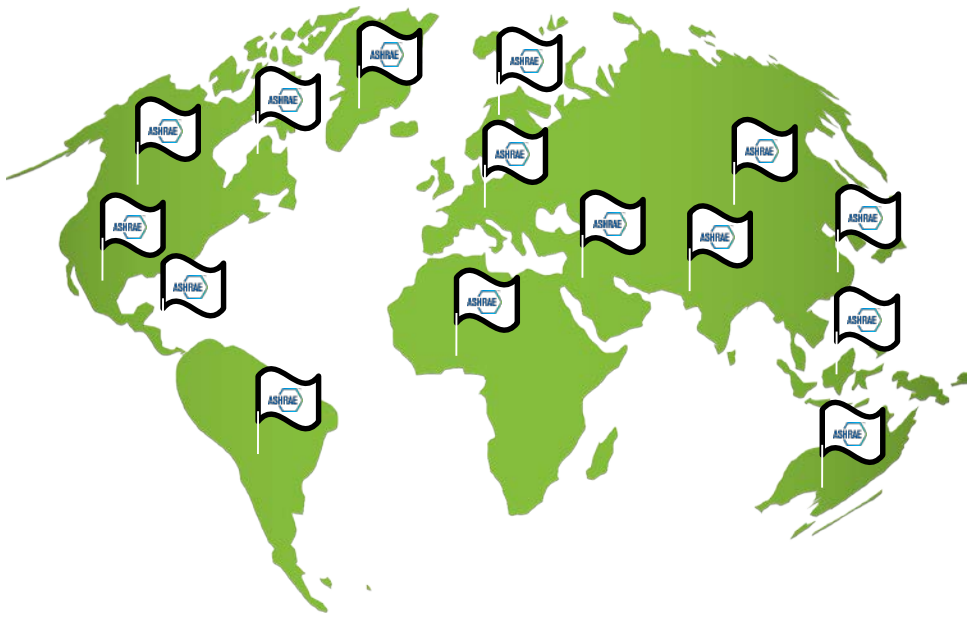
Shaping Tomorrow's
Built Environment Today
A Global Society for Building Technology

ASHRAE activities on ventilation for indoor air quality

Presenter: Professor Bjarne W. Olesen, Ph.D.
ICIEE, Technical University of Denmark
2017-2018 ASHRAE President

Extending Our Global Community



56,500+
members

15
Regions

130+
countries

180+
Chapters

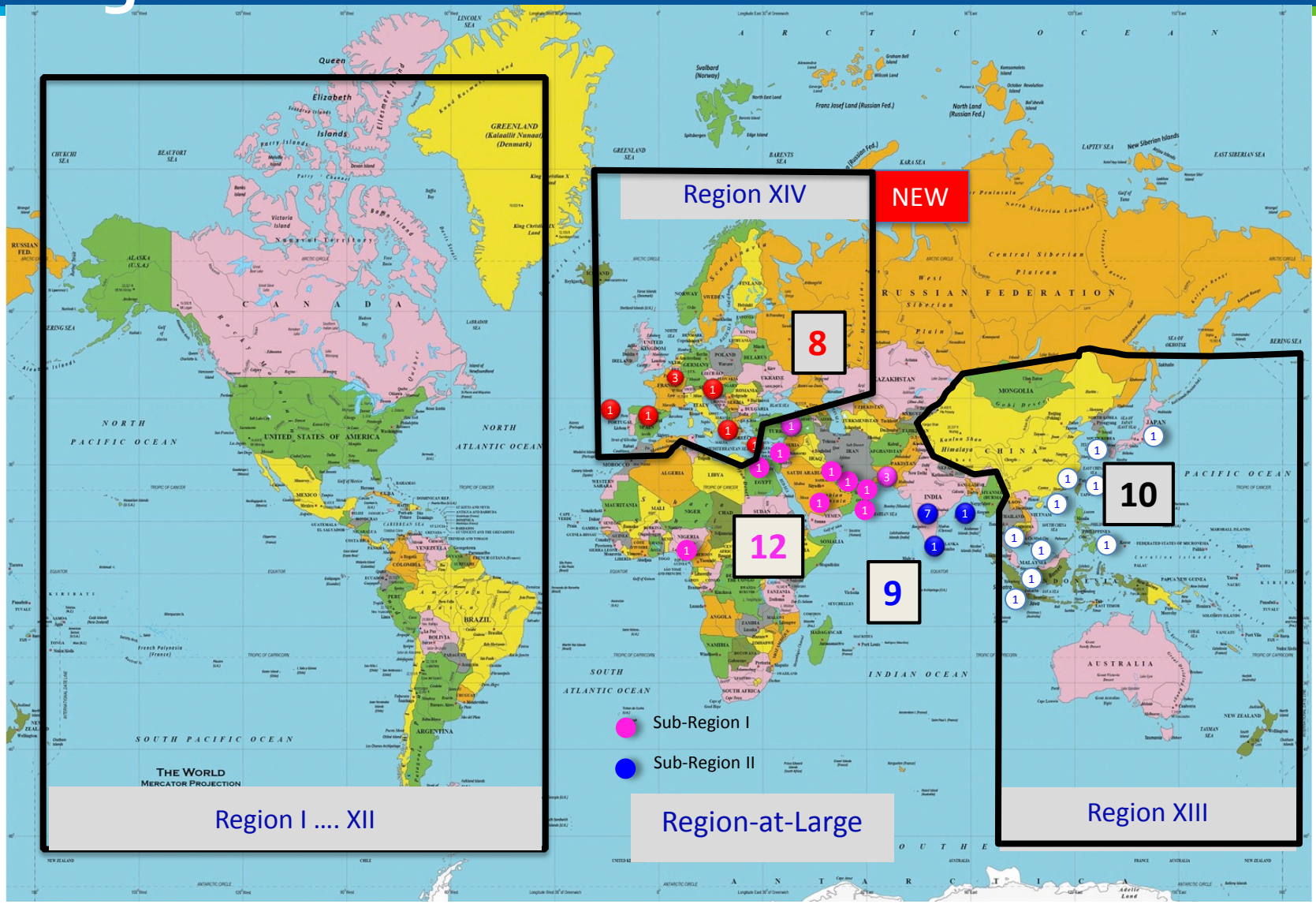
11,000+
outside N.A.

280+
Student Chapters

Chapters

186 Chapters

Regions


Region XIV
NEW
8
12
9
10
Region I XII
Region-at-Large
Region XIII
Sub-Region I
Sub-Region II
THE WORLD
MERCATOR PROJECTION

ASHRAE Overview

- Founded in 1894
- 56,000+ volunteer members in more than 130 countries

- Industry Classification
  - Consulting engineers
  - Contractors
  - Manufacturers
  - Manufacturing representatives
  - Government, health and education
  - Design build
  - Architects
- U.S./Canada (45,000+)
- Global (12,000+)

ASHRAE HQ – By The Numbers

- 128 Staff
  - 4 positions in Washington, D.C.
  - 2 attorneys (that don't practice law, thankfully)
  - 12 engineers
  - 3 relatively new Staff Directors (Mkt, Development, Advocacy)
- Technology: 18
- Member Services: 21
- Publications & Education: 33
- Administrative Services: 20
- Marketing: 14

ASHRAE By the Numbers

- 28 standing committees
- 130 standards and guidelines committees
- 100+ technical committees
- 300+ publications
- Six certification programs
- 100+ educational courses
- Research:
  - 60+ active projects
  - Over 700 projects completed over last 50 years
  - $148 million spent on research

The Business of ASHRAE

- $30 million organization; 501(c)(3) [New Tax Bill]
- $20 million in reserves; $10 million Foundation
- Largest Revenue streams
  - Dues: $8 million
  - AHR Expo: $5.4 million
  - Advertising: $4.4 million
  - Pub Sales: $3.8 million
  - RP: $2.69 million (RECORD)
- Not-for-Profit
- Not operating at a loss
  - 2015-16: $702K surplus
  - 2016-17: $436K surplus
  - 2017-18: $300K deficit

ASHRAE Overview

What We Do

- Serve as pipeline for technical information to members, chapters and companies
- Create standards and technical guidelines to serve built environment
- Offer continuing education for industry professionals
- Serve as networking tool for industry professionals

How We Do It

- 27 standing committees
- 130 standards and guidelines committees
- 100+ technical committees
- 300+ publications
- Six certification programs
- 100+ educational courses
- Research

ASHRAE : Air Tightness-Ventilation

ASHRAE Web-site search:

- Air Tightness 290
- Air leakage 829
- Air Infiltration 904
- **Ventilation** **5140**

How We Do It

- Handbooks
- Standards and guidelines committees
- Technical committees
- Publications
- Educational courses
- Conferences
- Research Activities

SECTION 4.0-LOAD CALCULATIONS AND ENERGY REQUIREMENTS

- 4.1 Load Calculation Data and Procedures
- 4.2 Climatic Information
- 4.3 Ventilation Requirements and Infiltration
- 4.4 Building Materials and Building Envelope Performance
- 4.5 Fenestration
- 4.7 Energy Calculations
- 4.10 Indoor Environmental Modeling
- TRG4 Indoor Air Quality Procedure Development

SECTION 5.0-VENTILATION AND AIR DISTRIBUTION

- 5.1 Fans
- 5.2 Duct Design
- 5.3 Room Air Distribution
- 5.4 Industrial Process Air Cleaning (Air Pollution Control)
- 5.5 Air-to-Air Energy Recovery
- 5.6 Control of Fire and Smoke
- 5.7 Evaporative Cooling
- 5.9 Enclosed Vehicular Facilities
- 5.10 Kitchen Ventilation
- 5.11 Humidifying Equipment

ASHRAE Standards for Ventilation

- **ANSI/ASHRAE Standard 62.1-2016**
  - **Ventilation for Acceptable Indoor Air Quality**
    - This standard applies to spaces intended for human occu- pancy within buildings except those within dwelling units in residential occupancies in which occupants are nontransient.
- **ANSI/ASHRAE Standard 62.2-2016**
  - **Ventilation and Acceptable Indoor Air Quality in Residential Buildings**
    - This standard applies to dwelling units in residential occupan- cies in which the occupants are nontransient.

ANSI/ASHRAE Standard 62.1-2016
Ventilation for Acceptable Indoor Air Quality

- ***acceptable indoor air quality:*** air in which there are no known contaminants at harmful concentrations as determined by cognizant authorities and with which a substantial major- ity (80% or more) of the people exposed do not express dis- satisfaction.

ANSI/ASHRAE Standard 62.1-2016
Ventilation for Acceptable Indoor Air Quality

- **Ventilation Rate Procedure.** The prescriptive design procedure presented in Section 6.2, in which outdoor air intake rates are determined based on space type/application, occupancy level, and floor area, shall be permitted to be used for any zone or system.

- **IAQ Procedure.** This performance-based design pro- cedure presented in Section 6.3, in which the building outdoor air intake rates and other system design parameters are based on an analysis of contaminant sources, contaminant concen- tration limits, and level of perceived indoor air acceptability, shall be permitted to be used for any zone or system.

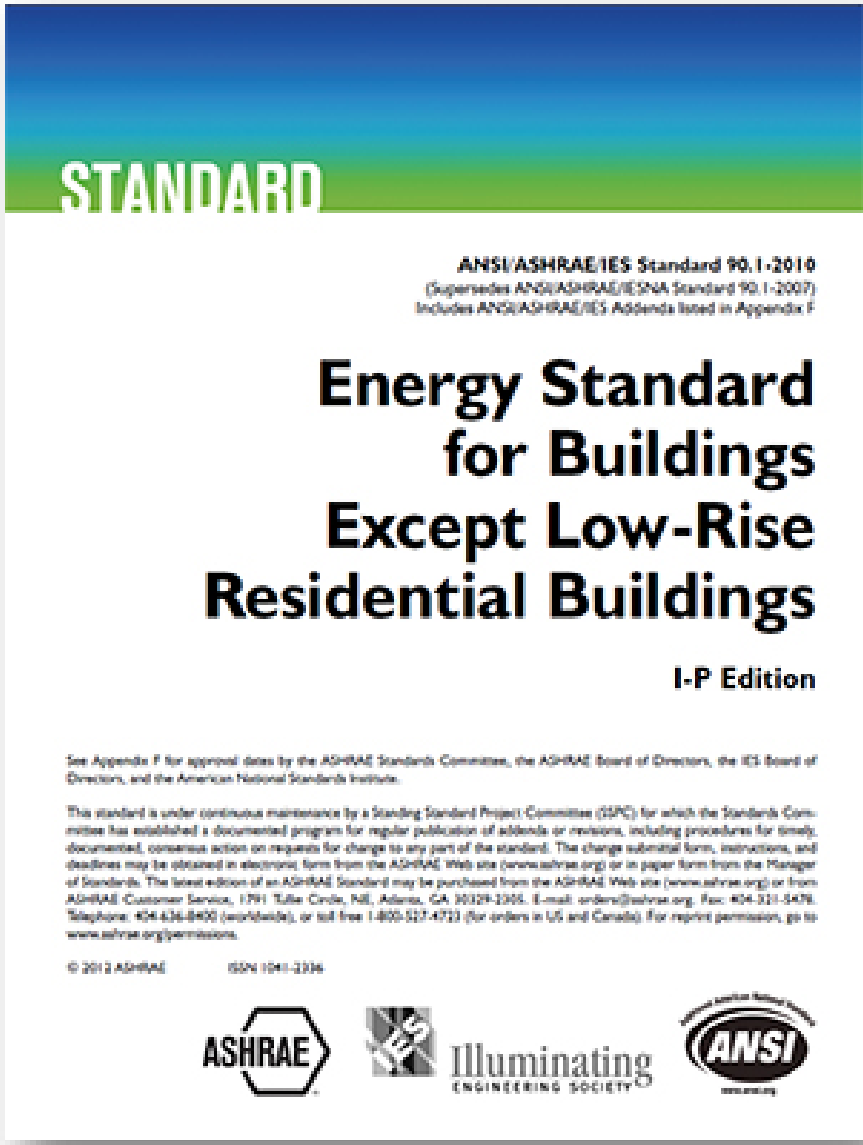
- **Natural Ventilation Procedure.** The prescriptive design procedure presented in Section 6.4, in which outdoor air is provided through openings to the outdoors, shall be per- mitted to be used for any zone or portion of a zone in con- junction with mechanical ventilation systems in accordance with Section 6.4.

ANSI/ASHRAE Standard 62.2-2016 Ventilation and Acceptable Indoor Air Quality in Residential Buildings

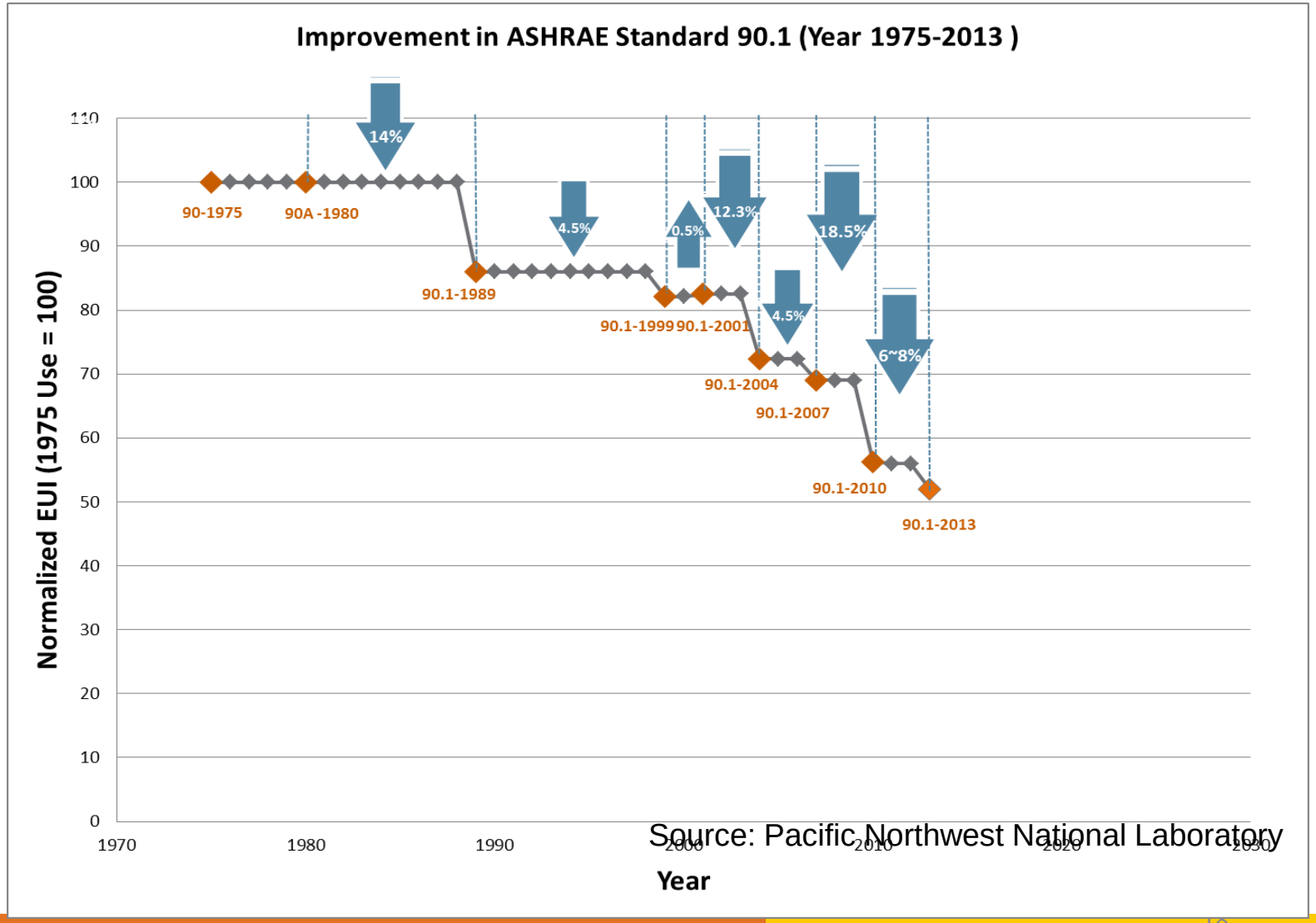
- While acceptable IAQ is the goal of this standard, it will not necessarily be achieved even if all requirements are met
- ***acceptable indoor air quality:*** air toward which a substantial majority of occupants express no dissatisfaction with respect to odor and sensory irritation and in which there are not likely to be contaminants at concentrations that are known to pose a health risk.

ASHRAE Standard 90.1-2016, *Energy Standard for Buildings Except Low-Rise Residential Buildings*

- Standard 90.1 is a benchmark for commercial building energy codes
- ASHRAE has set forth efforts to address plug load reduction and help design teams account for them when evaluating building loads with Standard 90.1
- "Regulated loads" are no longer included in a summary of energy savings in the Standard 90.1 revision in 2016
- Plug loads will continue to be a critical component in achieving Advanced Energy Design Guides



ANSI/ASHRAE/IES Standard 90.1-2013 -- Energy Standard for Buildings Except Residential Buildings

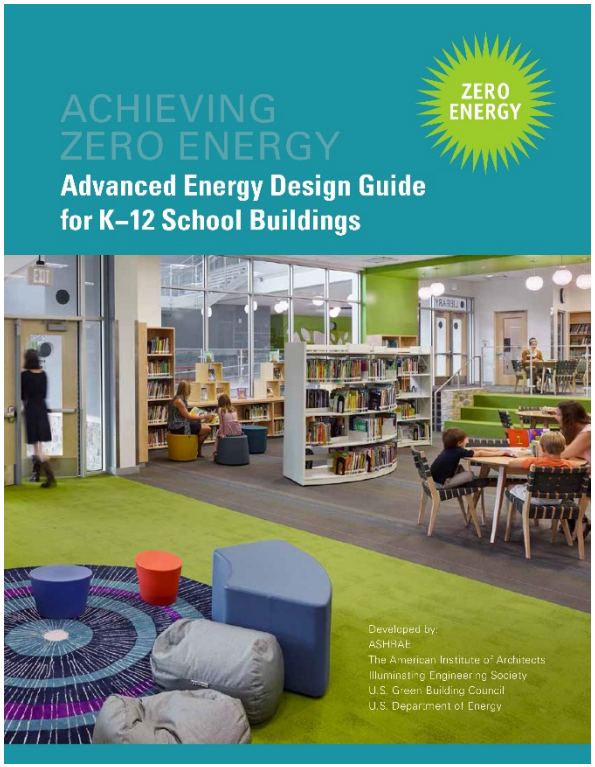


Source: Pacific Northwest National Laboratory

ASHRAE Standard 189.1-2014, *Standard for the Design of High-Performance Green Buildings*

- Standard 189.1 provides total building sustainability guidance for designing, building and operating high-performance green buildings
- Has broader scope than Standard 90.1
- Partners with the International Code Council (ICC) for the International Green Construction Code (IgCC)
- Single resource on green buildings "IgCC powered by 189.1" to be published in summer 2018

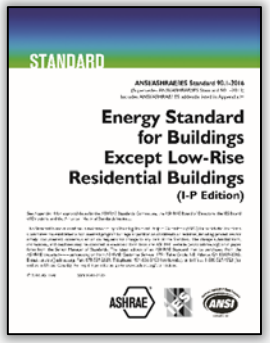
Advanced Energy Design Guide for K-12 School Buildings

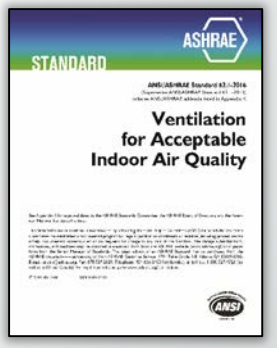


- Achieving zero energy is a driving force for ASHRAE
- New AEDG for Zero Energy K-12 Schools
- Prepared under ASHRAE special project 139
- First in a series for achieving zero energy and tailored to the design and creation of zero energy schools

Recent Publications

- Duct Fitting Database v. 6.00.05
- Standard 90.1-2016
- Standard 15/34-2016
- Standard 55 User's Manual
- Standard 55 - 2017
- Standard 62.1 User's Manual
- Standard 62.2 User's Manual
- Weather Data Viewer v. 6.0 DVD
- ASHRAE Design Guide for Dedicated Outdoor Air Systems





ASHRAE

Further New Publications

- ASHRAE GreenGuide, 5th edition
- ASHRAE Design Guide for Cleanrooms
- ASHRAE Design Guide for Duct Systems
- ASHRAE Design Guide for Air Terminal Units
- ASHRAE Design Guide for Sustainable Refrigeration Facilities and Systems
- Advanced Energy Design Guide for K-12 (Achieving Zero Energy)
- New International Green Construction Code (IGCC)
  - ANSI/ASHRAE/ICC/USBC/IES Standard 189.1, *Standard for the Design of High-Performance, Green Buildings* is the technical basis
  - Early to mid 2018

Thank You

To Join or Renew - www.ashrae.org/join

To Get More Involved - www.ashrae.org/volunteer