

General Stakeholder Workgroup Meetings

June 7-15, 2022

9:00 a.m. Each Day

Virtual Meeting: <https://vadhcd.adobeconnect.com/va2021cdc/>

AGENDAS

June 15, 2022

(Begin at 9:00 am)

Trades Proposals

1. RE2701.1.1-21
2. RE3902.16-21
3. RE3902.17-21
4. RM1404.1-21
5. RM1411-21
6. RM1601.4.11-21
7. M403.3.1.1-21
8. M1101.2-21
9. M1101.2(2)-21
10. M1101.2.1-21
11. M1101.7-21
12. M1103.1-21
13. M1104.3.1-21
14. M1104.3.1(2)-21
15. M1106.3-21
16. M1106.4-21 Part I
17. M1106.4-21 Part II
18. M-Chapter 15-21
19. M-FG Chapter 8-21
20. M-FG403.5-21
21. M-FG404.6-21
22. P401.4-21
23. P405.3.1-21
24. P605.15.2-21

General Stakeholder Workgroup Meeting Descriptions (Subject Groupings)

VCC: Virginia Construction Code (USBC Part I) including USBC Part I administrative provisions; IBC; VCS; VADR; IBSR; and MHSR (**Proposal Designations in cdpVA:** B; BF; IB; MH; CS; AD)

VEBC: Virginia Existing Building Code (USBC Part II) including USBC Part II administrative provisions; and IEBC (**Proposal Designations in cdpVA:** EB)

Energy: All technical energy provisions of the VCC, IECC and IRC; does not include administrative provisions (**Proposal Designations in cdpVA:** EC; REC)

VMC: Virginia Maintenance Code (USBC Part III) including USBC Part III administrative provisions (**Proposal Designations in cdpVA:** PM)

SFPC: Virginia Statewide Fire Prevention Code including SFPC administrative provisions (**Proposal Designations in cdpVA:** FP)

VRC: Residential technical provisions of the VCC and the IRC; does not include administrative or trades provisions (**Proposal Designations in cdpVA:** RB)

Trades: All technical trade provisions (mechanical, electrical, plumbing and fuel gas), including residential trade provisions, of the VCC, IRC, IPC, IMC, and IFGC; does not include administrative provisions (**Proposal Designations in cdpVA:** M; P; E; RE; RM; RP)

2021 cdpVA Proposal Subject Matter Designations (cdpVA Proposal Name “Agenda Number” Prefixes)

The following prefixes will be utilized as part of each proposal name to assist in identifying the subject matter of the proposal. DHCD staff assign proposal names after they have been submitted, reviewed and before they are placed in “Ready for Public Comment” status.

B = Virginia Construction Code
EB = Virginia Existing Building Code
PM = Virginia Maintenance Code
FP = Statewide Fire Prevention Code
BF = Virginia Construction Code IFC
EC = Virginia Energy Conservation Code
M = Virginia Mechanical Code
P = Virginia Plumbing Code
E = VCC Electrical
RB = Virginia Residential Code
REC = Virginia Residential Code Energy
RE = Virginia Residential Code Electric
RM = Virginia Residential Code Mechanical
RP = Virginia Residential Code Plumbing
IB = Industrialized Building Safety Regulations
MH = Manufactured Home Safety Regulations
AD = Virginia Amusement Device Regulations
CS = Virginia Certification Standards

Example: cdpVA Proposal Agenda Number “**RM**2301.1-21” indicates a proposal to the mechanical provisions (VRC Section M2301.1) of the 2021 Virginia Residential Code.

RE2701.1.1-21

Proponents: Dan Buuck (dbuuck@nahb.org); Andrew Clark (aclark@hbav.com); Mary Koban (mkoban@ahrinet.org)

2018 Virginia Construction Code

Revise as follows:

2701.1 Scope. This chapter governs the electrical components, *equipment* and systems used in buildings and structures covered by this code. Electrical components, *equipment* and systems shall be designed and constructed in accordance with the provisions of this code and NFPA 70.

2701.1.1 Changes to NFPA 70. The following changes shall be made to NFPA 70:

1. Change Sections 334.10(2) and 334.10(3) of NFPA 70 to read:
 - (2) Multifamily dwellings not exceeding four floors above grade and multifamily dwellings of any height permitted to be of Types III, IV and V *construction* except in any case as prohibited in Section 334.12.
 - (3) Other structures not exceeding four floors above grade and other structures of any height permitted to be of Types III, IV and V *construction* except in any case as prohibited in Section 334.12. In structures exceeding four floors above grade, cables shall be concealed within walls, floors or ceilings that provide a thermal barrier of material that has at least a 15-minute finish rating as identified in listings of fire-rated assemblies.

For the purpose of Items 2 and 3 above, the first floor of a *building* shall be that floor that has 50 percent or more of the exterior wall surface area level with or above finished grade. One additional level that is the first level and not designed for human habitation and used only for vehicle parking, storage or similar use shall be permitted.

2. Change Section 700.12(F)(2)(6) of NFPA 70 to read:
 - (6) Where the normal power branch circuits that supply luminaires providing illumination immediately on the inside and outside of exit doors are supplied by the same service or feeder, the remote heads providing emergency illumination for the exterior of an exit door shall be permitted to be supplied by the unit *equipment* serving the area immediately inside the exit door.
3. Change Article 555 of NFPA 70, 2017 Edition to NFPA 70, 2020 Edition for all code requirements related to *marinas*, boatyards, and commercial and noncommercial docking facilities.
4. Delete Section 210.8(F) in its entirety.

Reason Statement: See the attached documentation.

Cost Impact: The code change proposal will decrease the cost of construction
This change will reduce the cost of construction by not requiring GFCIs for outdoor outlets and by reducing the number of call-backs for HVAC contractors.

Resiliency Impact Statement: This proposal will increase Resiliency
This code change will allow more people to remain in their dwelling during a heat wave.

Attached Files

- **Reason Statement - GFCI-Outdoor Outlets.pdf**
<https://va.cdpaccess.com/proposal/1148/1555/files/download/668/>

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
- Consensus Disapproval
- Carry Over to Next Meeting

- Carry over to Final
 - Non-Consensus
 - None
-

Public Comments for: RE2701.1.1-21

This proposal doesn't have any public comments.

Proposal # 1148

RE3902.16-21

Proponents: Bryan Holland (bryan.holland@nema.org)

2018 Virginia Residential Code

Revise as follows:

E3902.16 Arc-fault circuit-interrupter protection. Branch circuits that supply 120-volt, single phase, 15-ampere and 20-ampere outlets installed in kitchens, family rooms, dining rooms, living rooms, parlors, libraries dens, bedrooms, sunrooms, recreation rooms, closets, hallways, laundry areas and similar rooms or areas shall be protected by any of the following:

1. A listed combination-type arc-fault circuit interrupter installed to provide protection of the entire branch circuit.
2. A listed branch/feeder-type AFCI installed at the origin of the branch-circuit in combination with a listed outlet branch-circuit type arc-fault circuit interrupter installed at the first outlet box on the branch circuit. The first outlet box in the branch circuit shall be marked to indicate that it is the first outlet of the circuit.
3. A listed supplemental arc protection circuit breaker installed at the origin of the branch circuit in combination with a listed outlet branch-circuit type arc-fault circuit interrupter installed at the first outlet box on the branch circuit where all of the following conditions are met:
 - 3.1. The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.
 - 3.2. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 50 feet (15.2 m) for 14 AWG conductors and 70 feet (21.3 m) for 12 AWG conductors.
 - 3.3. The first outlet box on the branch circuit shall be marked to indicate that it is the first outlet on the circuit.
4. A listed outlet branch-circuit type arc-fault circuit interrupter installed at the first outlet on the branch circuit in combination with a listed branch-circuit overcurrent protective device where all of the following conditions are met:
 - 4.1. The branch-circuit wiring shall be continuous from the branch-circuit overcurrent device to the outlet branch-circuit arc-fault circuit interrupter.
 - 4.2. The maximum length of the branch-circuit wiring from the branch-circuit overcurrent device to the first outlet shall not exceed 50 feet (15.2 m) for 14 AWG conductors and 70 feet (21.3 m) for 12 AWG conductors.
 - 4.3. The first outlet box on the branch circuit shall be marked to indicate that it is the first outlet on the circuit.
 - 4.4. The combination of the branch-circuit overcurrent device and outlet branch-circuit AFCI shall be identified as meeting the requirements for a system combination-type AFCI and shall be listed as such.
5. Where metal outlet boxes and junction boxes and RMC, IMC, EMT, Type MC or steel-armored Type AC cables meeting the requirements of Section E3908.8, metal wireways or metal auxiliary gutters are installed for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, a listed branch-circuit type AFCI installed at the first outlet shall be considered as providing protection for the remaining portion of the branch circuit.
6. Where a listed metal or nonmetallic conduit or tubing or Type MC cable is encased in not less than 2 inches (50.8 mm) of concrete for the portion of the branch circuit between the branch-circuit overcurrent device and the first outlet, a listed outlet branch-circuit type AFCI installed at the first outlet shall be considered as providing protection for the remaining portion of the branch circuit.

Exceptions:

1. AFCI protection is not required for an individual branch circuit supplying only a fire alarm system where the branch circuit is wired with metal outlet and junction boxes and RMC, IMC, EMT or steel-sheathed armored cable Type AC, or Type MC meeting the requirements of Section E3908.8.
- ~~2. AFCI protection is not required where GFCI protection is required in accordance with E3902 and NEC 210.8(A).~~

Reason Statement: This proposal deletes an exception that implies that GFCI protection required by this code and the NEC somehow mitigates the hazard of arcing-faults on those branch circuits. This is a technical fallacy. GFCI protection can only mitigate unintended ground-faults that could result in shock or electrocution. AFCI protection detects arcing-faults on the branch circuit that could result in fire. There is no technical correlation between the two life and property safety technologies. By deleting this exception, the AFCI protection requirements in the Commonwealth of Virginia will be restored to the national consensus standard in the 2021 IRC and 2020 NEC.

Cost Impact: The code change proposal will increase the cost of construction

This proposal will increase the cost of construction. The deletion of this exception will require not less than three additional AFCI protection devices to be installed for the two kitchen small appliance branch circuits and one laundry branch circuit. While the code permits several methods for providing AFCI protection of branch circuits, the most common method is by the circuit breaker protecting the branch circuit. The average cost difference between a regular circuit breaker and an AFCI circuit breaker is between \$35-50. There is no increase in time or labor to install AFCI circuit breakers versus regular circuit breakers. This would result in an overall cost increase of \$105-150 per dwelling unit.

Resiliency Impact Statement: This proposal will increase Resiliency

This proposal will increase the resiliency of occupancies under the scope of the Virginia Residential Code from that hazard of fire as a result of arcing-faults on the branch circuits that are currently exempted by the exception to this section of AFCI protection requirements.

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
 - Consensus Disapproval
 - Carry Over to Next Meeting
 - Carry over to Final
 - Non-Consensus
 - None
-

Public Comments for: RE3902.16-21

This proposal doesn't have any public comments.

RE3902.17-21

Proponents: Dan Buuck (dbuuck@nahb.org); Andrew Clark (aclark@hbav.com); Mary Koban (mkoban@ahrinet.org)

2021 International Residential Code

Delete without substitution:

~~**E3902.17 Outdoor outlets.** All outdoor outlets, other than those covered in E3902.3, Exception, that are supplied by single-phase branch circuits rated 150 volts to ground or less, 50 amperes or less, shall have ground fault circuit interrupter protection for personnel. [210.8(F)]~~

~~**Exception:** Ground fault circuit interrupter protection shall not be required on lighting outlets other than those covered in E3902.15. [210.8(F) Exception]~~

Reason Statement: See the attached documentation.

Cost Impact: The code change proposal will decrease the cost of construction

This change will reduce the cost of construction by not requiring GFCIs for outdoor outlets and by reducing the number of call-backs for HVAC contractors.

Resiliency Impact Statement: This proposal will increase Resiliency

This code change will allow more people to remain in their dwelling during a heat wave.

Attached Files

- **Reason Statement - GFCI-Outdoor Outlets.pdf**
<https://va.cdpaccess.com/proposal/1145/1553/files/download/669/>

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
- Consensus Disapproval
- Carry Over to Next Meeting
- Carry over to Final
- Non-Consensus
- None

Public Comments for: RE3902.17-21

This proposal doesn't have any public comments.

RM1404.1-21

Proponents: Mary Koban (mkoban@ahrinet.org)

2021 International Residential Code

Revise as follows:

M1404.1 Compliance. Refrigeration cooling *equipment* shall comply with ~~Section M1411.~~ Section M1411, UL 474, UL 484, UL 1995, or UL/CSA 60335-2-40.

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

UL 474-2015: Standard for Safety Dehumidifiers

UL 484-2019 Standard for Room Air Conditioners

UL/CSA/ANCE 60335-2-40—2012 Standard for Household and Similar Electrical Appliances, Safety Part 2-40: Particular Requirements for Motor-Compressors for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers

Reason Statement: This code change removes the reference to Section 1411 and adds the appropriate standards that regulate refrigeration cooling equipment. UL 484, UL 1995, and UL/CSA 60335-2-40 are the three standards that regulate all residential air conditioning and refrigerant cooling equipment. UL 474 and UL 484 is a new standard being introduced to the code. UL 474 regulates dehumidifiers. UL 484 regulates room air conditioners such as window units and package terminal air conditioners (PTACs). UL 474, UL 484, and UL 1995 will eventually sunset with UL/CSA 60335-2-40 as the replacement standard. However, these three standards are still being used for listing of equipment.

Currently, Section M1403.1 references UL 1995 and UL/CSA/ANCE 60335-2-40 for heat pumps. Similarly, Section M1412.1 references these two standards for absorption cooling equipment. The modification will compliment these two sections and their corresponding references to the standards. In addition, a revision to the IMC added these standards to Table 1101.2. This will keep the IRC consistent with the IMC regarding appropriate standards referenced for refrigeration equipment.

UL/CSA 60335-2-40 has been updated to the current edition since a significant number of new safety requirements were added to the standard. While Section 1411 is removed from a reference, the section still applies. It is not necessary to reference the section.

The code change was accepted and adopted in the 2024 IRC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This change only adds the appropriate standards that are used for testing and listing refrigeration cooling equipment. The code already requires such equipment to be listed.

Resiliency Impact Statement: This proposal will increase Resiliency

This code change proposal will increase resiliency as users will have more options to use equipment with lower GWP which meet the most current equipment safety standards.

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
 - Consensus Disapproval
 - Carry Over to Next Meeting
 - Carry over to Final
 - Non-Consensus
 - None
-

Public Comments for: RM1404.1-21

This proposal doesn't have any public comments.

Proposal # 1121

RM1411-21

IRC@: M1411.1, M1411.2 (New), M1411.3 (New), M1411.4 (New), M1411.5 (New), M1411.6 (New), M1411.7 (New), ANCE Chapter 44, CSA Chapter 44, UL Chapter 44

Proponents: Mary Koban (mkoban@ahrinet.org)

2021 International Residential Code

M1411.1 Approved refrigerants. Refrigerants used in direct refrigerating systems shall conform to the applicable provisions of ANSI/ASHRAE 34.

Add new text as follows:

M1411.2 Refrigeration system listing. Refrigeration systems using Group A2L refrigerants shall be listed and labeled to UL 60335-2-40/CAN/CSA

C22.2 No. 60335-2-40. Refrigeration systems using Group A1 refrigerants shall be listed to UL 60335-2-40/CAN/CSA C22.2 No. 6-335-2-40 or UL 1995/CSA C22.2 No. 236. The equipment shall be installed in accordance with the listing.

M1411.3 Refrigeration system installation. Refrigeration systems shall be installed in accordance with the manufacturer's installation instructions.

After installation, the manufacturer's installation instructions, owner's manuals, service manuals, and any other product literature provided with the equipment shall be attached to the indoor unit or left with the homeowner.

M1411.4 Field installed accessories. All Field installed accessories shall be installed in accordance with the accessory and equipment

manufacturer's installation instructions. Accessories installed in the ductwork of Group A2L refrigeration systems shall not contain electric heating elements, open flames, or devices switching electrical loads greater than 2.5 kVA.

M1411.5 Signs and identification. Each refrigeration system using Group A2L refrigerant shall have the following information legibly and

permanently indicated on a markable label provided by the equipment manufacturer.

1. Contact information of the responsible company that installed the refrigeration system, and

2. The system refrigerant charge and the refrigerant number.

M1411.6 Refrigerant charge. All refrigeration systems shall have refrigerant charge in compliance with the equipment manufacturer's installation instructions and the requirements of the listing. Group A2L refrigerant charge for an individual refrigeration system shall not exceed 34.5 lbs (15.7 kg).

M1411.7 Group A2L refrigerant piping testing. The piping system containing Group A2L refrigerant shall be tested in accordance with the

manufacturer's installation instructions and the requirements of the listing.

Delete without substitution:

ANCE

Association of Standardization and Certification
Av. Lázaro Cárdenas No. 869 Fraccion 3
Col. Nva. Industrial Vallejo Deleg. Gustavo A. Madero, México, D.F.

~~NMX-J-521/2-40-ANCE— Safety of Household and Similar Electric Appliances, Part 2-40: Particular Requirements for Heat Pumps, Air-Conditioners and Dehumidifiers
2014/CAN/CSA-22.2 No. 60335-2-40
—12/UL 60335-2-40~~

Revise as follows:

CSA

CSA Group
8501 East Pleasant Valley Road
Cleveland, OH 44131-5516

~~UL 60335-2-40- Standard for Safety of Household and Similar Electrical Appliances -Safety, Part 2-40: Particular Requirements
2019/CAN/CSA/C22.2 No. 60335-2-40
40—2012 60335-2-40—2012 19~~

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

~~UL/GSA/ANCE 60335-2-40—2012~~ Standard for Household and Similar Electrical Appliances- Safety, Part 2 -40: Particular Requirements for
~~60335-2-40—2012~~ 2019/CAN/CSA Electrical Heat Pumps, Air Conditioners and Dehumidifiers ~~Motor compressors~~
C22.2 No. 60335-2-40-19

Reason Statement: The general requirements list the specific standards that regulate refrigeration equipment. The change will mandate a listing to UL 60335-2- 40-2019/CAN/CSA C22.2 No. 60335-2-40-19 for any equipment using A2L refrigerant. The same standard will apply for systems using A1 refrigerants. Additionally UL 1995 is included for equipment using A1 refrigerants. UL 60335-2-40/CAN/CSA C22.2 No. 60335-2-40 has been updated to the 2019 edition which is the latest edition. In the latest edition, ANCE (from Mexico) withdrew their sponsorship. Hence, the ANCE listing is shown deleted. The standard is only bi-national between the United States and Canada.

The field marking of new equipment is required by the product standard. This requirement has been added to the code to keep the code consistent with the listing requirements.

The manufacturer specifies the charge limitation in the installation instructions for equipment using Group A2L refrigerant. This is also required by the product standard and assures the safe amount of charge based on room volume. The manufacturers also specify the testing requirements for refrigerant piping for residential equipment. Testing of the refrigerant piping is important to identify to allow the code official to observe that the piping can meet the pressure requirements of the equipment.

Resiliency Impact Statement: This proposal will increase Resiliency

The addition of the updated standards will provide manufacturers and users greater flexibility to meet the upcoming changes in refrigerants required by the implementation of the AIM Act.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

The installation of air conditioning equipment is optional. Therefore there is no increase or decrease in cost. This change emphasizes the requirements currently in the code regarding general listing and installation of mechanical equipment.

RM6

RM1601.4.11-21

Proponents: DHCD Staff (sbco@dhcd.virginia.gov)

2021 International Residential Code

Add new text as follows:

1601.4.11 Registers, grilles and diffusers. Duct registers, grilles and diffusers shall be installed in accordance with the manufacturer's instructions.

1601.4.11.1 Prohibited locations. Diffusers, registers and grilles shall be prohibited in the floor or its upward extension within toilet and bathing rooms

Reason Statement: This proposal was created by staff in response to a request from Delegate Bulova to address a concern about floor registers in toilet and bathing spaces. When a toilet overflows, contaminated water will spill onto the floor and flow down into the supply duct. In order to sanitize the duct, the HVAC system must be turned off, the sewage must be pumped from the ductwork, and then the ductwork will need to be sanitized. If the HVAC fan happens to be running when the toilet overflows, sewage particulates will be sprayed into the air.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
None.

Resiliency Impact Statement: This proposal will neither increase nor decrease Resiliency

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
 - Consensus Disapproval
 - Carry Over to Next Meeting
 - Carry over to Final
 - Non-Consensus
 - None
-

Public Comments for: RM1601.4.11-21

This proposal doesn't have any public comments.

M403.3.1.1-21

Proponents: Richard Grace (rgrace@culpepercounty.gov), VPMIA

2018 Virginia Mechanical Code

Revise as follows:

TABLE 403.3.1.1 MINIMUM VENTILATION RATES

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY#/1000 FT ² _a	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_p CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R_a CFM/FT ^{2 a}	EXHAUST AIRFLOW RATE CFM/FT ^{2 a}
Correctional facilities				
Booking/waiting	50	7.5	0.06	—
Cells				
without plumbing fixtures	25	5	0.12	—
with plumbing fixtures ⁹	25	5	0.12	1.0
Day room	30	5	0.06	—
Dining halls (see "Food and beverage service")	—	—	—	—
Guard stations	15	5	0.06	—
Dry cleaners, laundries				
Coin-operated dry cleaner	20	15	—	—
Coin-operated laundries	20	7.5	0.12	—
Commercial dry cleaner	30	30	—	—
Commercial laundry	10	25	—	—
Storage, pick up	30	7.5	0.12	—
Education				
Art classroom ⁸	20	10	0.18	0.7
Auditoriums	150	5	0.06	—
Classrooms (ages 5-8)	25	10	0.12	—
Classrooms (age 9 plus)	35	10	0.12	—
Computer lab	25	10	0.12	—
Corridors (see "Public spaces")	—	—	—	—
Day care (through age 4)	25	10	0.18	—
Lecture classroom	65	7.5	0.06	—
Lecture hall (fixed seats)	150	7.5	0.06	—
Locker/dressing rooms ⁹	—	—	—	0.25
Media center	25	10	0.12	—
Multiuse assembly	100	7.5	0.06	—
Music/theater/dance	35	10	0.06	—
Science laboratories ⁹	25	10	0.18	1.0
Smoking lounges ^b	70	60	—	—
Sports locker rooms ⁹	—	—	—	0.5
Wood/metal shops ⁹	20	10	0.18	0.5
Food and beverage service				
Bars, cocktail lounges	100	7.5	0.18	—
Bars or cocktail lounges designated as an area where smoking is permitted ^b	100	30	—	—
Cafeteria, fast food	100	7.5	0.18	—
Cafeteria or fast food designated as an area where smoking is permitted ^b	100	20	—	—

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY#/1000 FT	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R CFM/FT	EXHAUST AIRFLOW RATE CFM/FT
Dining rooms	70	7.5	0.18	—
Dining rooms designated as an area where smoking is permitted ^b	70	20	—	—
Kitchens (cooking) ^b	20	7.5	0.12	0.7
Hotels, motels, resorts and dormitories				
Bathrooms/toilet—private ^b	—	—	—	25/50 ^f
Bedroom/living room	10	5	0.06	—
Conference/meeting	50	5	0.06	—
Dormitory sleeping areas	20	5	0.06	—
Gambling casinos	120	7.5	0.18	—
Lobbies/prefunction	30	7.5	0.06	—
Multipurpose assembly	120	5	0.06	—
Medical facilities				
Medical procedure rooms ⁱ	20	15	—	—
Patient rooms ⁱ	10	25	—	—
Physical therapy rooms ⁱ	20	15	—	—
Offices				
Conference rooms	50	5	0.06	—
Main entry lobbies	10	5	0.06	—
Office spaces	5	5	0.06	—
Reception areas	30	5	0.06	—
Telephone/data entry	60	5	0.06	—
Private dwellings, single and multiple				
Garages, common for multiple units ^b	—	—	—	0.75
Kitchens ^b	—	—	—	25/100 ^f
Living areas ^c	Based on number of bedrooms. First bedroom, 2; each additional bedroom, 1	0.35 ACH but not less than 15 cfm/person	—	—
Toilet rooms and bathrooms ^g	—	—	—	20/50 ^f
Public spaces				
Corridors	—	—	0.06	—
Courtrooms	70	5	0.06	—
Elevator car	—	—	—	1.0
Legislative chambers	50	5	0.06	—
Libraries	10	5	0.12	—
Lounges designated as an area where smoking is permitted ^b	100	30	—	—
Museums (children's)	40	7.5	0.12	—
Museums/galleries	40	7.5	0.06	—
Places of religious worship	120	5	0.06	—
Shower room (per shower head) ⁹	—	—	—	50/20 ^f

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY#/1000 FT	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R CFM/FT	EXHAUST AIRFLOW RATE CFM/FT
Smoking lounges ^b	70	60	—	—
Toilet rooms — public ^g	—	—	—	50/70 ^e
Retail stores, sales floors and showroom floors				
Dressing rooms	—	—	—	0.25
Mall common areas	40	7.5	0.06	—
Sales	15	7.5	0.12	—
Shipping and receiving	2	10	0.12	—
Smoking lounges ^b	70	60	—	—
Storage rooms	—	—	0.12	—
Warehouses (see "Storage")	—	10	0.06	—
Specialty shops				
Automotive motor-fuel dispensing stations ^b	—	—	—	1.5
Barber	25	7.5	0.06	0.5
Beauty salons ^b	25	20	0.12	0.6
Nail salons ^{b, h}	25	20	0.12	0.6
Embalming room ^b	—	—	—	2.0
Pet shops (animal areas) ^b	10	7.5	0.18	0.9
Supermarkets	8	7.5	0.06	—
Sports and amusement				
Bowling alleys (seating areas)	40	10	0.12	—
Disco/dance floors	100	20	0.06	—
Game arcades	20	7.5	0.18	—
Gym, stadium, arena (play area)	7	20	0.18	—
Health club/aerobics room	40	20	0.06	—
Health club/weight room	10	20	0.06	—
Ice arenas without combustion engines	—	—	0.30	0.5
Spectator areas	150	7.5	0.06	—
Swimming pools (pool and deck area)	—	—	0.48	—
Storage				
Repair garages, enclosed parking garages ^{b,d}	—	—	—	0.75
Refrigerated warehouses/freezers	—	10	—	—
Warehouses	—	10	0.06	—
Theaters				
Auditoriums (see "Education")	—	—	—	—
Lobbies	150	5	0.06	—
Stages, studios	70	10	0.06	—
Ticket booths	60	5	0.06	—
Transportation				

OCCUPANCY CLASSIFICATION	OCCUPANT DENSITY#/1000 FT	PEOPLE OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R CFM/PERSON	AREA OUTDOOR AIRFLOW RATE IN BREATHING ZONE, R CFM/FT	EXHAUST AIRFLOW RATE CFM/FT
Platforms	100	7.5	0.06	—
Transportation waiting	100	7.5	0.06	—
Workrooms				
Bank vaults/safe deposit	5	5	0.06	—
Computer (without printing)	4	5	0.06	—
Copy, printing rooms	4	5	0.06	0.5
Darkrooms	—	—	—	1.0
Meat processing ^c	10	15	—	—
Pharmacy (prep. area)	10	5	0.18	—
Photo studios	10	5	0.12	—

For SI: 1 cubic foot per minute = 0.0004719 m³/s, 1 ton = 908 kg, 1 cubic foot per minute per square foot = 0.00508 m³/(s · m²), °C = [(°F) - 32]/1.8, 1 square foot = 0.0929 m².

- a. Based on net occupiable floor area.
- b. Mechanical exhaust required and the recirculation of air from such spaces is prohibited. Recirculation of air that is contained completely within such spaces shall not be prohibited (see Section 403.2.1, Item 3).
- c. Spaces unheated or maintained below 50 °F are not covered by these requirements unless the occupancy is continuous.
- d. Ventilation systems in enclosed parking garages shall comply with Section 404.
- e. Rates are per water closet or urinal. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied.
- f. Rates are per room unless otherwise indicated. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted only where the exhaust system is designed to operate continuously while occupied.
- g. Mechanical exhaust is required and recirculation from such spaces is prohibited except that recirculation shall be permitted where the resulting supply airstream consists of not more than 10 percent air recirculated from these spaces. Recirculation of air that is contained completely within such spaces shall not be prohibited (see Section 403.2.1, Items 2 and 4).
- h. For nail salons, each manicure and pedicure station shall be provided with a source capture system capable of exhausting not less than 50 cfm per station. Exhaust inlets shall be located in accordance with Section 502.20. Where one or more required source capture systems operate continuously during occupancy, the exhaust rate from such systems shall be permitted to be applied to the exhaust flow rate required by Table 403.3.1.1 for the nail salon.
- i. For spaces that are ~~not located in an ambulatory care facility or clinic~~, outpatient facilities as defined in Chapter 2 of the VCC.

Reason Statement: This proposed change is to footnote "i". The current language assumes the VCC definitions of "ambulatory care facility" and "clinic, outpatient" are similar, and they are not. This error in the current footnote makes the three occupancy classifications associated with this footnote unusable. The intent of this change during the 2018 code development cycle was to provide ventilation rates for general doctor or dentist offices without having to go to ASHRAE 170 as directed by VMC Section 407, Ambulatory Care Facilities and Group I-2 Occupancies. This proposed change corrects the 2018 error and brings forward the original intent.

Cost Impact: The code change proposal will not increase or decrease the cost of construction. This is a clarity proposal to allow the previously proposed intent to actually work.

Resiliency Impact Statement: This proposal will neither increase nor decrease Resiliency.

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
- Consensus Disapproval
- Carry Over to Next Meeting
- Carry over to Final
- Non-Consensus
- None

Public Comments for: M403.3.1.1-21

This proposal doesn't have any public comments.

M1101.2-21

Proponents: Mary Koban (mkoban@ahrinet.org)

2021 International Mechanical Code

1101.2 Factory-built equipment and appliances. *Listed* and *labeled* self-contained, factory-built *equipment* and *appliances* shall be tested in accordance with the applicable standards specified in Table 1101.2. 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.

Revise as follows:

TABLE 1101.2 FACTORY-BUILT EQUIPMENT AND APPLIANCES

EQUIPMENT	STANDARDS
Refrigeration fittings, including press-connect, flared and threaded	UL 109 and UL 207
Air-conditioning equipment	UL 1995 or UL/CSA 60335-2-40
Packaged terminal air conditioners and heat pumps	UL 484 or UL/CSA 60335-2-40
Split-system air conditioners and heat pumps	UL 1995 or UL/CSA 60335-2-40
Dehumidifiers	UL 474 or UL/CSA 60335-2-40
Unit coolers	UL 412 or UL/CSA 60335-2-89
Commercial refrigerators, freezers, beverage coolers and walk-in coolers	UL 471 or UL/CSA 60335-2-89
Refrigerating units and walk-in coolers	UL 427 or UL 60335-2-89
Refrigerant-containing components and accessories	UL 207

Reason Statement: This table was added during the last cycle when the refrigerant piping rewrite was completed. This resulted in the refrigerant fitting requirements appearing in two locations. The appropriate location for referencing fitting requirements is in Section 1107. It should be noted that UL 207 is included in 1107.5. By deleting this row, it avoids confusion regarding which section applies. This code proposal was accepted and approved for the 2024 IMC code cycle.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal will not increase or decrease the cost of construction

This change is editorial in nature. As such, it has no impact on the cost of construction.

Resiliency Impact Statement: This proposal will neither increase nor decrease Resiliency
This proposal is to provide clarity and will not have any change on resiliency.

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
- Consensus Disapproval
- Carry Over to Next Meeting
- Carry over to Final
- Non-Consensus
- None

Public Comments for: M1101.2-21

This proposal doesn't have any public comments.

M1101.2(2)-21

Proponents: Helen Walter-Terrinoni (psuphy1988@gmail.com); Mary Koban (mkoban@ahrinet.org)

2021 International Mechanical Code

Revise as follows:

TABLE 1101.2 FACTORY-BUILT EQUIPMENT AND APPLIANCES

EQUIPMENT	STANDARDS
Refrigeration fittings, including press-connect, flared and threaded	UL 109 and UL 207
Air-conditioning equipment and heat pump equipment	UL 1995 or UL/CSA 60335-2-40
Packaged terminal air conditioners and heat pumps	UL 484 or UL/CSA 60335-2-40
Split-system air conditioners and heat pumps	UL 1995 or UL/CSA 60335-2-40
Dehumidifiers	UL 474 or UL/CSA 60335-2-40
Air/water cooled condensers	UL 1995 or UL/CSA 60335-2-40 or UL/CSA 60335-2-89
Refrigeration equipment	UL 1995 or UL/CSA 60335-2-89
Unit coolers	UL 412 or UL/CSA 60335-2-89
Commercial refrigerators, freezers, beverage coolers and walk-in coolers	UL 471 or UL/CSA 60335-2-89
Refrigerating units and walk-in coolers	UL 427 or UL 60335-2-89
Refrigeration condensing units	UL 1995 or UL/CSA 60335-2-89
Automatic commercial ice machines	UL 563 or UL/CSA 60335-2-89
Refrigerant-containing components and accessories	UL 207

Reason Statement: This table was added during the last cycle. By adding additional equipment types and corresponding standards, the table provides further clarity on factory-built equipment and appliances.

Cost Impact: The code change proposal will not increase or decrease the cost of construction. This change is editorial in nature. As such, it has no impact on the cost of construction.

Resiliency Impact Statement: This proposal will neither increase nor decrease Resiliency. The table is being updated to provide more clarity. It will neither increase nor decrease resiliency.

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
- Consensus Disapproval
- Carry Over to Next Meeting
- Carry over to Final
- Non-Consensus
- None

Public Comments for: M1101.2-21

This proposal doesn't have any public comments.

M1101.2.1-21

Proponents: Mary Koban (mkoban@ahrinet.org)

2021 International Mechanical Code

Add new text as follows:

1101.2.1 Group A2L, A2, A3 and B1 high probability equipment. High probability equipment using Group A2L, A2, A3, or B1 refrigerant shall comply with UL 484, UL/CSA 60335-2-40, or UL/CSA 60335-2-89.

-

Revise as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

~~UL/CSA 60335-2-40—17 60335-2-40—17 2019~~ Household and Similar Electrical Appliances—Safety—Part 2-40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers

~~UL/CSA 60335-2-89—17 60335-2-89—17 2021~~ Household and Similar Electrical Appliances—Safety—Part 2-89: Particular Requirements for Commercial Refrigerating Appliances with an Incorporated or Remote Refrigerant Unit or Compressor

Reason Statement: During the last code cycle, Table 1101.2 was added to reference all of the appropriate standard for factory-built equipment. Included in the list are standards that regulate the use of Group A2L, A2, A3, and B1 refrigerants. However, that is not separated out in the table. To assist the code official, this new section will add the appropriate reference to the standards that regulate equipment using these refrigerant in high probability systems. The application of these refrigerants include the use of Group A2L in equipment providing human comfort. Group A2L, A2, A3, and B1 refrigerants are also used in high probability equipment such as water coolers, refrigeration equipment in supermarkets, and freezers and cooler in restaurants and similar facilities. There are strict limitation on the charge size of these refrigerants specified in the standards referenced. The reference to ASHRAE 15-2019 opened the code to the use of Group A2L refrigerants in high probability systems for human comfort. ASHRAE 15 has since added specific reference to the standards regulating equipment using Group A2L refrigerants. Thus, this proposal is consistent with the requirements in the addendums to ASHRAE 15. The 2019 edition of UL/CSA 60335-2-40 added additional safety requirements for equipment using Group A2L, A2, A3, and B1 refrigerants. The 2021 edition of UL/CSA 60335-2-89 added additional safety requirements for A2L, A2, and A3 refrigerants. The update to the 2019 edition of UL/CSA 60335-2-40 includes additional safety requirements. This edition added electrical and refrigerant safety requirements. There are provisions for refrigerant detection systems, UL-C germicidal lamp systems, CO2 systems, photovoltaic systems and new marking requirements. With the increased use of Group A2L, A2, and A3 refrigerants, it is important to reference the latest edition of the standard.

The update to the 2021 edition of UL/CSA 60335-2-89 includes additional safety requirements based on the lower GWP refrigerants and includes additional testing requirements. Therefore, it should also be updated.

This code proposal (except for the revised date for UL 60335-2-89) was accepted and approved for the 2024 IMC code cycle. UL 60335-2-89:2021 edition was published after the ICC Group A code cycle completed.

Cost Impact: The code change proposal will not increase or decrease the cost of construction. The code change proposal will not increase or decrease the cost of construction. This change is a clarification of the requirements for listing factory-built equipment. Therefore, there is no increase or decrease in the cost of construction. The code user still has the option as to what type of refrigeration equipment to install.

Resiliency Impact Statement: This proposal will increase Resiliency. Updating this section to allow lower GWP refrigerants in high-probability equipment that complies with UL 60335-2-40:2019 or UL 60335-89:2021, will ensure that manufacturers can meet new federal regulations (AIM Act) while ensuring safety.

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
- Consensus Disapproval
- Carry Over to Next Meeting
- Carry over to Final
- Non-Consensus
- None

Public Comments for: M1101.2.1-21

This proposal doesn't have any public comments.

M1101.7-21

Proponents: Mary Koban (mkoban@ahrinet.org)

2021 International Mechanical Code

Revise as follows:

~~1101.7 Change in refrigerant type.~~ The type of refrigerant in refrigeration systems having a refrigerant circuit containing more than 220 pounds (99.8 kg) of Group A1 or 30 pounds (13.6 kg) of any other group refrigerant shall not be changed without prior notification to the code official and compliance with the applicable code provisions for the new refrigerant type.

1101.7 Changing Refrigerant. Changes of refrigerant in an existing system to a refrigerant with a different refrigerant designation shall only be allowed where in accordance with the following:

1. The owner or the owner's authorized agent shall be notified prior to making a change of refrigerant, and the change of refrigerant shall not be made where the owner objects to the change.

2. The change in refrigerant shall be in accordance with one of the following.

2.1 Written instructions of the original equipment manufacturer.

2.2 An evaluation of the system by a registered design professional or by an approved agency that validates safety and suitability of the replacement refrigerant.

2.3 Approved by the code official.

3. Where the replacement refrigerant is classified into the same safety group, requirements that were applicable to the existing system shall continue to apply.

4. Where the replacement refrigerant is classified into a different safety group, the system shall comply with the requirements of this standard for a new installation, and the change of refrigerant shall require code official approval.

~~1102.2.1 Mixing.~~ Refrigerants, including refrigerant blends, with different designations in ASHRAE 34 shall not be mixed in a system.

~~Exception:~~ Addition of a second refrigerant is allowed where permitted by the *equipment* or *appliance* manufacturer to improve oil return at low temperatures. The refrigerant and amount added shall be in accordance with the manufacturer's instructions.

1102.2.1 Mixing. Refrigerants with different refrigerant designations shall only be mixed in a system in accordance with both of the following:

1. The addition of a second refrigerant is allowed by the equipment manufacturer and is in accordance with the manufacturer's written instructions.

2. The resulting mixture does not change the refrigerant safety group.

Add new text as follows:

Refrigerant Designation. The unique identifying alphanumeric value or refrigerant number assigned to an individual refrigerant and published in ASHRAE Standard 34.

Reason Statement: With the onset of flammable refrigerants, the need to address change of refrigerant from one safety class to another was identified. ASHRAE published addendum e to ASHRAE 15-2016 to address this concern (which is now part of the ASHRAE 15-2019 version, Section 5.3).

This code proposal was accepted and approved for the 2024 IMC code cycle.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This proposal provides a clarification to address the use of new systems but does not introduce any additional requirements that would impact cost.

Resiliency Impact Statement: This proposal will increase Resiliency

This proposal will increase resiliency as it will enable users to be able to use lower GWP refrigerants safely and effectively. If users need to change refrigerant from one class to another, they will have information available to make this change.

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
 - Consensus Disapproval
 - Carry Over to Next Meeting
 - Carry over to Final
 - Non-Consensus
 - None
-

Public Comments for: M1101.7-21

This proposal doesn't have any public comments.

Proposal # 1089

M1103.1-21

Proponents: Mary Koban (mkoban@ahrinet.org)

2021 International Mechanical Code

Revise as follows:

TABLE 1103.1 REFRIGERANT CLASSIFICATION, AMOUNT AND OEL

Portions of table not shown remain unchanged.

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE						
				RCL			LFL			OEL ^d
				Pounds per 1,000 cubic feet lb/MCf	ppm	g/m ³	lb/MCf	ppm	g/m ³	OEL ^e ppm
R-11 ^{d,c}	CCl ₃ F	trichlorofluoromethane	A1	0.39	1,100	6.2 6.1				€1,000
R-12 ^{d,c}	CCl ₂ F ₂	dichlorodifluoromethane	A1	5.6	18,000	90				1,000
R-13 ^{d,c}	CClF ₃	chlorotrifluoromethane	A1	—	—	—				1,000
R-13B1 ^{d,c}	CBrF ₃	bromotrifluoromethane	A1	—	—	—				1,000
R-13I1	CF ₃ I	trifluoroiodomethane	A1	1.0	2,000	16				500
R-31	CH ₂ ClF	chlorofluoromethane	-	-	-	-				-
R-32	CH ₂ F ₂	difluoromethane (methylene fluoride)	A2L ^e	4.8	36,000	77	19.1	144,000	306	1,000
R-41	fluoromethane (methyl fluoride)	-	-	-	-	-				-
R-50	CH ₄	methane	A3	—	—	—		50,000		1,000
R-113 ^{d,c}	CCl ₂ FCClF ₂	1,1,2-trichloro-1,2,2-trifluoroethane	A1	1.2	2,600	20				1,000
R-114 ^{d,c}	CClF ₂ CClF ₂	1,2-dichloro-1,1,2,2-tetrafluoroethane	A1	8.7	20,000	140				1,000
R-141b	CH ₃ CCl ₂ F	1,1-dichloro-1-fluoroethane	—	0.78	2,600	12	17.8	60,000	287	500
R-142b	CH ₃ CClF ₂	1-chloro-1,1-difluoroethane	A2	5.1	20,000	83 82	20.4	80,000	329	1,000
R-143a	CH ₃ CF ₃	1,1,1-trifluoroethane	A2L ^e	4.5 4.4	21,000	70	17.5	82,000	282	1,000
R-152a	CH ₃ CHF ₂	1,1-difluoroethane	A2	2.0	12,000	32	8.1	48,000	130	1,000
R-170	CH ₃ CH ₃	ethane	A3	0.54	7,000	8.7 8.6	2.4	31,000	38	1,000
R-E170	CH ₃ OCH ₃	Methoxymethane (dimethyl ether)	A3	1.0	8,500	16	4.0	34,000	64	1,000
R-290	CH ₃ CH ₂ CH ₃	propane	A3	0.56 0.59	5,300	9.5	2.4	21,000	38	1,000
R-C318	-(CF ₂) ₄ -	octafluorocyclobutane	A1	41	80,000	660 650				1,000
R-400A ^{d,c}	zeotrope	R-12/114 (50.0/50.0)	A1	10	28,000	160				1,000
R-400B ^{d,c}	zeotrope	R-12/114 (60.0/40.0)	A1	11	30,000	170				1,000
R-403B	zeotrope	R-290/22/218 (5.0/56.0/39.0)	A1	18	70,000 68,000	290				1,000
R-406A	zeotrope	R-22/600a/142b (55.0/4.0/41.0)	A2	4.7	21,000	25 75	18.8	82,000	301.9	1,000
R407I	zeotrope	R-32/125/134a(19.5/8.5/72.0)	A1	16	71,100	250				1,000

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE						
				RCL			LFL			OEL
				Pounds per 1,000 cubic feet lb/MCf	ppm	g/m	lb/MCf	ppm	g/m	OEL ppm
R-408A	zeotrope	R-125/143a/22 (7.0/46.0/47.0)	A1	21	95,000 94,000	340 330				1,000
R-411A	zeotrope	R-127/22/152a (1.5/87.5/11.0)	A2	2.9	14,000	46	11.6	55,000	185.6	990 970
R-411B	zeotrope	R-1270/22/152a (3.0/94.0/3.0)	A2	2.8	13,000	45	14.8	70,000	238.3	980 940
R-412A	zeotrope	R-22/218/142b (70.0/5.0/25.0)	A2	5.1	22,000	82	20.5	87,000	328.6	1,000
R-413A	zeotrope	R-218/134a/600a (9.0/88.0/3.0)	A2	5.8	22,000	94 93	23.4	88,000	374.9	1,000
R-414B	zeotrope	R-22/124/600a/142b (50.0/39.0/1.5/9.5)	A1	6.0	23,000	95 96				1,000
R-417A	zeotrope	R-125/134a/600 (46.6/50.0/3.4)	A1	3.5	13,000	56 55				1,000
R-417B	zeotrope	R-125/134a/600 (79.0/18.3/2.7)	A1	4.3	15,000	70 69				1,000
R-418A	zeotrope	R-290/22/152a (1.5/96.0/2.5)	A2	4.8	22,000	77	19.2	89,000	308.4	1,000
R-419A	zeotrope	R-125/134a/E170 (77.0/19.0/4.0)	A2	4.2	15,000	67	16.7	60,000	268.6	1,000
R-419B	zeotrope	R-125/134a/E170 (48.5/48.0/3.5)	A2	4.6	17,000	74	18.5	69,000	297.3	1,000
R-420A	zeotrope	R-134a/142b (88.0/12.0)	A1	12	45,000 44,000	190 180				1,000
R-423A	zeotrope	R-134a/227ea (52.5/47.5)	A1	19	59,000	310 300				1,000
R-424A	zeotrope	R-125/134a/600a/600/601a (50.5/47.0/0.9/1.0/0.6)	A1	6.2	23,000	100				970 990
R-428A	zeotrope	R-125/143a/290/600a (77.5/20.0/0.6/1.9)	A1	23	83,000 84,000	370				1,000
R-429A	zeotrope	R-E170/152a/600a (60.0/10.0/30.0)	A3	0.81	6,300	13	3.2	25,000	83.8	1,000
R-430A	zeotrope	R-152a/600a (76.0/24.0)	A3	1.3	8,000	21	5.2	32,000	44.0	1,000
R-431A	zeotrope	R-290/152a (71.0/29.0)	A3	0.69 0.68	5,500	11	2.7	22,000	38.6	1,000

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE						
				RCL			LFL			OEL
				Pounds per 1,000 cubic feet lb/MCf	ppm	g/m	lb/MCf	ppm	g/m	OEL ppm
R-432A	zeotrope	R-1270/E170 (80.0/20.0)	A3	0.13	1,200	2.1	<u>2.4</u>	<u>22,000</u>	<u>39.2</u>	700 <u>550</u>
R-433A	zeotrope	R-1270/290 (30.0/70.0)	A3	0.34	3,100	5.5	<u>2.4</u>	<u>20,000</u>	<u>32.4</u>	880 <u>760</u>
R-433B	zeotrope	R-1270/290 (5.0-95.0)	A3	0.51 <u>0.39</u>	4,500 <u>3,500</u>	8.1 <u>6.3</u>	<u>2.0</u>	<u>18,000</u>	<u>32.1</u>	950
R-433C	zeotrope	R-1270/290 (25.0-75.0)	A3	0.41	3,600 <u>3,700</u>	6.6 <u>6.5</u>	<u>2.0</u>	<u>18,000</u>	<u>83.8</u>	790
R-435A	zeotrope	R-E170/152a (80.0/20.0)	A3	1.1	8,500	17	<u>4.3</u>	<u>34,000</u>	<u>68.2</u>	1,000
R-436A	zeotrope	R-290/600a (56.0/44.0)	A3	0.50	4,000	8.1	<u>2.0</u>	<u>16,000</u>	<u>32.2</u>	1,000
R-436B	zeotrope	R-290/600a (52.0/48.0)	A3	0.51	4,000	8.1 <u>8.2</u>	<u>2.0</u>	<u>16,000</u>	<u>32.7</u>	1,000
R-437A	zeotrope	R-125/134a/600/601 (19.5/78.5/1.4/0.6)	A1	5.0 <u>5.1</u>	19,000	82				990
R-439A	zeotrope	R-32/125/600a (50.0/47.0/3.0)	A2	4.7	26,000	76	<u>18.9</u>	<u>104,000</u>	<u>303.3</u>	990 <u>1,000</u>
R-440A	zeotrope	R-290/134a/152a (0.6/1.6/97.8)	A2	1.9	12,000	31	<u>7.8</u>	<u>46,000</u>	<u>124.7</u>	1,000
R-441A	zeotrope	R-170/290/600a/600 (3.1/54.8/6.0/36.1)	A3	0.39	3,200	6.3	<u>2.0</u>	<u>16,000</u>	<u>31.7</u>	1,000
R-443A	zeotrope	R-1270/290/600a (55.0/40.0/5.0)	A3	0.19	1,700	3.1	<u>2.2</u>	<u>20,000</u>	<u>35.6</u>	580 <u>640</u>
R-444A	zeotrope	R-32/152a/1234ze(E) (12.0/5.0/83.0)	A2L ^e	5.1	21,000	81	<u>19.9</u>	<u>82,000</u>	<u>324.8</u>	850
R-444B	zeotrope	R-32/152a/1234ze(E) (41.5/10.0/48.5)	A2L ^e	4.3	23,000	69	<u>17.3</u>	<u>93,000</u>	<u>277.3</u>	890 <u>930</u>
R-445A	zeotrope	R-744/134a/1234ze(E) (6.0/9.0/85.0)	A2L ^e	4.2	16,000	67	<u>21.7</u>	<u>63,000</u>	<u>347.4</u>	930
R-446A	zeotrope	R-32/1234ze(E)/600 (68.0/29.0/3.0)	A2L ^e	2.5	16,000	39	<u>13.5</u>	<u>62,000</u>	<u>217.4</u>	960
R-447A	zeotrope	R-32/125/1234ze(E) (68.0/3.5/28.5)	A2L ^e	2.6	16,000	42	<u>18.9</u>	<u>65,000</u>	<u>303.5</u>	900 <u>960</u>
R-447B	zeotrope	R-32/125/1234ze(E) (68.0/8.0/24.0)	A2L ^e	23	30,000 <u>16,000</u>	360 <u>42</u>	<u>20.6</u>	<u>121,000</u>	<u>312.7</u>	970

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE						
				RCL			LFL			OEL
				Pounds per 1,000 cubic feet lb/MCf	ppm	g/m	lb/MCf	ppm	g/m	OEL ppm
R-448A	zeotrope	R-32/125/1234yf/134a/1234ze(E) (26.0/26.0/20.0/21.0/7.0)	A1	24	110,000	390				890 860
R-449A	zeotrope	R-32/125/1234yf/134a (24.3/24.7/25.3/25.7)	A1	23	100,000	370				830 840
R-451A	zeotrope	R-1234yf/134a (89.8/10.2)	A2L ^e	5.3	18,000	81	<u>20.3</u>	<u>70,000</u>	<u>326.6</u>	520 530
R-451B	zeotrope	R-1234yf/134a (88.8/11.2)	A2L ^e	5.3	18,000	81	<u>20.3</u>	<u>70,000</u>	<u>326.6</u>	530
R-452A	zeotrope	R-32/125/1234yf (11.0/59.0/30.0)	A1	27	10,000 100,000	440				780 790
R-452B	zeotrope	R-32/125/1234yf (67.0/7.0/26.0)	A2L ^e	23 <u>4.8</u>	30,000	360 77	<u>19.3</u>	<u>119,000</u>	<u>310.5</u>	870
R-452C	zeotrope	R-32/125/1234yf (12.5/61.0/26.5)	A1	27	100,000	430				800 810
R-454A	zeotrope	R-32/1234yf (35.0/65.0)	A2L ^e	28 <u>3.2</u>	16,000	450 52	<u>18.3</u>	<u>63,000</u>	<u>293.9</u>	690
R-454B	zeotrope	R-32/1234yf (68.9/31.1)	A2L ^e	22 <u>3.1</u>	19,000	360 49	<u>22.0</u>	<u>77,000</u>	<u>352.6</u>	850
R-454C	zeotrope	R-32/1234yf (21.5/78.5)	A2L ^e	29 <u>4.4</u>	19,000	460 71	<u>18.0</u>	<u>62,000</u>	<u>289.5</u>	620
R-455A	zeotrope	R-744/32/1234yf (3.0/21.5/75.5)	A2L ^e	23 <u>4.9</u>	30,000 22,000	380 79	<u>26.9</u>	<u>118,000</u>	<u>432.1</u>	650
R-457A	zeotrope	R-32/1234yf/152a (18.0/70.0/12.0)	A2L ^e	25 <u>3.4</u>	15,000	400 54	<u>13.5</u>	<u>60,000</u>	<u>216.3</u>	650
R-457B	zeotrope	R-32/1234yf/152a (35.0/55.0/10.0)	A2L	3.7	19,000	59	14.9	76,000	239	730
R-459A	zeotrope	R-32/1234yf/1234ze(E) (68.0/26.0/6.0)	A2L ^e	23 <u>4.3</u>	27,000	360 69	<u>17.4</u>	<u>107,000</u>	<u>278.7</u>	870
R-459B	zeotrope	R-32/1234yf/1234ze(E) (21.0/69.0/10.0)	A2L ^e	30	16,000 25,000	470 92	<u>23.3</u>	<u>99,000</u>	<u>373.5</u>	640
R-460A	zeotrope	R-32/125/134a/1234ze(E) (12.0/52.0/14.0/22.0)	A1	24	92,000	380				650 950
R-460C	zeotrope	R-32/125/134a/1234ze(E) (2.5/52.5/46.0/49.0)	A1	20	73,000	310				900
R-462A	zeotrope	R-32/125/143a/134a/600 (9.0/42.0/2.0/44.0/3.0)	A2	3.9	16,000	62	<u>16.6</u>	<u>105,000</u>	<u>265.8</u>	1,000
R-464A	zeotrope	R-32/125/1234ze(E)/227ea (27.0/27.0/40.0/6.0)	A1	27	120,000	430				930

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE						
				RCL			LFL			OEL
				Pounds per 1,000 cubic feet lb/MCf	ppm	g/m	lb/MCf	ppm	g/m	OEL ppm
R-465A	zeotrope	R-32/290/1234yf (21.0/7.9/71.1)	A2	2.5	12,000	40	10.0	98,000	160.9	660
R-466A	zeotrope	R-32/125/131i (49.0/11.5/39.5)	A1	6.2	30,000	99				860
R-467A	zeotrope	R-32/125/134a/600a (22.0/5.0/72.4/0.6)	A2L	6.7	31,000	110				1,000
R-468A	zeotrope	R-1132a/32/1234yf (3.5/21.5/75.0)	A2L	4.1	16.00	66				610
R-469A	zeotrope	R-744/32/125 (35.0/32.5/32.5)	A1	8	53,000					1,600
R-470A	zeotrope	R-744/32/125/134a/1234ze(E)/227ea (10.0/17.0/19.0/7.0/44.0/3.0)	A1	17	77.00	270				1,100
R-470B	zeotrope	R-744/32/125/134a/1234ze(E)/227ea (10.0/11.5/11.5/3.0/57.0/7.0)	A1	16	72,000	270				1,100
R-471A	zeotrope	R-1234ze(E)/227ea/1336mzz(E) (78.7/4.3/17.0)	A1	9.7	31,000	160				710
R-472A	zeotrope	R-744/32/134a (69.0/12.0/19.0)	A1	4.5	35,000	72				2,700
R-500 ^{ed}	azeotrope	R-12/152a (73.8/26.2)	A1	7.6 7.4	30,000 29,000	120				1,000
R-501 ^{de}	azeotrope	R-22/12 (75.0/25.0)	A1	13	54,000	210				1,000
R-502 ^{ed}	azeotrope	R-22/115 (48.8/51.2)	A1	21	73,000	330				1,000
R-503 ^{e_d}	azeotrope	R-23/13 (40.1/59.9)	—	—	—	—				1,000
R-504 ^{de}	azeotrope	R-32/115 (48.2/51.8)	—	28	140,000	450				1,000
R-507A	azeotrope	R-125/143a (50.0/50.0)	A1	32	130,000	520 510				1,000
R-509A	azeotrope	R-22/218 (44.0/56.0)	A1	24	75,000	390 380				1,000
R-510A	azeotrope	R-E170/600a (88.0/12.0)	A3	0.87	7,300	14	3.5	29,000	56.1	1,000
R-511A	azeotrope	R-290/E170 (95.0/5.0)	A3	0.59	5,300	9.5	2.4	21,000	38.0	1,000
R-512A	azeotrope	R-134a/152a (5.0/95.0)	A2	1.9	11,000	31	7.7	45,000	123.9	1,000
R-515A	azeotrope	R-1234ze(E)/227ea (88.0/12.0)	A1	19	62,000 63,000	300				810
R-515B	azeotrope	R-1234ze(E)/227ea (91.1/8.9)	A1	18	61,000	290				810
R-516A	azeotrope	R-1234yf/134a/152a (77.5/8.5/14.0)	A2	7.0 3.2	27,000 13,000	110 52	13.1	50,000	210.1	590
R-600	CH ₃ CH ₂ CH ₂ CH ₃	butane	A3	0.15	1,000	2.4	3.0	20,000	48	1,000

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE						
				RCL			LFL			OEL
				Pounds per 1,000 cubic feet lb/MCf	ppm	g/m	lb/MCf	ppm	g/m	OEL ppm
R-600a	CH(CH ₃) ₂ CH ₃	2-methylpropane (isobutane)	A3	0.59	4,000	9.6	<u>2.4</u>	<u>16,000</u>	<u>38</u>	1,000
R-601	CH ₃ CH ₂ CH ₂ CH ₂ CH ₃	pentane	A3	0.18	1,000	2.9	<u>2.2</u>	<u>12,000</u>	<u>35</u>	600
R-601a	(CH ₃) ₂ CHCH ₂ CH ₃	2-methylbutane (isopentane)	A3	0.18	1,000	2.9	<u>2.4</u>	<u>13,000</u>	<u>38</u>	600
<u>R-717</u>	<u>NH₃</u>	<u>ammonia</u>	<u>B2L</u>	<u>0.014</u>	<u>320</u>	<u>0.22</u>	<u>7.2</u>	<u>167,000</u>	<u>116</u>	<u>25</u>
R-1130(E)	CHCl=CHCl	trans-1,2-dichloroethene	<u>B+2</u>	0.25	1,000	4	<u>16</u>	<u>65,000</u>	<u>258</u>	200
R-1132a	CF ₂ =CH ₂	1,1-difluoroethylene	A2	2.0	13,000	33	<u>8.1</u>	<u>50,000</u>	<u>131</u>	500
R-1150	CH ₂ =CH ₂	ethene (ethylene)	A3	—	—	—	<u>2.2</u>	<u>31,000</u>	<u>36</u>	200
R-1224yd(Z)	CF ₃ CF=CHCl	(Z)-1-chloro-2,3,3,3-tetrafluoroethylene	A1	23	60,000	360 <u>370</u>				1,000
R-1234yf	CF ₃ CF=CH ₂	2,3,3,3-tetrafluoro-1-propene	A2L ^e	4.7	16,000	75	<u>18.0</u>	<u>62,000</u>	<u>289</u>	500
R-1234ze(E)	CF ₃ CH=CHF	trans-1,3,3,3-tetrafluoro-1-propene	A2L ^e	4.7	16,000	75 <u>76</u>	<u>18.8</u>	<u>65,000</u>	<u>303</u>	800
R-1270	CH ₃ CH=CH ₂	Propene (propylene)	A3	0.1	1,000	1.7				500
<u>R-1336mzz(E)</u>	<u>CF₃CHCHCF₃</u>	<u>trans-1,1,1,4,4,4-hexafluoro-2-butene</u>	<u>A1</u>	<u>3.0</u>	<u>7,200</u>	<u>48</u>				<u>400</u>
R-1336mzz(Z)	CF ₃ CHCHCF ₃	cis-1,1,1,4,4,4-hexafluoro-2-butene	A1	5.4 <u>5.2</u>	13,000	87 <u>84</u>				500

For SI: 1 pound = 0.454 kg, 1 cubic foot = 0.0283m³

- a. Degrees of hazard are for health, fire, and reactivity, respectively, in accordance with NFPA 704.
- b. Reduction to 1-0-0 is allowed if analysis satisfactory to the code official shows that the maximum concentration for a rupture or full loss of refrigerant charge would not exceed the IDLH, considering both the refrigerant quantity and room volume.
- c.

The ASHRAE Standard 34 flammability classification for this refrigerant is 2L, which is a subclass of Class

~~2.d. Class~~

I ozone depleting substance; prohibited for new installations.

~~e.~~

d. Occupational Exposure Limit based on the OSHA PEL, ACGIH TLV-TWA, the TERA WEEL or consistent value on a time-weighted average (TWA) basis (unless noted C for ceiling) for an 8 hr/d and 40 hr/wk.

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Reason Statement: The Refrigerant Classifications (except Degrees of Hazard) are determined by ASHRAE SSSC 34 and published in ASHRAE Standard 34. This proposal seeks to update the refrigerant table with the new refrigerants added to Standard 34 since the last code cycle. The reasons for the additions of new refrigerants can be found at <https://www.ashrae.org/standards-research-technology/standards-addenda>. All proposed changes are either incorporated into ASHRAE Standard 34-2019 or the published addenda to ASHRAE Standard 34-2019 located at the

link above.

The code proposal was accepted and adopted in the 2024 IMC

Cost Impact: The code change proposal will not increase or decrease the cost of construction

Updating the table of refrigerants that could be used in systems does not add labor or material costs because the choice of refrigerant is up to the owner and designer.

Resiliency Impact Statement: This proposal will increase Resiliency

The code change will provide users more flexibility to use lower GWP refrigerants and also allow greater flexibility with equipment design. Therefore, it will increase resiliency.

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
 - Consensus Disapproval
 - Carry Over to Next Meeting
 - Carry over to Final
 - Non-Consensus
 - None
-

Public Comments for: M1103.1-21

This proposal doesn't have any public comments.

M1104.3.1-21

Proponents: Mary Koban (mkoban@ahrinet.org)

2021 International Mechanical Code

Revise as follows:

1104.3.1 Air conditioning for human comfort. ~~In other than industrial occupancies where the quantity in a single independent circuit does not exceed the amount in Table 1103.1, Group B1, B2 and B3 refrigerants shall not be used in high-probability systems for air conditioning for human comfort. High probability systems used for human comfort shall use Group A1 or A2L refrigerant.~~

Exceptions:

1. Listed equipment for residential occupancies containing a maximum of 6.6 pounds (3 kg) of refrigerant.
2. Listed equipment for commercial occupancies containing a maximum of 22 pounds (10 kg) of refrigerant.
3. Industrial occupancies.

1104.3.2 ~~Nonindustrial occupancies~~ Group A3 and B3 refrigerants. ~~Group A2 and B2 refrigerants shall not be used in high-probability systems where the quantity of refrigerant in any independent refrigerant circuit exceeds the amount shown in Table 1104.3.2. Group A3 and B3 refrigerants shall not be used except where *approved*.~~

~~Exception~~ Exceptions: This section does not apply to

1. ~~laboratories~~ Laboratories where the floor area per occupant is not less than 100 square feet (9.3 m²).
2. Listed self contained systems having a maximum of 0.331 pounds (150 g) of Group A3 refrigerant.
3. Industrial occupancies.

Delete without substitution:

M1104.3.1(2)-21

Proponents: Helen Walter-Terrinoni (psuphy1988@gmail.com); Mary Koban (mkoban@ahrinet.org)

2021 International Mechanical Code

Revise as follows:

1104.3.1 Air conditioning for human comfort. ~~In other than industrial occupancies where the quantity in a single independent circuit does not exceed the amount in Table 1103.1, Group B1, B2 and B3 refrigerants shall not be used in high-probability systems for air conditioning for human comfort. High probability systems used for human comfort shall use Group A1 or A2L refrigerant.~~ ~~comfort.~~

Exceptions:

1. Listed equipment for residential occupancies containing a maximum of 6.6 pounds (3 kg) of refrigerant.
2. Listed equipment for commercial occupancies containing a maximum of 22 pounds (10 kg) of refrigerant.
3. Industrial occupancies.

-

1104.3.2 Nonindustrial occupancies Group A2, A3, B2, and B3 refrigerants. ~~Group A2 and B2 refrigerants shall not be used in high-probability systems high probability systems where the quantity of refrigerant in any independent refrigerant circuit exceeds the amount shown in Table 1104.3.2. Group A3 and B3 refrigerants shall not be used except where approved.~~

Exception Exceptions: This section does not apply to ~~laboratories~~:

1. Laboratories where the floor area per occupant is not less than 100 square feet (9.3 m²).
2. Listed self-contained systems having a maximum of 0.331 pounds (150 g) of Group A3 refrigerant.
3. Self-contained systems listed per UL 60335-2-89 having a maximum of 1.1 pounds (500g) of Group A3 refrigerant.
4. Industrial occupancies.
5. Equipment listed for and used in residential occupancies containing a maximum of 6.6 pounds (3 kg) of Group A2 or B2 refrigerant.
6. Equipment listed for and used in commercial occupancies containing a maximum of 22 pounds (10 kg) of Group A2 or B2 refrigerant.

-

Delete without substitution:

TABLE 1104.3.2 MAXIMUM PERMISSIBLE QUANTITIES OF REFRIGERANTS

TYPE OF REFRIGERATION SYSTEM	MAXIMUM POUNDS FOR VARIOUS OCCUPANCIES			
	Institutional	Public assembly	Residential	All other occupancies
Sealed absorption system				
In exit access	0	0	3.3	3.3
In adjacent outdoor locations	0	0	22	22
In other than exit access	0	6.6	6.6	6.6
Unit systems				
In other than exit access	0	0	6.6	6.6

For SI: 1 pound = 0.454 kg.

Reason Statement: These requirements being stricken are based on previous editions of ASHRAE 15. ASHRAE 15 has been updated numerous times resulting in the modification to the requirement similar to this proposal. High probability direct systems for human comfort must use either Group A1 or A2L refrigerant. Other refrigerants can be used provided the maximum charge does not exceed 6.6 pound for residential applications and 22 pounds for commercial units. Plus, these unit must be listed for use with these other refrigerants.

This section is being further updated after the 2024 cycle to incorporate new information regarding equipment listed to UL 60335-2-89. The standard was published in October 2021 following the close of the 2024 cycle. Therefore, the updates incorporate the newest information and align with the equipment listing and most recent updates to ASHRAE 15.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This change is a further clarification of the allowed refrigerants for human comfort and the allowed exceptions for A3 and B3 refrigerants . There is no impact to the cost of construction.

Resiliency Impact Statement: This proposal will increase Resiliency

The new text aligns more clearly with changes made to ASHRAE 15 and should provide equipment manufacturers and users more opportunities to use lower GWP refrigerants and meet the current standards.

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
- Consensus Disapproval
- Carry Over to Next Meeting
- Carry over to Final
- Non-Consensus
- None

Public Comments for: M1104.3.1-21

This proposal doesn't have any public comments.

M1106.3-21

Proponents: Mary Koban (mkoban@ahrinet.org)

2021 International Mechanical Code

Revise as follows:

1106.3 Flammable Class 2 and 3 refrigerants. Where refrigerants of Groups A2, A3, B2 and B3 are used, the *machinery room* shall conform to the Class I, Division 2, *hazardous location* classification requirements of NFPA 70.

~~**Exception:** *Machinery rooms* for systems containing Group A2L refrigerants that are provided with ventilation in accordance with Section 1106.4.~~

Reason Statement: ASHRAE 15 has been modified removing the term "flammable refrigerant" and replacing it with the specific Class of refrigerant. Section 1106.3 has thus been modified to indicate Class 2 and 3 refrigerants.

This code proposal was accepted and adopted in the 2024 IMC code cycle.

Cost Impact: The code change proposal will not increase or decrease the cost of construction. This change is editorial in nature. As a result, there is no impact to the cost of construction.

Resiliency Impact Statement: This proposal will increase Resiliency. This code proposal will increase resiliency by further enabling low GWP refrigerants and aligning with ASHRAE 15.

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
- Consensus Disapproval
- Carry Over to Next Meeting
- Carry over to Final
- Non-Consensus
- None

Public Comments for: M1106.3-21

This proposal doesn't have any public comments.

M1106.4-21 Part I

Proponents: Mary Koban (mkoban@ahrinet.org)

2021 International Mechanical Code

Revise as follows:

~~1106.4 Special requirements for Group A2L refrigerant machinery rooms~~

~~Group A2L and B2L Refrigerant~~

~~. Machinery rooms with systems containing Group A2L refrigerants that do not conform to the Class I, Division 2, hazardous location electrical requirements of NFPA 70, as permitted by the exception to Section 1106.3, shall comply with Sections 1106.4.1 through 1106.4.3.~~

~~**Exception:** Machinery rooms conforming to the Class I, Division 2, hazardous location classification requirements of NFPA 70 are not required to comply with Sections 1106.4.1 and 1106.4.2.~~

Machinery rooms for Group A2L and B2L refrigerant shall comply with Sections 1106.4.1 through Section 1106.4.3.

Add new text as follows:

1106.4.1 Elevated Temperature. Open flame-producing devices or continuously operating hot surfaces over 1290 °F (700 °C) shall not be permanently installed in the room

Revise as follows:

~~**1106.4.2 Emergency ventilation system—system Refrigerant Detector.** An emergency ventilation system shall be provided at the minimum exhaust rate specified in ASHRAE 15 or Table 1106.4.2. Shutdown of the emergency ventilation system shall be by manual means.~~

~~In addition to the requirements of Section 1105.3, refrigerant detectors shall signal an alarm and activate the~~

~~ventilation system in accordance with the response time specified in Table 1106.4.2.~~

Add new text as follows:

Table 1106.4.2 GROUP A2L and B2L DETECTOR ACTIVATION

<u>Activation Level</u>	<u>Maximum Response Time (seconds)</u>	<u>ASHRAE 15 Ventilation Level</u>	<u>Alarm Reset</u>	<u>Alarm Type</u>
<u>Less than or equal to the OEL in Table 1103.1</u>	<u>300</u>	<u>1</u>	<u>Automatic</u>	<u>Trouble</u>
<u>Less than or equal to the refrigerant concentration level in Table 1103.1</u>	<u>15</u>	<u>2</u>	<u>Manual</u>	<u>Emergency</u>

Delete without substitution:

TABLE 1106.4.2 MINIMUM EXHAUST RATES

REFRIGERANT	Q(m/sec)	Q(cfm)
R32	15.4	32,600
R143	13.6	28,700
R444A	6.46	13,700
R444B	10.6	22,400
R445A	7.83	16,600
R446A	23.9	50,700
R447A	23.8	50,400
R451A	7.04	15,000
R451B	7.05	15,000
R1234yf	7.80	16,600
R1234ze(E)	5.92	12,600

Revise as follows:

1106.4.3 Emergency ventilation system discharge Mechanical Ventilation. The emergency ventilation system point of discharge to the atmosphere shall be located outside of the structure at not less than 15 feet (4572 mm) above the adjoining grade level and not less than 20 feet (6096 mm) from any window, ventilation opening or exit. The machinery room shall have a mechanical ventilation system complying with ASHRAE 15.

Reason Statement: The machinery room requirements in the 2019 edition of ASHRAE 15 have been completely revised for Group A2L and B2L refrigerants. The table in the current code was part of the original draft to ASHRAE 15 that was subsequently rejected as being inaccurate. This is proposed for deletion. With Group A2L and B2L refrigerants, research has proven that open flames and hot surfaces can be at a higher temperature than Group A2, A3, B2, and B3 refrigerants.

Section 1106.4.1 adds special provisions for Group A2L and B2L refrigerants regarding hot surfaces.

New ventilation requirements were added to ASHRAE 15: 2019 for machinery rooms using Group A2L and B2L refrigerants. There are two levels of ventilation that are required based on the response of the refrigerant detector. This proposal references ASHRAE 15 for the ventilation requirement (note that the latest standard can be viewed free of charge at <https://www.ashrae.org/technical-resources/standards-and-guidelines/read-onlyversions-> of-ashrae-standards.) A table is included that identifies the two levels of annunciation in the event of a refrigerant leak in a machinery room.

The first activation is a trouble alarm for a small leak. This requires a minimal amount of ventilation. The second level is an emergency alarm. This signals the activation of the full amount of ventilation for the room.

This code proposal was accepted and adopted in the 2024 IMC code cycle.

Cost Impact: The code change proposal will not increase or decrease the cost of construction. This change clarified requirements for machinery room ventilation. The use of low GWP refrigerants is optional.

Resiliency Impact Statement: This proposal will increase Resiliency. This code proposal will further align the IMC with ASHRAE 15 and provide the appropriate safety measures in machinery rooms. It will further enable low GWP refrigerants and therefore increase resiliency.

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
- Consensus Disapproval

- Carry Over to Next Meeting
 - Carry over to Final
 - Non-Consensus
 - None
-

Public Comments for: M1106.4-21 Part I

This proposal doesn't have any public comments.

Proposal # 1101

M1106.4-21 Part II

Proponents: Mary Koban (mkoban@ahrinet.org)

2021 International Mechanical Code

Delete without substitution:

~~[F] 1106.4.1 Ventilation system activation. Ventilation shall be activated by the refrigerant detection system in the machinery room. Refrigerant detection systems shall be in accordance with Section 605.8 of the International Fire Code and all of the following:~~

- ~~1. The detectors shall activate at or below a refrigerant concentration of 25 percent of the LFL.~~
- ~~2. Upon activation, the detection system shall activate the emergency ventilation system required by Section 1106.4.2.~~
- ~~3. The detection, signaling and control circuits shall be supervised.~~

Reason Statement: The machinery room requirements in the 2019 edition of ASHRAE 15 have been completely revised for Group A2L and B2L refrigerants. The table in the current code was part of the original draft to ASHRAE 15 that was subsequently rejected as being inaccurate. This is proposed for deletion. With Group A2L and B2L refrigerants, research has proven that hot surfaces can be at higher temperatures than Group A2, A3, B2, and B3 refrigerants. Section 1106.4.1 adds special provisions for Group A2L and B2L refrigerants regarding hot surfaces. New ventilation requirements were added to ASHRAE 15 for machinery rooms using Group A2L and B2L refrigerants. There are two levels of ventilation that are required based on the response of the refrigerant detector. This proposal references ASHRAE 15 for the ventilation requirement (note that the latest standard can be viewed free of charge at <https://www.ashrae.org/technical-resources/standards-and-guidelines/read-onlyversions-of-ashrae-standards>.) A table is included that identifies the two levels of annunciation in the event of a refrigerant leak in a machinery room.

The first activation is a trouble alarm for a small leak. This requires a minimal amount of ventilation. The second level is an emergency alarm. This signals the activation of the full amount of ventilation for the room.

This code proposal was accepted and adopted in the 2024 IMC

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code proposal is to align with the most recent changes to ASHRAE 15 and should not impact the cost of construction.

Resiliency Impact Statement: This proposal will increase Resiliency
This code proposal will enable the use of low GWP refrigerants and help manufacturers meet the AIM Act.

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
 - Consensus Disapproval
 - Carry Over to Next Meeting
 - Carry over to Final
 - Non-Consensus
 - None
-

Public Comments for: M1106.4-21 Part II

This proposal doesn't have any public comments.

M-Chapter 15-21

Proponents: Helen Walter-Terrinoni (psuphy1988@gmail.com); Mary Koban (mkoban@ahrinet.org)

2021 International Mechanical Code

Revise as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

UL/CSA ~~60335-2-89~~—17.60335-2-89—2021 Household and Similar Electrical Appliances—Safety—Part 2-89: Particular Requirements for Commercial Refrigerating Appliances and Ice-Makers with an Incorporated or Remote Refrigerant Unit or Motor-Compressor

Reason Statement: This proposal updates UL 60335-2-89 to the most recent version which published in October of 2021. It is critical that the newest version is used as there are important safety features and testing for A2L, A2, and A3 flammable low GWP refrigerants. This would have been submitted to the ICC during the last code cycle, but the standard published after the cycle completed. Therefore, this code proposal seeks to align with the most current version of the UL standard.

Cost Impact: The code change proposal will not increase or decrease the cost of construction. This is just a clerical update, so there is no cost associated with the code change.

Resiliency Impact Statement: This proposal will neither increase nor decrease Resiliency. This is to align the reference with the most recent version of the standard. Therefore, it will not increase or decrease resiliency.

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
- Consensus Disapproval
- Carry Over to Next Meeting
- Carry over to Final
- Non-Consensus
- None

Public Comments for: M-Chapter 15-21

This proposal doesn't have any public comments.

TABLE 1104.3.2 MAXIMUM PERMISSIBLE QUANTITIES OF REFRIGERANTS

TYPE OF REFRIGERATION SYSTEM	MAXIMUM POUNDS FOR VARIOUS OCCUPANCIES			
	Institutional	Public assembly	Residential	All other occupancies
Sealed absorption system				
In exit access	0	0	3.3	3.3
In adjacent outdoor locations	0	0	22	22
In other than exit access	0	6.6	6.6	6.6
Unit systems				
In other than exit access	0	0	6.6	6.6

For SI: 1 pound = 0.454 kg.

Reason Statement: These requirements are based on previous editions of ASHRAE 15. ASHRAE 15 has been updated numerous

times resulting in the modification to the requirement similar to this proposal. High probability direct systems for human comfort must use either Group A1 or A2L refrigerant. Other refrigerants can be used provided the maximum charge does not exceed 6.6 pound for residential applications and 22 pounds for commercial units. Plus, these unit must be listed for use with these other refrigerants. The revision to Section 1104.3.1 becomes consistent with Section 7.5.2 of ASHRAE 15. Although, ASHRAE lists the refrigerants prohibited for this application, whereas this proposal lists the refrigerants required to be used.

Section 1104.3.2 text being stricken is addressed in the revised text to Section 1104.3.1. The remaining text is consistent with the requirements in Section 7.5.3 of ASHRAE 15.

Addendum i of ASHRAE 15-2019 deleted the table that is equivalent to Table 1104.3.2. This table is no longer necessary with the change to ammonia refrigerant requirements during the last two cycles and with the change adding the exceptions to Section 1104.3.1.

This code change was accepted and adopted in the 2024 IMC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This change is a clarification of the current requirements that allow Group A1 and A2L for high probability systems used for human comfort. There is no impact to the cost of construction.

Resiliency Impact Statement: This proposal will increase Resiliency

This proposal will increase resiliency by enabling the use of low GWP refrigerants in high probability human comfort systems. It will also allow the use of low GWP refrigerants in self contained applications.

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
- Consensus Disapproval
- Carry Over to Next Meeting
- Carry over to Final
- Non-Consensus
- None

Public Comments for: M1104.3.1-21

This proposal doesn't have any public comments.

M-FG Chapter 8-21

Proponents: William Chapin (bill@profcc.us)

2021 International Fuel Gas Code

Add new text as follows:

Chapter 8 . ASTM F1281-17 Standard Specification for Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene (PEX-AL-PEX) Pressure Pipe

Reason Statement: Adds ASTM F1281 for reference of the approved code changes.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Will not affect the cost of construction.

Resiliency Impact Statement: This proposal will neither increase nor decrease Resiliency

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
 - Consensus Disapproval
 - Carry Over to Next Meeting
 - Carry over to Final
 - Non-Consensus
 - None
-

Public Comments for: M-FG Chapter 8-21

This proposal doesn't have any public comments.

M-FG403.5-21

Proponents: William Chapin (bill@profcc.us)

2021 International Fuel Gas Code

Revise as follows:

403.5 Plastic pipe, tubing and fittings. Polyethylene plastic pipe, tubing and fittings used to supply fuel gas shall conform to ASTM D2513. Such pipe shall be marked "Gas" and "ASTM D2513." Polyamide pipe, tubing and fittings shall be identified and conform to ASTM F2945. Such pipe shall be marked "Gas" and "ASTM F2945." Crosslinked PEX-Aluminum-PEX (PEX-AL-PEX) composite pipe and fittings used to supply and or distribute fuel gas shall conform to ASTM F1281. Such pipe shall be marked "Gas" and "ASTM F1281".

Polyvinyl chloride (PVC) and chlorinated polyvinyl chloride (CPVC) plastic pipe, tubing and fittings shall not be used to supply fuel gas.

Reason Statement: PEX-AL-PEX has been used for gas distribution for over 15 years under numerous ISO, EU, and Australian standards. ASTM F1281 was first published in the year 2000 and includes allowance for use with gases that are compatible with the pipe and fittings.

Cost Impact: The code change proposal will decrease the cost of construction. When installed properly, this system can decrease the cost of construction.

Resiliency Impact Statement: This proposal will neither increase nor decrease Resiliency.

Attached Files

- **F1281-17.pdf**
<https://va.cdpassess.com/proposal/1103/1456/files/download/637/>

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
 - Consensus Disapproval
 - Carry Over to Next Meeting
 - Carry over to Final
 - Non-Consensus
 - None
-

Public Comments for: M-FG403.5-21

This proposal doesn't have any public comments.

M-FG404.6-21

Proponents: William Chapin (bill@profcc.us)

2021 International Fuel Gas Code

Add new text as follows:

404.6 Composite Pipe and Tubing . Pipe and tubing shall not be used with gases corrosive with the pipe and tubing.

404.6.1 PEX-AL-PEX Crosslinked PEX-Aluminum-PEX (PEX-AL-PEX) composite pipe and fittings used to supply and or distribute fuel gas shall conform to ASTM F1281. Such pipe shall be marked "Gas" and "ASTM F1281" PEX-AL-PEX shall be used indoors or underground when installed in accordance the condition of their listing and the manufacturer's installation instructions

404.6.2 Design and installation. Piping shall be supported with pipe hooks, straps, bands, hangers or building structural components suitable for the size of the piping, of adequate strength and quality and located at intervals to prevent or damp out excessive vibration. Piping shall be anchored to prevent undue strains on connected appliances and shall not be supported by other piping. Supports, hangers and anchors shall be installed to not interfere with the free expansion and contraction of piping between the anchors.

404.6.3 Workmanship and defects

Pipe tubing and fittings shall be clear and free from burrs and defects in structure and be properly reamed

404.6.4 Fittings

Fittings for PEX-AL-PEX gas systems shall be listed to ASTM F1281 for the piping system being installed or repaired.

405.4 Composite pipe. Composite pipe bends shall comply with the following:

1. The pipe shall not be damaged and the internal diameter of the pipe shall not be effectively reduced.
2. Joints shall not be located in pipe bends.
3. The radius of the inner curve of such bends shall be to the limits of the manufacturer's instructions.
4. Where the piping manufacturer specifies the use of special bending tools or procedures, such tools or procedures shall be used.

Reason Statement: PEX-AL-PEX has been used for indoor gas distribution for over 15 years under numerous ISO, EU, and Australian standards. ASTM F1281 was first published in the year 2000 and includes allowance for use with gases that are compatible with the pipe and fittings. Section 405.4 adds pipe bending instructions for composite pipe.

NOTE: *staff to renumber existing sections accordingly.*

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal will not increase or decrease the cost of construction.

Resiliency Impact Statement: This proposal will neither increase nor decrease Resiliency

Attached Files

- **F1281-17.pdf**
<https://va.cdpassess.com/proposal/1105/1598/files/download/679/>

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
 Consensus Disapproval
 Carry Over to Next Meeting

- Carry over to Final
 - Non-Consensus
 - None
-

Public Comments for: M-FG404.6-21

This proposal doesn't have any public comments.

Proposal # 1105

P401.4-21

IPC: 401.4 (New)

Proponents: Paula Eubank (paula.neal.eubank@gmail.com)

2021 International Plumbing Code

Add new text as follows:

401.4 Plumbing fixtures and accessory controls. All plumbing fixtures and restroom accessories located in public restrooms shall be equipped with automatic or touchless control devices required for activation, operation and termination without direct contact by users, including water closet, urinal and bidet flush controls, lavatory and shower faucet controls, and dispenser, dryer and waste restroom accessories. Such automatic or touchless control devices shall be equipped with emergency shut-off provisions accessible to building maintenance personnel.

Reason Statement: This code proposal supports environmental responsibility, sustainability, and resilience by automating plumbing fixture and restroom accessory control devices. The requirement for automatic or touchless operational control devices located in public restrooms promotes public health and sanitation and results in the significant reduction or elimination of germ and disease transfer among occupants and users, especially in consideration of the presence of COVID-19 conditions and considerations.

Resiliency Impact Statement: This proposal will increase Resiliency
This proposal positively supports resiliency through the increase in resource conservation and the reduction in resource waste.

Cost Impact: The code change proposal will increase the cost of construction
This code change proposal increases the cost of construction by marginally increasing the initial construction costs although potentially reduces the lifespan operational and maintenance costs.

P405.3.1-21

Proponents: Paula Eubank (paula.neal.eubank@gmail.com)

2021 International Plumbing Code

Revise as follows:

405.3.1 Water closets, urinals, lavatories and bidets. A water closet, urinal, lavatory or bidet shall not be set closer than 15 inches (381 mm) from its center to any side wall, partition, vanity or other obstruction. Where partitions or other obstructions do not separate adjacent water closets, urinals, or bidets, the fixtures shall not be set closer than 30 inches (762 mm) center to center between adjacent fixtures or adjacent water closets, urinals, or bidets. There shall be not less than a 21-inch (533 mm) clearance in front of a water closet, urinal, lavatory or bidet to any wall, fixture or ~~door~~ door swinging outward. Doors swinging inward shall not encroach into the required 21 inch clearance by more than 7 inches. Water closet compartments shall be not less than 30 inches (762 mm) in width and not less than 60 inches (1524 mm) in depth for floor-mounted water closets and not less than 30 inches (762 mm) in width and 56 inches (1422 mm) in depth for wall-hung water closets.

Exception: An accessible children's water closet shall be set not closer than 12 inches (305 mm) from its center to the required partition or to the wall on one side.

Reason Statement: This code proposal supports and reinforces the requirement to provide adequate knee and maneuvering clearance within the water closet compartment without users contacting the plumbing fixtures, water closet fixture, or other restroom accessories located within the water closet compartment. This code proposal allows adequate area to safely enter, rotate, maneuver, and exit the water closet compartment as necessary. Not affecting water closet compartments equipped with outward swinging doors, this code proposal would not significantly increase the minimum water closet compartment dimension/length requirements of those equipped with inward swinging doors, approximately 8 inches. The code proposal reinforces the necessity for occupant and user health and sanitation.

The majority of existing water closet compartments having water closet compartment doors swinging into water closet compartment interiors do not provide even the minimal of necessary maneuvering clearance without contact with water closet fixtures, typically 6 inches. This provision would not be applicable to or alter water closet compartment provisions for fully accessible water closet compartments in accordance with ICC/ANSI A117.1, however this provision should be applied to alternate wheelchair accessible water closet compartments.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

While potentially increasing the required water closet compartment dimensions minimally when the water closet compartment door swings into the water closet compartment interior, the code proposal reinforces the code intent to provide adequate maneuvering clearance within the water closet compartment without contacting the water closet fixture or other restroom accessories located within the water closet compartment. The code proposal reinforces the necessity for occupant health and sanitation.

Resiliency Impact Statement: This proposal will neither increase nor decrease Resiliency

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
- Consensus Disapproval
- Carry Over to Next Meeting
- Carry over to Final
- Non-Consensus
- None

Public Comments for: P405.3.1-21

This proposal doesn't have any public comments.

P605.15.2-21

Proponents: Michael Kerbe (mkerbe@oatey.com)

2021 International Plumbing Code

Revise as follows:

605.15.2 Solvent cementing. Joint surfaces shall be clean and free from moisture, and an approved primer shall be applied. Solvent cement, orange in color and conforming to ASTM F493, shall be applied to joint surfaces. The joint shall be made while the cement is wet, and in accordance with ASTM D2846 or ASTM F493. Solvent cement joints shall be permitted above or below ground.

Exception: A primer is not required where all of the following conditions apply:

1. The solvent cement used is third-party certified as conforming to ASTM F493.
2. The solvent cement used is yellow or green in color.
3. The solvent cement is used only for joining 1/2-inch (12.7 mm) through 2-inch-diameter (51 mm) CPVC/AL/CPVC pipe and CPVC fittings.
4. The CPVC fittings are manufactured in accordance with ASTM D2846.

2021 International Residential Code

Revise as follows:

P2906.9.1.2 CPVC plastic pipe. Joint surfaces shall be clean and free from moisture. Joints shall be made in accordance with the pipe, fitting or solvent cement manufacturer's installation instructions. Where such instructions require a primer to be used, an *approved* primer shall be applied, and a solvent cement, orange in color and conforming to ASTM F493, shall be applied to joint surfaces. Where such instructions allow for a one-step solvent cement, ~~yellow or red~~ in or green in color and conforming to ASTM F493, to be used, the joint surfaces shall not require application of a primer before the solvent cement is applied. The joint shall be made while the cement is wet, and in accordance with ASTM D2846 or ASTM F493. Solvent cement joints shall be permitted above or below ground.

Reason Statement: Revise P2906.9.1.2 IRC and 605.15.2 IPC to include one-step solvent cement in the color green, which has already been approved in the 2024 IPC code book.

Speaking with plumbers across the country who use FlowGuard Gold CPVC, the most problematic installation mistake is something called a dry-fit, which occurs when the installing contractor simply forgets to apply solvent cement to a connections before moving on.

Oatey FlowGuard™ High Contrast Medium Green All Weather One-Step Cement was developed with input from the Lubrizol Corporation to be used with their FlowGuard Gold® pipe and fittings. The 2021 Edition of the Universal Plumbing Code specifies the use of yellow CPVC cement for one-step assembly of FlowGuard Gold® pipe and fittings. However, the use of yellow cement on the yellow pipe and fittings can make it difficult to identify if every dry fit joint in the system has been cemented together during the installation and inspection process. This leads to failures when the system is pressure tested and on the rare occasion, can lead to failures when the system is brought into service if the interference fit of the pipe and fitting was tight enough during the testing phase.

To make final inspection easier and to reduce the possibility of field failures, Lubrizol has worked with Oatey to come up with a different color of cement, that has a higher contrast in color to FlowGuard Gold® the pipe and fittings. Oatey FlowGuard™ High Contrast cement was developed for this reason. The dark green color stands out from the yellow pipe and fitting, allowing for installers and inspectors to catch any dry fit joints that were not cemented. The key difference between the High Contrast Green formula and Oatey's FlowGuard Gold® cement is the color. Both cements have been tested to ANSI/NSF 14 by NSF and are approved for use with potable water (NSF 61), and both pass ASTM F 493.

Lubrizol has been working to update the Universal Plumbing Code to add the color green as an approved color for cements used in the one step assembly process. Based on initial balloting of the 2024 Plumbing codes, this change is approved and will be incorporated into the 2024 edition of the Universal Plumbing. Until this code becomes official in 2024, Oatey will guarantee the performance of this cement as long as it is used and applied in accordance with ASTM F3328 - Standard Practice for One Step (Solvent Cement Only) method of Joining PVC or CPVC Pipe and Piping Components with Tapered Sockets. The product is listed with NSF for compliance to ANSI/NSF 14 and bears IAPMO Classified Marking Certification Mark.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

This code change would not increase cost of construction as the this product would not replace the already approved yellow flowguard gold cpvc cement.

Resiliency Impact Statement: This proposal will neither increase nor decrease Resiliency

This proposal should not have a major change as the already approved yellow flowguard gold will still be an option.

Attached Files

- **Lubrizol Letter Re FlowGuard High Contrast Cement (002).docx**
<https://va.cdpaccess.com/proposal/1084/1416/files/download/580/>
 - **Oatey Letter of Usage FlowGuard High Contrast.docx**
<https://va.cdpaccess.com/proposal/1084/1416/files/download/579/>
-

Workgroup Recommendation

2021 Workgroups Workgroup Action: None

2021 Workgroups Reason:

Workgroup Action

- Consensus Approval
 - Consensus Disapproval
 - Carry Over to Next Meeting
 - Carry over to Final
 - Non-Consensus
 - None
-

Public Comments for: P605.15.2-21

This proposal doesn't have any public comments.