impact isolation class
- damping
- inertia block
- resilient support
- floating floor
- duct lining (liner)
- silencer
- active noise cancellation
 - analysis/synthesis device
 - adaptive digital filter
- ballast rating
- sound isolation enclosure
- composite damping barrier material
- FHA grades of isolation (I, II, III)
- noise reduction coefficient

Important Metrics

- NRC (noise reduction coefficient, percentage)
- AC (articulation class, integer value)
- TL (transmission loss, dB)
- NR (noise reduction, dB)
- A (total absorption, sabins)
- STC (sound transmission class, dB)
- CAC rating (ceiling attenuation class, integer value)
- AC (articulation class, integer value)
- AI (articulation index, percentage)
- IIC (impact isolation class, dB)
- NC (noise criteria curve, dB)

Chapter 20: Water and Basic Design

Important Terminology

- potable
- storm sewer
- combined sewer
- sanitary drainage (or sewer)
- precipitation
- runoff
- soil moisture
- groundwater
- water table
- cistern
- low-flush toilet
- porous concrete
- incremental paving
- open-celled paver
- gutter
- leader
- downspout

Important Metrics

- g/cd (gallons per capita per day)
- [also see Table 20.1 for typical water-related units]

Chapter 21: Water Supply

Important Terminology

- potable water
- domestic water
- service water
- DHW (domestic hot water)
- turbidity
- foamability
- alkalinity
- hardness
- pH
- toxic substance
- fluoride
- chlorides
- nitrates
- sulfates
- coliform (E. coli)
- sedimentation
- coagulation
- Giardia cyst
- Cryptosporidium cyst
- Legionella pneumophila
- sand filters
- Diatomaceous Earth
- cartridge filter
- activated carbon
- disinfection
- chlorination
- chloramine
- nanofiltration
- ultraviolet radiation
- ozonation
- aeration
- corrosion
- water hardness
- ion exchange
- reverse osmosis
- electrodialysis
- distillation
- well (drilled, bored, driven, jetted)
- pump (positive displacement—reciprocating, rotary; centrifugal; turbine; jet [ejector]; submersible)
- hydropneumatic tank
- energy factor (EF)
- tankless (instantaneous) water heater
- heat pump water heater
- recirculating hot water system
- solar water heaters
 - thermosiphon
 - forced circulation
 - passive system
 - active system
 - direct system
 - indirect system

- batch system
- thermosiphon system
- closed-loop (freeze-resistant) system
- drain-back system
- drain-down system
- air-to-liquid system
- phase-change system
- “breadbox” (integral passive solar water heater)
- fixtures
 - lavatory
 - tub
 - shower
 - toilet or water closet (conventional—washdown, siphon jet, siphon vortex, blowout; watersaver; low-consumption; waterless)
 - urinal
 - hose bibb or sill cock
 - horizontal-axis washer
- Microphor toilet
- Envirovac toilet
- dual cycle toilet
- faucet
- low-flow faucet
- flush valve
- flush tank
- automatic flush
- water supply fixture unit
- upfeed distribution
- pumped upfeed distribution
- hydro-pneumatic distribution
- downfeed distribution
- water distribution zones
- suction tank
- house tank
- static pressure
- ferrous pipe
- plastic pipe
- threaded connection
- solder-joint connection
- welded connection
- bolted/flanged connection
- condensation (sweating)
- aquastat
- P/T (pressure/temperature) relief valve
- pressure reducing valve
- stop-and-waste valve
- drain valve
- bypass shutoff valve
- pressure-reducing valve
- meter
- water hammer
- street main
- developed length
- total equivalent length
- demand (probable flow)
- lawn sprinklers (as distinct from fire sprinklers)
- tensiometer

- bubbler
- drip irrigation

Important Metrics

- ppm (parts per million)
- mg/L (milligrams per liter)
- pH (scale, 0-14, of acidity/alkalinity)
- gpm (gallons per minute)
- gpd (gallons per day)
- total pressure
- head (static pressure; feet of water column)
- static pressure (feet of water column; pounds per square inch)
- water supply fixture unit (wsfu; "self-dimensioning")
- developed length (length of run)
- total equivalent length (length of run plus effective length of fittings)
- demand (probable flow rate)

Chapter 22: Liquid Waste

Important Terminology

- sanitary drainage
- DWV (drainage, waste, and vent)
- branch (soil branch, waste branch, or vent branch)
- building drain
- building sewer
- stack (soil stack, waste stack, or vent stack)
- stack vent
- trap
- siphonage
- vent
 - circuit venting
 - continuous venting
- Sovent system
- drainage fixture unit (DFU)
- flushometer (flush valve)
- vacuum breaker
- materials (for piping inside a building)
 - cast iron
 - copper
 - ABS plastic
 - PVC
- materials (for piping underground)
 - vitrified clay tile
 - cast iron
 - copper
 - asbestos-cement
 - ABS plastic
 - PVC
 - concrete pipe
- fitting
- solder
- solvent weld
- floor drain
- backwater valve
- effluent
- sump
- ejector
- interceptor
- cleanout
- wet column
- rough in
- septic tank
- aerobic treatment unit
- cesspool (seepage pit)
- disposal field
- percolation test
- leaching (bed)
- sand filter (intermittent, recirculating)
- lagoon (anaerobic, aerobic, aerated, facultative)
- AIWPS (Advanced Integrated Wastewater Pond System)
- wetland
- Living Machine

- biosolid
- water classifications (potable, rainwater, graywater, blackwater; dark graywater, clearwater)
- phytoremediation

Important Metrics

- drainage fixture unit (dfu; “self-dimensioning”)

Chapter 23: Solid Waste

Important Terminology

- high-grade resource (metals, paper, wood, plastic, glass)
- low-grade resource (combustible but not recyclable)
- OSB (oriented strand board)
- biogas
- anaerobic digester
- aerobic decomposition
- scrubbing (as part of the biogas process)
- methane
- fuel cell
- garbage disposer
- garbage compactor
- compost
- humus

Important Metrics

None introduced.

Chapter 24: Fire Protection

Important Terminology

General:

- NFPA (National Fire Protection Association)
 - *Life Safety Code* (NFPA 101)
 - *National Electrical Code* (NFPA 70)
- ANSI (American National Standards Institute)
- Underwriters Laboratories

Fire Protection:

- performance code
- prescriptive code
- fire
- combustion
- ignition
- products of combustion
 - smoke
 - carbon monoxide
 - carbon dioxide
- exit access
- exit discharge
- smokeproof tower
- automatic fire suppression
- refuge area
- firewall
- smoke barrier or curtain board or fire spandrel (watch that word “barrier”)
- smoke exhaust shaft
- automatic ventilating hatch
- water curtain
- fire rated (glazing, wall, door)
- computational fluid dynamics (CFD)
- standpipe and hose system (Class I, Class II, Class III)
- standpipe (automatic-wet, automatic-dry, semiautomatic-dry, manual-dry, manual-wet)
- roof tank
- fire pump
- street siamese
- street hydrant
- zone
- automatic sprinkler system (wet-pipe, dry-pipe, preaction, deluge)
- sprinkler head (upright, pendant, sidewall; recessed, flush, concealed, ornamental; ordinary, quick-response, flow control)
 - fusible metal link
 - glass bulb
 - early suppression fast-response sprinkler (ESFR)
 - quick-response, early suppression sprinkler (QRES)
 - extended coverage sprinkler
- circulating closed-loop system
- building (fire) hazard
- valve (dry-pipe, preaction, deluge)
- mist system (Class I, Class II, Class III)
- clean agent gas
- intumescent material
- halogenated hydrocarbon (halon)
- inerting gas

- expansion ratio
- portable fire extinguisher
- air terminal
- ground terminal
- down conductor
- Franklin cone
- Faraday cage
- overhead ground shield wire
- lightning arrester

Fire Alarm (for a more extensive list see section 24.8):

- protected premises alarm system
- auxiliary fire alarm system
- remote-station protective signaling system
- proprietary fire alarm system
- central station fire alarm system
- circuit supervision
- verification
- threshold device
- audible device
- visual device
- coded (zone, master, dual, selective, or noncoded)
- annunciator
- presignaling
- conventional fire detection device (and system)
- addressable fire detection device (and system)
- analog fire detection device
- fire stage (incipient, smoldering, flame, heat)
- gas-sensing fire detector
- photoelectric smoke detector (spot, projected beam, scattered light, laser beam)
- air sampling detector
- ultraviolet radiation detector
- infrared radiation detector
- thermal or temperature detector (spot, linear)
- false alarm
- manual station
- sprinkler alarm
- strobe

Important Metrics

- persons per minute per inch (a measure of occupant exit flow rates)
- flow rate, water (gallons per minute)
- pressure, water (pounds per square inch)
- K factor (for sprinkler heads; truly obscure units)
- RTI, Response Time Index (measure of thermal sensitivity of sprinklers; obscure units)
- expansion ratio (for foams, dimensionless)
- portable fire extinguisher capacity (integer numbers)

Chapter 25: Principles of Electricity

Important Terminology

- electric current (direct or alternating; dc or ac)
- electric potential or voltage
- electric resistance
- conductor
- insulator
- Ohm's Law
- electric circuit (parallel, series)
- short circuit
- cycle
- frequency
- wavelength
- battery
- generator (dc; ac = alternator)
- commutator
- kWh meter
- energy
- power
- reactance
- power factor (pf)
- vectorial sum
- overall load factor
- demand charge
- electric demand control
- time-of-day (variable) utility rate
- interruptible and uninterruptible loads
- demand control (shedding, automated load, peak demand, programmable load controls)
- duty cycle
- load comparator controller
- rate control
- ideal curve
- forecasting
- meter (amperage, voltage, watt-hour)

Important Metrics

- A (ampere; electric current)
- V (volt; electric potential)
- R (resistance; DC resistance, in ohms)
- Z (impedance; AC resistance, in ohms)
- Hz (Hertz; same as cycles per second)
- electron-volt (a measure of energy at the atomic scale)
- W (watt; electric power; also kW)
- PF (power factor; dimensionless)
- volt-ampere (wattage equivalent in a resistive circuit)
- Wh (watt-hour; electric energy; also kWh)
- load factor (a measure of peak power demand versus average power demand; dimensionless)

Chapter 26: Electrical Systems and Materials: Service and Utilization

Important Terminology

- NEMA (National Electrical Manufacturers Association)
- EPACT (U.S. Energy Policy Act of 1992)
- IEC (International Electrotechnical Commission)
- service tap (overhead service drop, underground service lateral)
- overhead cables (bare, weatherproof, preassembled aerial cable)
- service entrance cable (SE)
- underground wiring (direct burial, concrete encased duct, direct burial duct)
- underground service entrance cable (SE type U)
- underground feeder (UF)
- transformer (step-down, step-up; dry, liquid-filled)
 - load center transformer
 - distribution transformer
 - substation transformer
- liquid-filled transformer (oil-insulated, less-flammable liquid-insulated, non-flammable fluid-filled)
- primary (usually higher) and secondary (usually lower) voltages
- transformer (fire resistant) vault
- meter (metering, sub-metering)
- electrical switch (fusible, nonfusible)
 - pole
 - throw
- service switch (service disconnecting means)
- general duty safety switch
- contactor
- relay
- remote control (RC) switch
- automatic transfer switch
- time-controlled switch
- solid-state switch
- time-controlled electronic switch
- programmable time switch
- "SunTracker"
- programmable controller
- normally open, normally closed (NO, NC)
- equipment enclosure
- fuse (cartridge, plug)
- circuit breaker (molded-case, large air breaker)
- terminal (line, load)
- overload protection
- short-circuit protection
- ground-fault protection
- switchboard or switchgear
 - building type switchboard
 - dead-front
- substation (unit, load-center)
- electrical panel or panelboard (branch circuit, load center, intelligent)
- branch
- feeder
- load control
- motor (direct-current; alternating-current: squirrel-cage induction)
- premium efficiency (PE) motor

- motor control (manual starter, magnetic starter, combination starter, full-voltage across-the-line, reduced voltage)
- motor control center
- variable-voltage, variable-frequency controller (VVVF)
- variable frequency drive (VFD)
- wiring device (various grades)
 - hospital grade
 - Federal specification grade
 - general purpose grade
- premise wiring
- receptacle (or convenience receptacle outlet, receptacle outlet, convenience outlet, duplex)
- GFCI (ground fault circuit interrupter)
- cap or plug
- lighting dimmer
- computer-grade power
- power conditioning
 - voltage regulator
 - electrical isolation
 - filtering
 - surge suppressor
 - integrated power conditioning unit
 - transient voltage surge suppression (TVSS)
- RFI (radio frequency interference)
- EMI (electromagnetic interference)
- line harmonics
- transients
- surge
- low-voltage switching (remote control switching, low-voltage control)
- power line carrier (PLC) system
- UPS (uninterruptible power supply)
- emergency power supply
- standby power supply
- engine-generator set
- battery

Important Metrics

- kVA (kilovolt-ampere; transformer power capacity)
- AFF (above finished floor)
- joule rating (tentative measure of energy absorbing capacity for power conditioner)

Chapter 27: Electrical Systems and Materials: Wiring and Raceways

Important Terminology

- *National Electrical Code* (NEC)
- Underwriters Laboratories (UL)
- wiring system (electric power, data transmission, telephone and signal)
- wire (building wire)
- conductor (copper, aluminum)
- cable
- insulation
- jacket
- ampacity
- free-air rating
- service rating
- BX (flexible armored cable)
- MC (metal-clad cable)
- Romex (also NM and NMC; non-metallic clad cable)
- busway (and also plug-in busway)
- busduct
- cablebus
- raceway (open, closed)
- conduit (heavy wall or rigid steel, intermediate wall or IMC, electric metallic tubing or EMT or thin wall)
- Greenfield
- Sealite
- cable tray
- ceiling raceway
- floor raceway (underfloor, cellular metal, cellular concrete)
- underfloor duct (single-level, two-level)
- full access floor
- under-carpet wiring system
- flat-cable assemblies
- lighting track
- manufactured wiring system
- life-cycle cost
 - present-value equivalent
 - annual owning and operating costs
- low-tension
- outlet (device) box
- fire rated construction

Important Metrics

- V (volt; voltage)
- A (ampere; current flow)
- AWG (American Wire Gauge; integer numbers)
- kcmil (thousand circular mil; integer numbers)
- OD (outside diameter)

Chapter 28: Electric Wiring Design

Important Terminology

- design criteria
- energy budget
- load estimating
- electric load categories
 - lighting
 - miscellaneous power
 - HVAC
 - plumbing/piping
 - vertical transportation
 - kitchen equipment
 - special equipment
- shedability
- service voltage
- system voltage (transformer voltage standards)
 - 120V, 1-phase, 2-wire
 - 120/240V, 1-phase, 3-wire
 - 120/208V, 1-phase, 3-wire
 - 120/208V, 3-phase, 4-wire
 - 277/480V, 3-phase, 4-wire
 - 2400/4160V, 3-phase, 4-wire
- utilization voltage (motor voltage standards)
- grounding
- ground-fault
- GFCI (ground-fault circuit interrupter)
- power factor
- electric closet
- feeder
- branch circuit
- appliance circuit
- continuous load
- demand factor
- spare capacity
- space
- power quality
- harmonic current
- neutral conductor
- active line conditioning
- voltage drop
- emergency system
- legally required standby
- optional standby
- power drawings
- lighting drawings
- panel schedule
- riser diagram

Important Metrics

- energy budget (Btu per square foot per year)

Chapter 29: Photovoltaic Systems

Important Terminology

- rectifier
- battery (lead-acid, lead-calcium, lead-antimony, nickel-cadmium; sealed; shallow-cycle, deep-cycle)
- photovoltaic (PV)
 - cell
 - module
 - panel
 - array
 - thick-crystal
 - thin-film
 - polycrystalline
 - amorphous
- stand-alone PV
- grid-connected PV
- interactive PV system
- hybrid stand-alone PV
- direct-connected PV system
- building-integrated photovoltaics (BIPV)
- inverter (power conditioning unit, power conversion system)
- safety cutoff
- kWh meter
- PURPA (Public Utilities Regulatory Policy Act)
- avoided cost
- net metering
- insolation
- irradiance
- energy
- power
- tilt angle
- fixed array
- tracking array (single axis, dual axis)
- charge controller

Important Metrics

- watts per square foot (irradiance, solar power received)
- watt-hours per square foot (insolation, solar energy received)
- nanometer (wavelength)
- electron-volt (a measure of energy at the atomic scale)
- efficiency (dimensionless)
- A-H (ampere-hour; battery capacity)

Chapter 30: Signal Systems

Important Terminology

- surveillance equipment/system
- communication equipment/system
- timing equipment/system
- Doppler effect
- normally-open (NO) contact
- normally-closed (NC) contact
- “make” (as a detector action)
- intrusion detector
 - mechanical motion detector
 - photoelectric detector
 - visible (light)
 - infrared beam
 - laser
 - passive infrared presence detector (PIR)
 - motion detector
 - ultrasonic
 - microwave
 - acoustic detector
- dedicated wiring
- power line carrier (PLC)
- control bus
- premise wiring
- wire management
- lobby-to-apartment communication system
- emergency call system
- access control
- room access security
- equipment security
- LED (light-emitting diode)
- LCD (liquid crystal display)
- passive-mode electronic teaching system
- interactive-mode electronic teaching system
- clocked-in (as a watchman’s action)
- FO cables (fiber optics)
- telephone/communications system
 - network cable
 - network interface
 - equipment room
 - riser shaft
 - riser closet (zone closet; apparatus closet)
 - satellite closet
 - backbone cables (risers)
 - private switchboard (PBX) equipment
- supervisory control center
- stand-alone control system
- integrated control system
- building automation system (BAS)
 - remote control
 - automatic control
- identification technologies
 - magnetic
 - bar-code

- proximity-reader card
- biometric
- intelligent building
- open architecture
- plastic optical cable (POC)

See also Section 30.29 for a glossary of computer and control terminology.

Important Metrics

- AFF (above finish floor)

Chapter 31: Vertical Transportation: Passenger Elevators

Important Terminology

- National Elevator Industry, Inc.
- ANSI (American National Standards Institute)
- NFPA (National Fire Protection Association)
- ASME (American Society of Mechanical Engineers)
- ADA (Americans with Disabilities Act)
- elevator components
 - cars
 - doors
 - single slide
 - center opening
 - two-speed
 - two-speed center opening
 - cables (ropes)
 - counterweight
 - elevator machine
 - sheave
 - motor-generator (mg) set
 - control equipment
 - drive control (motion control)
 - operating control
 - supervisory control
 - single automatic pushbutton
 - collective
 - selective collective
 - computerized and inconspicuous riser
 - attendant or independent service
 - convention or priority feature
 - thyristor control
 - Ward-Leonard system (unit multivoltage [UMV] drive)
 - variable-voltage, variable-frequency (VVVF) control
 - lobby panel
- shaft (hoistway)
- elevator machine room
- ac and dc motors
- general purpose traction elevator
 - single-wrap roping
 - double-wrap 1:1 roping
 - 2:1 roping
 - underslung arrangement
- hydraulic elevator
- zoning
- service car
- standard elevator layouts
- regeneration
- demand factor
- performance specification
- equipment-type specification

Important Metrics

- I (interval; seconds)
- average waiting time [or average lobby waiting time] (seconds)

- HC (handling capacity; percent of building population)
- AVTRP (travel [average trip] time; seconds)
- registration time (seconds)
- RT (round trip time; seconds)
- car speed (feet per minute)
- car capacity (pounds)

Chapter 32: Vertical Transportation: Special Topics

Important Terminology

- ANSI (American National Standards Institute)
- sky lobby (sky plaza)
- hydraulic elevator
 - telescoping plunger
 - hole-less hydraulic arrangement
 - roped hydraulic arrangement
- freight elevator classes (A, B, C1, C2, C3)
- VVVF (variable-voltage, variable-frequency) control
- umv (unit multi-voltage) control
- rheostatic control
- rack and pinion elevator drive
- linear motor drive
- dumbwaiter
- ejection lift
- conveyor
- pneumatic tube
- automated messenger cart

Important Metrics

None introduced.

Chapter 33: Moving Stairways and Walks

Important Terminology

- moving stairway (escalator; electric stairway)
- parallel arrangement (of moving stairways)
 - parallel-spiral arrangement
 - stacked-parallel arrangement
- crisscross arrangement (of moving stairways)
 - spiral arrangement
 - walkaround arrangement
- reversibility
- width (of escalator)
- size (of escalator)
- components
 - truss
 - tracks
 - sprocket assemblies
 - handrail
 - working points
 - ballustrade (crystal ballustrade)
- fire protection
 - rolling shutters
 - smoke guard
 - spray-nozzle curtain
 - sprinkler vent
- moving walk (autowalk)
- moving ramp

Important Metrics

- width (of escalator, inches [mm])
- size (of escalator, inches [mm])