HVACR and Water Heating Industry Certification, Advocacy, and Horizons

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What we will cover...

- Introduction to AHRI
  - History
  - The “Three Pillars” of AHRI
  - How it Works: Membership and Governance

- Industry Trends
  - Regulations
  - Systems Efficiency
  - “Smart” Equipment
AHRI: Air-Conditioning, Heating, and Refrigeration Institute

- Is one of the nation’s largest trade associations
  - Representing over 300 HVACR and water heating manufacturers across 39 product sections
- Administers rigorous certification programs
  - 40 Certification Programs
- Establishes international standards
  - Nearly 100 industry standards and guidelines
- Promotes policies beneficial to industry
- Represents the industry domestically & globally
- Administers a comprehensive industry statistics program
AHRI History

- Formed in 2008 in a merger between:
  - ARI – Air-conditioning and Refrigeration Institute
  - GAMA – Gas Appliance Manufacturers Association
- Gas-fired appliances since 1915 (National Boiler and Radiator Manufacturers)
Member Profile

- Our members manufacture:
  - Central air conditioning and heating equipment
  - Water heating equipment
  - Commercial and industrial air-conditioning, heating, and ventilation equipment
  - Commercial and industrial refrigeration equipment
  - Hydronic heating equipment
  - Components for heating, air-conditioning, and refrigeration systems
Heating & Component Product Sections

- Air Filtration and Ultraviolet Light Treatment
- Blowers, Fans & Motors
- Burners
- Commercial and Industrial Forced Air Heating
- Controls
- Direct Heating
- Flexible Metallic Gas Piping
- Fluid Pumps
- Furnaces
- Gas Detection and Analysis
- Heat Pump Pool Heaters
- Hydronics Institute
- Infrared Heaters
- Variable Frequency Drives
- Vent-free Gas Products
- Venting Products
- Water Heaters
- Zone Control System Technology
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Cooling, Refrigeration, and Component Sections

- Air Control & Distr. Devices
- Air-Conditioning Heat Transfer
- Applied Packaged Systems
- Automatic Commercial Ice makers
- Chemical and Refrigerant Reclaimers
- Chilled Beams
- Commercial Refrigeration Manufacturers
- Compressors and Condensing Units
- Datacom Cooling
- Dehumidifiers
- Ductless Equipment
- Flow and Contaminant Controls
- Geothermal /WS Heat Pump
- Humidifiers
- Industrial Refrigeration and Heat Transfer Products
- Liquid Chillers
- Mobile Refrigeration
- Thermal Storage Equipment
- Unitary Large Equipment
- Unitary Small Equipment
Three Pillars of AHRI

Advocacy

Standards

Certification
Three Pillars of AHRI

See video at www.youtube.com/watch?v=t8Ymojesf1M
Certification
AHRI Certification

- 40 certification programs
- Foremost globally recognized HVACR & water heating certification program
- 400+ participants
  - 58 International Licensees from 16 countries
- Over 2,200 tests annually
- Accredited by Standards Council of Canada (SCC) to ISO 17065
- Testing contracted to several ISO-17025 accredited, third-party labs
- ENERGY STAR Certified Body
- DOE / CEC / NRCan Information Providers
History of AHRI Certification

- AHRI Certification Program dates back more than 80 years
- All GAMA Efficiency Rating Certified marks, I=B-R, and ARI Performance Certified marks have been replaced with the AHRI Certified mark.
Equipment Certified By AHRI

- Air-Cooling and Heating Coils
- Air and Water-Cooled Chillers
- Baseboard Heaters
- Central Station Air-Handling Units
- Commercial AC and Heat Pumps
- Commercial Refrigerators
- Datacom Cooling
- Direct Heaters
- Energy Recovery Ventilators
- Finned Tube Radiators
- Gas Purge Equipment for Use with Chillers
- Geo-Exchange Heat Pumps
- Ice-Makers/Ice Bins
- Indirect Water Heaters
- Liquid-to-Liquid Heat Exchangers
- Pool Heat Pumps
- PTAC/PTHP
- Reclaimed Refrigerant

- Refrigerant Recovery/Recycling Equipment
- Residential & Commercial Furnaces
- Residential & Commercial Water Heaters
- Residential & Commercial Boilers
- Residential AC and Heat Pumps
- Refrigerant Testing Laboratory Certification
- Room Fan-Coils
- Single Package Vertical AC and Heat Pumps
- Truck/Trailer Refrigeration Units
- Unit Coolers
- Unit Ventilators
- Variable Air Volume Terminals
- Variable Frequency Drives
- Variable Refrigerant Flow AC/HP
- Water Source Heat Pumps
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Online Directory:  www.ahridirectory.org

- AHRI Directory
  - The portal between manufacturers and consumers
- Over 1,900,000 product listings
- More than 177,000 visitors per month
## Directory of Certified Product Performance

<table>
<thead>
<tr>
<th>Agency</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOE</td>
<td>426,000 models submitted</td>
</tr>
<tr>
<td>EPA</td>
<td>145,000 models submitted</td>
</tr>
<tr>
<td>FTC</td>
<td>11,000 Energy Guide labels downloaded</td>
</tr>
</tbody>
</table>
Certification Licensees Continue to Grow

![Bar chart showing the growth of certification licensees from 2011 to 2015. The chart includes data for PBM and OEM categories.]

- **2011**: 163 PBM, 456 OEM (Total: 619)
- **2012**: 173 PBM, 479 OEM (Total: 652)
- **2013**: 201 PBM, 490 OEM (Total: 691)
- **2014**: 207 PBM, 502 OEM (Total: 709)
- **2015**: 232 PBM, 517 OEM (Total: 749)
Joining an AHRI Certification Program

- **Application Submittals**
  - Application is separately applied to each Certification Program
  - Ratings provided for all models (Certify All)
  - Exact process can vary from program to program
    - Refer to program-specific Operations Manual

- **Testing**
  - Products tested from each manufacturer, each year
  - Conducted by a 3\textsuperscript{rd} party lab (not AHRI)
Standards
Standards

- AHRI has published more than 100 standards and guidelines
  - Many in both I-P and SI
  - Majority are designated American National Standards by ANSI

- Regularly work with organizations and governments around the world to help them either adopt or harmonize our standards

- Accredited by the Standards Council of Canada to develop National Standards of Canada
Standards – Heating products

- **New:**
  - AHRI 1330-2014 – Radiant Output of Gas-fired Infrared Heaters
  - ANSI/AHRI 1500-2015 – Commercial Space Heating Boilers

- **Under development:**
  - Draft AHRI 1260P – Portable Combustion Gas Analyzers
  - ASHRAE/AHRI 155P – Commercial Space Heating Boilers
Advocacy
Government Affairs

- U.S. Congress
- Federal Agencies
  - Department of Energy
  - Environmental Protection Agency
  - Department of Commerce
  - Federal Trade Commission
- State Governments
- Foreign Organizations and Governments
  - Standards Adoption and Harmonization
  - Performance Certification
  - International Trade Issues
Safety Issues

- Member of UL / CSA committees
  - Z21/83 Standards
  - UL STP 296

- Track Fuel Gas Codes Activities
  - NFPA, ICC

- State Regulations
  - Plumbing, Fuel Gas, and Oil Codes
  - e.g. PVC venting issues

- Publications
Product Section Organization

- Nominating Committee
- Engineering/Technical Committee
- Certification Committee
- Compliance Committee
- Membership Committee
- Statistics Committee
- Regulatory Committee
- Other Ad Hoc Committees (as needed)

Not all sections have all committees.
Approval Process

• Standards: Engineering/Technical Committee
• Certification: Compliance Committee

Section Committee

Section

• Standards
• Certification Programs

AHRI Committee
Industry Trends
Increasing Efficiency Regulations

- The players:
  - U.S.
    - Department of Energy (DOE)
    - Environmental Protection Agency (EPA)
    - Federal Trade Commission (FTC)
    - Consumer Product Safety Commission (CPSC)
    - California Energy Commission (CEC)
    - State Air Quality Control Districts, e.g. SCAQMD
  - International
    - Natural Resources Canada (NRCan)
    - EU Directives
    - Emerging Markets
Increasing Efficiency Regulations – DOE Rulemaking

- 2015-2016 Expected Rulemakings
  - Single package vertical units
  - Unitary large equipment
  - Commercial furnaces
  - Residential furnaces
  - ASHRAE 90.1 products
  - Hearth products
  - Residential Boilers
  - Packaged Terminal equipment
  - Commercial Pumps
  - Commercial fans and blowers
Increasing Efficiency Regulations – DOE Rulemaking

- Legal authority under EPCA, NAECA, and various amendments

- Process:
  1. Establish Test Procedures
  2. Establish Minimum Efficiency Performance Standards (MEPS)
  3. Repeat!

- Steps:
  1. Request for Information/Framework Document
  2. Notice of Proposed Rulemaking (NOPR)
     - Supplemental NOPR if necessary
  3. Final Rule
  4. Delay until final implementation
     - Test procedure: 6 months
     - MEPS: 3 to 5 years
Increasing Efficiency Regulations – DOE Rulemaking

What trends are we seeing?
- Rulemaking is more hurried
  - MEPS before Test Procedures
- More frequent changes that are increasingly aggressive
- Added scope of regulations
- More data collection (certification reports)
- More enforcement activity

Why are we seeing this?
- Climate Change and social health concerns
- Pressure from Energy Efficiency Advocates
- Lack of Congressional action
- Ideology
Increasing Efficiency Regulations – DOE Rulemaking

- How are manufacturers impacted?
  - Product redesigns
  - Product testing
  - Cost to respond to rulemaking
  - Changed marketplace
  - Greater chance of penalties
Increasing Efficiency Regulations – DOE Rulemaking

- Examples
  - New metrics
    - Residential Water Heaters UEF
    - Pool Heaters Integrated Thermal Efficiency
    - Standby/Off-mode electrical consumption
    - Furnace Fan Energy Rating
  - Stringent standards
    - 92% AFUE Furnace Standard (proposed)
    - Residential Water Heater > 55 gal must be Heat Pump/Condensing Gas
Increasing Efficiency Regulations – DOE Rulemaking

- AHRI Strategy
  - Negotiate
    - Engage stakeholders
    - Most effective if put into law
  - Engage
    - Respond to Rulemaking documents
    - Legal and Technical evaluations
    - Input of AHRI members is indispensable
  - If Negotiating and Engagement fails, Oppose
    - Petitions for reconsideration
    - File lawsuits if procedures were not followed
    - Add pressure on DOE via Congress to address industry concerns
      - Lobbying
      - Public Awareness Campaign
    - Change rules about how DOE regulates
Systems Efficiency

- Currently using **Appliance** MEPS
- Appliance efficiency ≠ building efficiency
- System Efficiency needs to consider:
  - Components
  - Subsystems
  - Building impacts
  - Seasonal impact
Systems Efficiency

- Gas-fired commercial boiler example:
  - Currently rated with Thermal Efficiency
  - 80°F return, 180°F supply
  - Maximum input rate
- Actual energy use of a hydronic system:
  - Water temperature $\Delta T \neq 100\,^\circ F$
    - Actual temps. depend on heat exchangers
  - Modulation/cycling
  - Optional DHW
  - Component energy
    - Pumps
    - Blower
    - Controls
    - Pilot energy
A recent study by ACEEE showed that the USA has some of the highest component efficiencies and most complex prescriptive requirements in the world, but ranks 13th out of 16 major countries in efficiency.

Global initiatives are starting to move in new directions as shown by the Second European Directive and new initiatives in Canada. ASHRAE 90.1 is also looking moving this direction.

The industry needs to be more proactive and take the lead on efficiency improvements with strong initiatives to move away from the component approach toward a subsystem and system approach while addressing the continued sustainability of the equipment and systems.
Systems Efficiency

- AHRI’s Board of Directors has established a Systems Steering Committee to coordinate activities.
- AHRI Product Sections are developing and executing strategic plans to address commercial systems:
  - Commercial Boilers
  - Commercial Furnaces
  - Commercial Water Heaters
  - Direct-fired Commercial/Industrial Heaters
  - Unit Heaters
- Plans have 5-10 year executable goals
- May result in new metrics, new certifications, computer models, etc.
Smart/Grid-enabled Equipment

- Technology to connect utilities with equipment is available, but is basic
  - Manages peak-demand and energy storage with on/off controls
  - Growing importance
  - MEPS for grid-enabled residential water heaters

- AHRI Smart & Connected Ad-hoc Committee
  - Will start first for unitary AC equipment, then may expand further
Questions?