

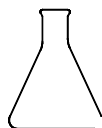
Appendix



*Research Laboratory
NIH Design Policy and Guidelines*

F.1 Acronym List

above finished floor (AFF)	capital recovery factor (CRF)
acquired immune deficiency syndrome (AIDS)	carbon dioxide(CO ₂)
air-handling unit (AHU)	Centers for Disease Control and Prevention (CDC)
Air Moving and Conditioning Association (AMCA)	Certified Ballast Manufacturers (CBM)
alternating current (AC)	Clinical Center Complex (CCC)
Ambulatory Care Research Facility (ACRF)	cold water (CW)
ampere interrupting capacity (AIC)	color rendering index (CRI)
American Association for the Accreditation of Laboratory Animal Care (AAALAC)	common accounting number (CAN)
American Association of State Highway and Transportation Officials (AASHTO)	compressed gas (CG)
American Hospital Association (AHA)	Compressed Gas Association (CGA)
American Institute of Architects (AIA)	computer-aided design and drafting (CADD)
American National Standards Institute (ANSI)	concrete masonry unit (CMU)
American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)	constant air volume (CAV)
American Society of Mechanical Engineers (ASME)	construction quality management (CQM)
American Society of Plumbing Engineers (ASPE)	control power transformer (CPT)
American Society for Testing and Materials (ASTM)	
American Water Works Association (AWWA)	dedicated ground riser (DGR)
American Welding Society (AWS)	dental treatment room (DTR)
animal-holding area (AHA)	deoxyribonucleic acid (DNA)
animal-watering system (AWS)	Department of Energy (DOE)
Architect/Engineer (A/E)	diagnostic and treatment (D&T)
Associated Air Balance Council (AABC)	diameter index safety system (DISS)
Association of Edison Illuminating Companies (AEIC)	direct current (DC)
automatic temperature control (ATC)	distribution duct system (DDS)
automatic transfer switch (ATS)	distributive digital control (DDC)
average water gauge (AWG)	drain, waste, and vent (DWV)
	dynamic insertion loss (DIL)
backflow prevention (BFP)	
biological safety cabinet (BSC)	electrical metal conduit (EMC)
biosafety level (BL)	electrical metal tubing (EMT)
Building and Facilities (B&F)	electromagnetic interference (EI)
Building Officials and Code Administrators, International (BOCA)	electronic data processing (EDP)
	Electronic Industries Association (EA)
	Electronic Testing Laboratory (ETL)
	equivalent linear measurement [of laboratory work space] (ELM)
	ethylene oxide [sterilizer] (EtO)
	ethylene propylene rubber (EPR)
	exhaust fan (EF)
	external manual operator (EMO)



Federal Communications Commission (FCC)
full-time employee (FTE)

General Services Administration (GSA)
grand fault interrupting (GFI)

halogen infrared (HIR)
hand-off-auto (HOA)
heating, ventilation, and air-conditioning (HVAC)
high-efficiency particulate air (HEPA)
hot water (HW)
hot water recirculating (HWR)

Illuminating Engineering Society of North America (IESNA)
indoor air quality (IAQ)
Inter Building Closet (IBC)
Institute of Electrical and Electronics Engineers (IEEE)
intensive care unit (ICU)
InterNational Electrical Testing Association (NETA)
International Electrotechnical Commission (IEC)

Joint Commission on the Accreditation of Healthcare Organizations (JCAHO)

laboratory air (LA)
laboratory vacuum (LV)
Lighting Protection Institute (LPI)
limit switch (LS)
local area network (LAN)

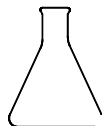
magnetic resonance imaging (MRI)
main circuit breaker (MCB)
main lugs only (MLO)
Maryland Department of Environment (MDE)
mass spectrometry (MS)
mechanical/electrical/plumbing (MEP)
medical air (MA)
medical gas (MG)
medical, surgical, and nursing (MS&N)
medical vacuum (MV)
Memorandum of Understanding (MOU)

mental health patient care unit (MHPCU)
metal oxide varistor (MOV)
metal halide (MH)
modular building controller (MBC)
motor control center (MCC)

National Electrical Code (NEC)
National Electrical Manufacturers Association (NEMA)
National Electrical Safety Code (NESC)
National Fire Codes (NFC)
National Fire Protection Association (NFPA)
National Institute of Occupational Safety and Health (NIOSH)
National Institutes of Health (NIH)
National Institute of Standards and Technology (NIST)
nitrous oxide (NO)
noise criteria (NC)
noise reduction coefficient (NRC)
nuclear magnetic resonance (NMR)

Occupational Safety and Health Act (OSHA)
Occupational Safety and Health Administration (OSHA)

paper-insulated, lead-covered (PILC)
patient care unit (PCU)
pediatric patient care unit (PPCU)
perceived air quality (PAQ)
personal computer (PC)
polytetra fluoroethylene (PTFE)
polyvinyl chloride (PVC)
positron emission tomography (PET)
post anesthesia recovery (PAR)
Potomac Electric Power Company (PEPCO)
power factor (PF)
pressure-reducing valve (PRV)
Program of Requirements (POR)
programmable lighting control (PLC)
Public Health Service (PHS)
pulse-width modulation (PWM)



radio frequency interference (RFI)
ratio (R-value) (R)
relative humidity (RH)
remote terminal unit (RTU)
reverse osmosis (RO)
rigid galvanized steel (RGS)
room cavity ratio (RCR)
room criteria (RC)

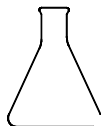
Washington Suburban Sanitary Commission
(WSSC)
World Health Organization (WHO)

Scientific Apparatus Makers Association
(SAMA)
service entrance (SE)
Sheet Metal and Air Conditioning Contractors
National Association (SMACNA)
silicone-controlled rectifiers (SCR)
smoke (SM)
sound transmission class (STC)
stand-alone control unit (SCU)
standard dimension ration (SDR)

Telecommunications Industries Association
(TIA)
terminal equipment controller (TEC)
testing and balancing (T & B)
thermal manual motor starter (TMMS)
total harmonic distortion (THD)
transient voltage surge suppression (TVSS)

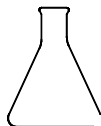
Underwriters Laboratories (UL)
Uniform Federal Accessibility Standards
(UFAS)
uniform present worth (UPW)
uninterruptible power supply (UPS)
unit directional flow (UDF)
unshielded twisted pair (UTP)

variable air volume (VAV)
variable-frequency speed drive (VFD)
variable-speed drive (VSD)
ventilation rate (VR)
vinyl composition tile (VCT)
volatile organic compound (VOC)
voltage-source inverter (VSI)



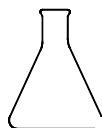
F.2 Units of Measure

A	ampere	Pa	pascal
cd	candela	%	percent
cph	changes per hour	ppm	parts per million
dB	decibels	rpm	revolutions per minute
°C	degrees Celsius	s	second
°K	degrees Kelvin	V	volt
g	gram	VA	voltampere
Hz	hertz	W	watt
kg	kilogram		
kJ	kilojoule		
kPa	kilopascal		
kV	kilovolt		
kVA	kilovoltampere		
kW	kilowatt		
kWh	kilowatt hour		
L	liters		
L/s	liters per second		
LPM	liters per minute		
LPW	lumens per watt		
lx	lux		
m	meter		
m ²	square meter		
mA	milliampere		
MCM	thousand circular mils		
mil	millimeter		
MJ	megajoule		
mL	milliliter		
mm	millimeter		
mmHg	millimeters of mercury		
mRem	millirem		
m/s	meters per second		
nm ²	net square meter		



F.3 Committees, Contributors, Founders

The following list of Ad Hoc committees met over a period of eight months in order to formulate, edit, and format this document. We thank them for their efforts and their continuing service to the National Institutes of Health.



F.3.1 Architectural - Ad Hoc Committee

Name

Charles E. Blumberg, FIIDA

Ricardo C. Herring, AIA

Herbert B. Jacobi

J.P. Khoshbin, RA

Frank M. Kutlak, RA

Kristy Long, RA

Rand M. Mortimer

Judith A. Quasney

Solange Rangel, RA

Donald A. Sebastian, RA

Gary Zackowitz, RA

Nonvoting

Rassa Davoodpour

Cyrena G. Simons

Dr. James F. Taylor

Dr. Alan L. Chedester

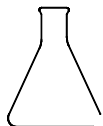
Dan Cushing AIA

Roland Binker AIA

Christopher Cowansage

Cory English

Barbara Myerchin



F.3.2 Structural - Ad Hoc Committee

Name

Athanasia Mantzouranis, PE

John Pavlides, PE

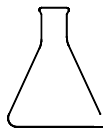
Shahriar Saleh, PE

Nonvoting

Rassa Davoodpour

Frank M. Kutlak, R.A.

Frank Lancaster



F.3.3 Mechanical - Ad Hoc Committee

Name

Joseph M. Bladen

Ben Buck

Byung Kim

James S. Lewis, PE

Johnny Madlangbayan

Dr. Farhad Memarzadeh

Rand M. Mortimer

Peter W. Sweeney

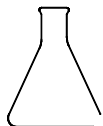
E. Torkashvan

Non Voting

Rassa Davoodpour

Frank M. Kutlak, RA

Duane S. Pinnix, PE



F.3.4 Electrical - Ad Hoc Committee

Name

David H. Epley, PE

John K. Hollingsworth

Thomas Ligis

Phillip Marcus

Leon F. Pheder, PE

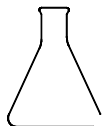
William Strine

Nonvoting

Rassa Davoodpour

Frank M. Kutlak, RA

Wesson H. Miller, Jr., PE



F.3.5 Plumbing - Ad Hoc Committee

Name

Dave Berry

Joseph M. Bladen

Ben Buck

Frank R. Kelly

Byung Kim

Johnny Madlangbayan

Peter W. Sweeney

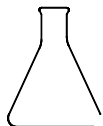
E. Torkashvan

Nonvoting

Rassa Davoodpour

Frank M. Kutlak, RA

Duane S. Pinnix, PE



F.3.6

Name

Christine M. Campbell

David H. Epley, PE

Louis Kepitch

Thomas Ligis

J. P. McCabe, PE

Albert Parrish

William Strine

Nonvoting

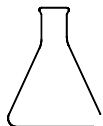
Rassa Davoodpour

Frank M. Kutlak, RA

Joseph G. Dafin, PE

Albert P. Free, PE, CSP

Jeffrey M. Bauer, PE,
CIH, CSP



F.3.7 Controls - Ad Hoc Committee

Name

Joseph M. Bladen

Martin D. Borenstein, PE

Ben Buck, PE

John Madlangbayan

Dr. Farhad Memarzadeh

Nga Nguyen

Peter W. Sweeney

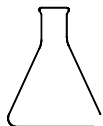
E. Torkashvan

Nonvoting

Rassa Davoodpour

Frank M. Kutlak, RA

Duane S. Pinnix, PE



F.3.8 Environmental - Ad Hoc Committee

Name

Capt. Terry L. Christensen, PE

Alfred J. Ferruggiaro

Shawn Googins

Herbert B. Jacobi

Randolf Larsen

Mark F. Miller

Rand M. Mortimer

Edward A. Pfister

Nonvoting

Rassa Davoodpour

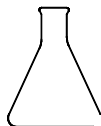
Frank M. Kutlak, RA

Albert P. Free, PD, CSP

Jeffrey M. Bauer, PE,
CIH, CSP

Michael S. Terpilak, CHP

John H. Keene, DR, PH
Biohaztec Associates, Inc.



F.3.9 Civil - Ad Hoc Committee

Name

James Carscadden, PE

Capt. Terry L. Christensen, PE

Mark F. Miller

Arvind Patel, PE

Daryl E. Paunil, PE

John Pavlides, PE

Shahriar Saleh, PE

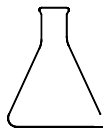
Nonvoting

Rassa Davoodpour

Frank M. Kutlak, RA

Kenton J. Balenske, PE

Lynn M. Mueller, RLA



F.3.10 Standard Detail - Ad Hoc Committee

Name

Joseph M. Bladen

David H. Epley, PE

Herbert B. Jacobi

Thomas Ligis

Rand M. Mortimer

John Pavlides, PE

E. Torkashvan

Gary Zackowitz, RA

Nonvoting

Rassa Davoodpour

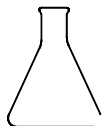
Frank M. Kutlak, RA

Dan Cushing, AIA

Duane S. Pinnix, PE

Wesson H. Miller, Jr., PE

Kenton J. Belanske, PE



F.3.11 A/E Checklist - Ad Hoc Committee

Name

Capt. Terry L. Christensen, PE

David H. Epley, PE

Ricardo C. Herring, AIA

Herbert B. Jacobi

J.P. Khoshbin, RA

Frank M. Kutlak, RA

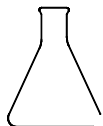
Rand M. Mortimer

John Pavlides, PE

Nonvoting

Rassa Davoodpour

Dan Cushing, AIA



F.3.12 Style and Format - Ad Hoc Committee

Name

Ricardo C. Herring, AIA

J.P. Khoshbin, RA

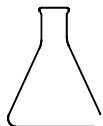
Angela D. Watson

Gary Zackowitz

Nonvoting

Rassa Davoodpour

Dan Cushing, AIA



F.3.13 Contributors

Name

Charles C. Barrett

Frank A. Battistello

Nancy G. Boyd

Raymond Bowen

Clarence Bruce

Edward Burns

Harry S. Cepura

Mehryar Ebrahimi, P.E.

Paul Hawver

Erin L. Hoke

Paul Hudes

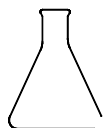
Herman M. Orrison

Justin Smith

Hillel Soclof

Roger Solomon

Karen D. Thomas



F.3.14 Founders

Name

Terry Adsit

Charles E. Blumberg, FIIDA

Kenneth A. Brow, PE

Davis H. Epley, PE

Juanita M. Mildenberg, RA, AIA

Jonas L. Morehart, PE

Patricio Ochoa

John Pavlides, PE

Marshal White

Ricardo C. Herring, AIA

