Update on ASHRAE 15 “Safety Standard for Refrigeration Systems”

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ASHRAE 15

- **Purpose:** Specifies safe design, construction, installation, and operation of refrigeration systems
- **Scope:** Establishes safeguards for life, limb, health, and property and prescribes safety requirements
- **Applies to**
  - The design, construction, test, installation, operation, and inspection of mechanical and absorption refrigeration systems, including heat pump systems used in stationary applications;
  - Modifications including replacement of parts or components if they are not identical in function and capacity; and
  - Substitutions of refrigerant having a different designation
Risks of Flammable Refrigerants

What are 2L Refrigerants:
- Exhibit flame propagation when tested at 60°C
- LFL > 0.10 kg/m³
- HOC < 19000 kJ/kg
- $S_U \leq 0.1 \text{ m/s}$

Increasing probability of a combustion event

Slide Source: P. Johnson, ASHRAE 2012 Annual Meeting Seminar 11
ASHRAE Standard 15 Overview – Basis of Standard

- **Refrigerant Safety Classification**
  - Class 1 Nonflammable
  - Class 2 Lower Flammability
  - Class 3 Higher Flammability
  - Class A Lower Toxicity
  - Class B Higher Toxicity

- **Occupancy Classification**
  - Institutional
  - Public assembly
  - Residential
  - Commercial
  - Large mercantile
  - Industrial
  - Mixed

- **Refrigerating System Classification**
  - Direct
  - Indirect (open or closed)
  - High probability
  - Low Probability

- **Restrictions on Refrigerant Use**
- **Installation Restrictions**
- **Design and Construction of Equipment & Systems**
- **Operation and Testing**
Class 2 & 3 Restrictions

- In general, it is very restrictive.
- A2 or A2L refrigerants allowed in self-contained systems with less than 3kg (residential) or 10kg (commercial), depending on location in the building.
  - The current Standard 15 does not differentiate class 2 and 2L refrigerants because 2L is the sub-class of class 2.
- A3 cannot be used except if allowed by AHJ
  - Exceptions:
    - Laboratories with more than 100 ft² (9.3 m²) area per person
    - Industrial occupancies
    - Portable unit systems containing less than 0.331 lb (150 g) of refrigerant charge

Slide Source: P. Johnson, ASHRAE 2012 Annual Meeting Seminar 11
Change Cycles

- Standard 15-2013 is on “Continuous Maintenance”
- Anyone can submit change proposals at any time, SSPC15 committee reviews and can modify, accept, or reject
- Consensus based with a public review process
- Addenda published on continuous basis
- Every 3 years publish an updated edition, including all addenda approved since the prior edition
  ...2007, 2010, 2013...2016, 2019, 2022
ASHRAE Standard 15 Recent Activities

- 2L Working Group (WG) was tasked to propose requirements on equipment using 2L refrigerants. The WG recent activities include:
  - use of A2L refrigerants for human comfort with certain restrictions
  - requirements for refrigerant leak detectors (definition, reliability, response time, etc.)
  - ventilation requirements for the use of A2L refrigerants in machine room (current focus) and occupied space (later stage).

- 15.2 Subcommittee was created to address residential applications.
ASHRAE Standard 15.2 Subcommittee

- **Proposed equipment coverage:**
  - split system AC&HPs and single package AC&HPs
  - whole house dehumidifiers, whole house dehumidifiers/ventilators, and
  - permanently connected heat pump water heaters

- **Proposed scope:**
  - one- and two-family dwellings
  - multi-family structures with individual dwelling units, where each dwelling unit has its own dedicated heating and air-conditioning system
  - detached outbuildings (and garages, guest houses, pool houses, etc.) located on the same private property defined above
## ASHRAE Standard 15.2 Subcommittee

### Proposed timeline:

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
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<tbody>
<tr>
<td>SC 15.2 draft for Advisory Public Review (APR) ready for SSPC 15 review</td>
<td>12 / 2016</td>
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<tr>
<td>SSPC 15 approval for APR</td>
<td>1 / 2017</td>
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<tr>
<td>SC 15.2 draft for Publication Public Review (PPR) ready for SSPC 15 review</td>
<td>6 / 2017</td>
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<tr>
<td>SSPC 15 approval for PPR</td>
<td>7 / 2017</td>
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<tr>
<td>SC 15.2 second draft for PPR ready for SSPC 15 review</td>
<td>9 / 2017</td>
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<tr>
<td>SSPC 15 approval for second PPR</td>
<td>10 / 2017</td>
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<tr>
<td>Standard ready for submission to ICC for 2021 code cycle</td>
<td>1 / 2018</td>
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</tbody>
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Additional Issues

- changing Standard 15 ⇒ model building codes ⇒ state and local codes adoption of model codes and/or Standard 15
- Model building codes are published once every three years, following a fixed process during each code change cycle
- Safety requirements for class 2L refrigerants were not added to the 2015 building codes, unlikely to be added in the 2018 edition, more likely for 2021
- Adoption & effective date by individual states or localities will be at different times
Thank you for your attention!