

**Issue: DS 2024-024:** The petitioner Rolando Soto of Broward County Board of Rules and Appeals is seeking a declaratory statement regarding the use of A2L refrigerants in accordance with Chapter 11 of the 8<sup>th</sup> Edition (2023) Florida Building Code, Mechanical.

**Petitioner seeks clarification of the following questions:**

**Questions:**

1. Can a refrigeration system using an A2L refrigerant be designed installed using ASHRAE 15 -2019 if the Florida Building Code, Mechanical, 8<sup>th</sup> Edition (2023), Chapter 11 addresses said refrigerant and has more restrictive requirements?
2. Can the A2L refrigerant quantity in an independent refrigerant circuit in a high-probability system exceed the amount for A2 refrigerants stated in Table 1104.3.2 of the Florida Building Code, Mechanical, 8<sup>th</sup> Edition (2023), Chapter 11 or in ASHRAE 15-2019, Table 7.1?
3. Can an alternative method be used to design and install an independent refrigerant circuit in a high probability system that exceeds the amount of A2 or A2L refrigerant stated in Table 1104.3.2 of the Florida Building Code, Mechanical, 8<sup>th</sup> Edition (2023), Chapter 11?
4. Can a refrigeration system be designed and installed using ASHRAE 15-2002 or Chapter 11 of the 2024 International Code as an alternative to the current FMC?

**Background:**

The Petitioner provides for the following:

- The United States Environmental Protection Agency has issued a rule phasing down hydrofluorocarbon refrigerants.
- According to Chapter 11, Refrigeration, of the Florida Building Code, Mechanical, 8<sup>th</sup> Edition (2023), the refrigerants chosen to replace hydrofluorocarbons are included in the A2 category, flammable refrigerants.
- The 2023 FMC severely restricts allowed quantities of A2 refrigerant in air conditioning equipment.
- In the case of Institutional and assembly occupancies, the allowed quantity is zero (0) pound; please see section 1104.3 Refrigerant Restrictions and Table 1104.3.2 Maximum Permissible Quantities of Refrigerants in Chapter 11 of the Florida Building Code, Mechanical, 8<sup>th</sup> Edition, 2023.

**8<sup>th</sup> Edition (2023) Florida Building Code, Building**

**CHAPTER 1 SCOPE AND ADMINISTRATION**

**102.4 Referenced codes and standards.** The codes and standards referenced in this code shall be **considered part of the requirements of this code to the prescribed extent** of each such reference and as further regulated in Sections 102.4.1 and 102.4.2.

**102.4.1 Conflicts.** Where conflicts occur between provisions of this code and referenced codes and standards, the provisions of this code shall apply.

**102.4.2 Provisions in referenced codes and standards.** Where the extent of the reference to a referenced code or standard includes subject matter that is within the scope of this code or the Florida Codes listed in Section 101.4, the provisions of this code or the Florida Codes listed in Section 101.4, as applicable, shall take precedence over the provisions in the referenced code or standard.

**104.11 Alternative materials, design and methods of construction and equipment.** The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *building official* finds that the proposed alternative meets all of the following:

1. The alternative material, design or method of construction is satisfactory and complies with the intent of the provisions of this code.
2. The material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code as it pertains to the following:
  - 2.1. Quality.
  - 2.2. Strength.
  - 2.3. Effectiveness.
  - 2.4. *Fire resistance*.
  - 2.5. Durability.
  - 2.6. Safety.

Where the alternative material, design or method of construction is not approved, the *building official* shall respond in writing, stating the reasons why the alternative was not approved.

## 8<sup>th</sup> (2023) Florida Building Code, Mechanical

### CHAPTER 11 REFRIGERATION

**1101.2 Factory-built equipment and appliances.** *Listed* and *labeled* self-contained, factory-built *equipment* and appliances shall be tested in accordance with UL 207, UL 412, UL 471, UL 1995, UL/CSA 60335-2-40 or UL 60335-2-89. Such *equipment* and appliances are deemed to meet the design, manufacture and factory test requirements of this code if installed in accordance with their listing and the manufacturer's instructions.

**1101.6 General.** Refrigeration systems shall comply with the requirements of this code and, except as modified by this code, ASHRAE 15. Ammonia-refrigerating systems shall comply with this code and, except as modified by this code, ASHRAE 15 and IIAR 2.

**1102.2 Refrigerants.** The refrigerant shall be that which the *equipment* or *appliance* was designed to utilize or converted to utilize. Refrigerants not identified in Table 1103.1 shall be *approved* before use.

**1103.1 Refrigerant classification.** Refrigerants shall be classified in accordance with ASHRAE 34 as listed in Table 1103.1.

## ANSI/ASHRAE Standard 15-2019

## Safety Standard for Refrigeration Systems

### 7. RESTRICTIONS ON REFRIGERANT USE

**7.2 Refrigerant Concentration Limits.** The concentration of *refrigerant* in a complete discharge of each independent circuit of high-probability systems *shall not* exceed the amounts shown in ASHRAE Standard 34 2, Table 4-1 or 4-2, except as provided in Sections 7.2.1 and 7.2.2 of this standard. The volume of *occupied space shall* be determined in accordance with Section 7.3.

#### Exceptions to 7.2:

1. *Listed* equipment containing not more than 6.6 lb (3 kg) of *refrigerant*, regardless of its *refrigerant* safety classification, is exempt from Section 7.2, provided the equipment is installed in accordance with the listing and with the *manufacturer's* installation instructions.
2. *Listed* equipment for use in laboratories with more than 100 ft<sup>2</sup> (9.3 m<sup>2</sup>) of space per person, regardless of the *refrigerant* safety classification, is exempt from Section 7.2, provided that the equipment is installed in accordance with the listing and the *manufacturer's* installation instructions.

**7.3 Volume Calculations.** The volume used to convert from *refrigerant concentration limits* to *refrigerating system* quantity limits for *refrigerants* in Section 7.2 *shall* be based on the volume of space to which *refrigerant* disperses in the event of a *refrigerant* leak.

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**7.4 Location in a Machinery Room or Outdoors.** All components containing *refrigerant shall be located either in a machinery room or outdoors*, where the quantity of *refrigerant* needed exceeds the limits defined by Sections 7.2 and 7.3 or where direct-fired absorption equipment is used.

#### Exceptions to 7.4:

1. *Self-contained systems* are permitted outside of a *machinery room*, provided that such systems are not located in public hallways or *lobbies* and are limited to the following *occupancies* and *refrigerant* quantities:
  - a. 6.6 pounds (3 kg) of *refrigerant* where located in residential *occupancies* or
  - b. 22 pounds (10 kg) of *refrigerant* where located in commercial *occupancies*.
2. *Sealed absorption systems not exceeding the refrigerant quantity limits indicated in Table 7-1.*

**7.4.1** Direct-fired absorption equipment *shall* be located in a *machinery room* or outdoors.

**7.5.2 Applications for Human Comfort.** Group A2, A3, B1, B2L, B2, and B3 *refrigerants shall not* be used in high probability systems for human comfort. Use of Group A2L *refrigerants shall* be in accordance with Section 7.6.

**7.6 Group A2L Refrigerants for Human Comfort.** High probability systems using Group A2L *refrigerants* for human comfort applications *shall* comply with this section.

#### 7.6.1 Refrigerant Concentration Limits

**7.6.1.1** *Occupied spaces shall comply with Section 7.2.*

**7.6.1.2** *Unoccupied spaces with refrigerant containing equipment, including but not limited to piping or tubing, shall comply with Section 7.2 except as permitted by Section 7.6.4.*

**7.6.2 Listing and Installation Requirements.** Refrigeration systems *shall be listed and shall* be installed in accordance with listing, the *manufacturer's* instructions, and any markings on the equipment restricting the installation.

**7.6.2.1** The nameplate required by Section 9.15 *shall* include a symbol indicating that a flammable *refrigerant* is used, as *specified* by the product listing.

**7.6.2.2** A label indicating a flammable *refrigerant* is used *shall* be placed adjacent to service ports and other locations where service involving components containing *refrigerant* is performed, as *specified* by the product listing.

**7.6.2.3** A *refrigerant detector shall* be provided in accordance with Section 7.6.5 where any of the following apply:

#### 7.6.3 Ignition Sources Located in Ductwork

**7.6.3.1** Open-flame-producing devices *shall not* be permanently installed in the ductwork that serves the space.

**7.6.3.2** Unclassified electrical devices *shall not* be located within the ductwork that serves the space.

**7.6.3.3** Devices containing hot surfaces exceeding 1290°F (700°C) *shall not* be located in the ductwork that serves the

space unless there is a minimum airflow of 200 ft/min (1.0 m/s) across the heating device(s) and there is proof of airflow before the heating device(s) is energized.

**7.6.4 Compressors and Pressure Vessel Located Indoors.** For refrigeration *compressors* and *pressure vessels* located in an indoor space that is accessible only during service and maintenance, it *shall* be permissible to exceed the *RCL* if all of the following provisions are met:

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**7.6.5 Refrigerant Detectors.** *Refrigerant detectors* required by Section 7.6.2 *shall* meet the following requirements:  
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## **Staff Analysis**

### **Question #1:**

Can a refrigeration system using an A2L refrigerant be designed and installed using ASHRAE 15 -2019 if the Florida Building Code, Mechanical, 8<sup>th</sup> Edition (2023), Chapter 11 addresses said refrigerant and has more restrictive requirements?

### **Answer:**

#### **Option #1/Petitioner:**

In our opinion, the answer is no. FMC 1101.6 General states that ASHRAE 15 can only be used as modified by this code.

#### **Option #2/Staff:**

The answer to the Petitioner’s question is yes. Pursuant to section 102.4 of the 8<sup>th</sup> Edition (2023) Florida Building Code (FBC), Building and since ASHRAE Standard 15 – 2019 provides for specific design and installation requirements for A2L refrigerant than that of Chapter 11 of the 8<sup>th</sup> Edition (2023) Florida Building Code, Mechanical, ASHRAE Standard 15 as referenced in section 1101.6 of the 8<sup>th</sup> Edition (2023) Florida Building Code (FBC), Mechanical is considered to be an integral part of the FBC, Mechanical and therefore, its provisions would prevail over those of Chapter 11 of the FBC, Mechanical. Designing and installation of A2L refrigerant using ASHRAE 15 would meet the minimum requirements of the 8<sup>th</sup> Edition (2023) Florida Building Code, Mechanical.

### **Question #2:**

Can the A2L refrigerant quantity in an independent refrigerant circuit in a high-probability system exceed the amount for A2 refrigerants stated in Table 1104.3.2 of the Florida Building Code, Mechanical, 8<sup>th</sup> Edition (2023), Chapter 11 or in ASHRAE 15-2019, Table 7.1?

#### **Option #1/Petitioner:**

In our opinion, the answer is no. A2L refrigerants are listed as A2 in the Florida Building Code, Mechanical, 8<sup>th</sup> Edition (2023), Chapter 11, Table 1103.1.

#### **Option #2/Staff:**

**Answer:** See answer to question #1.

### **Question #3:**

Can an alternative method be used to design and install an independent refrigerant circuit in a

high probability system that exceeds the amount of A2 or A2L refrigerant stated in Table 1104.3.2 of the Florida Building Code, Mechanical, 8<sup>th</sup> Edition (2023), Chapter 11?

**Answer:**

**Option #1/Petitioner:**

In our opinion, the answer is may be. The designer would have to analyze and possibly upgrade the whole building, including structural integrity, exit capacity, fire resistivity, fire suppression, and fire alarm, among other factors, to compensate for the added risk of introducing an A2 refrigerant into the space, as required by the Florida Building Code, Existing Buildings, 8<sup>th</sup> Edition (2023), Chapter 14, and Florida Building Code, Building, 8<sup>th</sup> Edition (2023), Chapter 1, section 104.11.

**Option #2/Staff:** The answer to the Petitioner's question is yes. Pursuant to section 104.11 of the 8<sup>th</sup> Edition (2023) Florida Building Code (FBC), Building, the building official has the authority to accept alternative design to that of the prescriptive requirements of the code where he/she finds that the proposed design/alternative complies with the requirements of section 104.11 of the 8<sup>th</sup> Edition (2023) FBC, Building.

**Question #4:**

Can a refrigeration system be designed and installed using ASHRAE 15-2022 or Chapter 11 of the 2024 International Code as an alternative to the current FMC?

**Answer:**

**Option #1/Petitioner:**

In our opinion, the answer is no. The Florida Building Commission must adopt ASHRAE 15-2022 or Chapter 11 of the 2024 International Mechanical Code.

**Option #1/Staff:** This question is general in nature and falls outside the scope of this specific request.