ASA Mechanical System Code Committee -
Summary Notes from ICC Code Hearings April 21-28, 2021

ASA TOOK A POSITION ON PROPOSALS HIGHLIGHTED THIS COLOR

INTERNATIONAL MECHANICAL CODE

Proposal	Chapter	Summary of Proposed Revision	ICC TC Vote	Comments
M1	2 - Definitions	AIR-HANDLING UNIT. - A blower or fan used for the purpose of distributing supply and return air to a room, space or area.	Failed	**ICC Hearing Result** Concern that it might be adding a requirement within a definition and would result in conflicting definitions in different codes Committee motion to disapprove passed with a vote of 11 yes and 0 no
M2	2 - Definitions	CONDENSING UNIT. ~~A specific refrigerating machine combination for a given refrigerant, consisting of one or more power-driven compressors, condensers and, where required, liquid receivers, and the regularly furnished accessories.~~ A factory-made assembly of refrigeration components designed to compress and liquefy a specific refrigerant. The unit consists of one or more power-driven compressors, condensers, liquid receivers (where required) and factory-supplied accessories.	Approve	**ICC Hearing Results** Motion to approve passed with a vote of 7 yes to 4 no
M4	Part I – IMC Section 202 Definitions	~~HEAT PUMP. A refrigeration system that extracts heat from one substance and transfers it to another portion of the same substance or to a second substance at a higher temperature for a beneficial purpose.~~	Approve	**ICC Hearing Results** Proposed modification to add “transfer heat into or out of a space…” It was noted that the condenser

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		HEAT PUMP. A refrigeration system or factory-made appliance that utilizes refrigerant to transfer heat into a space or substance.		portion, defined separately, to take the heat out. Motion to approve as submitted passed with a vote of 6 yes to 5 no
	Part II – IRC Section 202 Definitions	~~[MP] HEAT PUMP. An *appliance* having heating or heating and cooling capability and that uses refrigerants to extract heat from air, liquid or other sources.~~ HEAT PUMP. A refrigeration system or factory-made appliance that utilizes refrigerant to transfer heat into a space or substance.	Failed	**ICC Hearing Results** Move for disapproval passed based on a vote of 6 yes to 5 no
M5	2- Definitions	LOWER FLAMMABLE LIMIT (REFRIGERANT) (LFL). The minimum concentration of refrigerant ~~that is~~ at which a flame is capable of propagating ~~a flame~~ through a homogeneous mixture of refrigerant and air under specific test conditions in accordance with ASHRAE 34.	Approve	**ICC Hearing Results** Motion to approve passes with a vote of 7 yes to 4 no
M6	2- Definitions	NONCOMBUSTIBLE MATERIAL~~S~~. A material that passes ASTM E136. ~~Materials that, when tested in accordance with ASTM E136, have not fewer than three of four specimens tested meeting all of the following criteria:~~ ~~The recorded temperature of the surface and interior thermocouples shall not at any time during the test rise more than 54ºF (30ºC) above the furnace temperature at the beginning of the test.~~ ~~There shall not be flaming from the specimen after the first 30 seconds.~~ ~~If the weight loss of the specimen during testing exceeds 50 percent, the recorded temperature of the surface and interior thermocouples shall not at any time during the test rise above the furnace air temperature at the beginning of the test, and there shall not be flaming of the specimen.~~	Approve	**ICC Hearing Results** Motion to approve as submitted was approved 11 yes to 0 no

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M7	2- Definitions	PLENUM. An enclosed portion of the building structure, other than an *occupiable space* being conditioned, that is designed to allow for passive *air transfer* ~~movement~~ or active, ducted, air transport from the *air handling unit*, and thereby serve as part of an air distribution system.	Failed	**ICC Hearing Results** Concern noted that the new text would now include duct work in attics to fall under the definition. Would prohibit plenums to be used for return air. Motion to disapprove passed with a vote of 10 yes to 0 no and 1 abstention
M8	2 - Definitions	~~REFRIGERANT. A substance utilized to produce refrigeration by its expansion or vaporization.~~ REFRIGERANT. The fluid used for heat transfer in a refrigeration system that undergoes a change of state to absorb heat.	Approve	**ICC Hearing Results** Was noted this was approved by the IRC TC. Motion to approve passed with a vote of 10 yes to 0 no and 1 abstention
M 9	2 - Definitions	REFRIGERATION SAFETY GROUP CLASSIFICATION. The ~~alphabetical/numerical~~ alphanumeric designation that indicates both the toxicity and flammability classifications of refrigerants in accordance with ASHRAE 34. Delete without substitution:	Approve	**ICC Hearing Results** Proposed modification to definition submitted that clarifies intent was not to delete Toxicity Classification and

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		~~TOXICITY CLASSIFICATION (REFRIGERANT). An alphabetical designation used to identify the toxicity of refrigerants. Class A indicates a refrigerant with low toxicity. Class B indicates a refrigerant with high toxicity.~~ ~~FLAMMABILITY CLASSIFICATION (REFRIGERANT). The alphabetical/numerical designation used to identify the flammability of refrigerants.~~		Flammability Classification (Refrigerant) but rather move as sub-definitions under the main definition Refrigeration Safety and Group Classification. Motion to approve as modified passed with a vote of 10 yes to 0 no and 1 abstention
M10	2 - Definitions	REFRIGERATION ~~REFRIGERATING~~ SYSTEM. A combination of interconnected parts in which a refrigerant is enclosed and ~~refrigerant- containing parts constituting one closed refrigerant circuit in which a refrigerant~~ is circulated for the purpose of extracting then rejecting heat.	Approve	**ICC Hearing Results** Motion to approve passed with a vote of 10 yes to 0 no and 1 abstention.
M11	3 - General	304.7.1 Garage conditioning. Where private garages are required to be conditioned, HVAC systems shall be dedicated to the garage and serve no other spaces. Return air from forced air systems shall be in accordance with Section 601.5.		Withdrawn by Proponent
M12	3 - General	Delete PB pipe and tubing from Table 305.4, Piping Support Spacing.	Approve	**ICC Hearing Results** Approved on a vote of 10 yes, 0 no, 1 abstention
P 6 Part III	3 – General 5 – Exhaust Systems 1100 - Refrigeration	Add new text as follows: 305.5.1 Shield plates. Shield plates shall be of steel material having a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 gage). Revise as follows:	Approve as Modified	**ASA Position:** Oppose due to lowering dimension not justified for and concern with safety.

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		305.5 Protection against physical damage. In concealed locations where piping, other than cast-iron or steel, is installed through holes or notches in studs, joists, rafters or similar members less than ~~1 1/2 inches (38 mm)~~ 1 1/4 inches (32 mm) from the nearest edge of the member, the pipe shall be protected by shield plates. Protective steel shield plates ~~having a minimum thickness of 0.0575 inch (1.463 mm) (No. 16 gage)~~ shall cover the area of the pipe where the member is notched or bored, and shall extend not less than 2 inches (51 mm) above sole plates and below top plates. 504.8 Protection ~~required~~ against physical damage. Protective shield plates shall be placed where nails or screws from finish or other work are likely to penetrate the clothes dryer exhaust duct. Shield plates shall be placed on the finished face of all framing members where there is less than $1^1/_4$ inches (32 mm) between the duct and the finished face of the framing member. Protective shield plates shall ~~be constructed of steel, have a thickness of 0.062 inch (1.6 mm) and~~ extend not less than 2 inches (51 mm) above sole plates and below top plates. Add new text as follows: 504.8.1 Shield plates. Shield plates shall be of steel material having a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 gage). Revise as follows: 1109.3.1 ~~Pipe protection~~ Protection against physical damage,. In addition to the requirements of Section 305.5, aluminum, copper and steel tube used for Group A2L and B2L refrigerants and located in concealed locations where tubing is installed in studs, joists, rafters or similar member spaces, and located less than ~~$1^1/_2$ inches (38 mm)~~ 1 1/4 inches (32 mm) from the nearest edge of the member, shall be continuously protected by shield plates. Protective steel shield plates h~~aving a minimum thickness of 0.0575 inch (1.46 mm) (No. 16 gage)~~ shall cover the area of the tube plus the area extending not less than 2 inches (51 mm) beyond both sides of the tube. Add new text as follows: 1109.3.1.1 Shield plates. Shield plates shall be of steel material having a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 gage).		**ICC Hearing Results** Motion to approve as modified by a vote of 10 yes to 0 no Modification was to 1109.3.1 as follows: " ~~A2L~~ A2, A3, B2, and ~~B2L~~ B3 …"
G 1 Part V	3 - General	306.1 Access. *Appliances*, controls devices, heat exchangers and HVAC system components that utilize energy shall ~~be accessible~~ provide access for inspection, service, repair and replacement without disabling the function of a fire-resistance-rated assembly or removing permanent construction, other	Approve	**ICC Hearing Results** 11 yes to 0 no

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		appliances, venting systems or any other piping or ducts not connected to the *appliance* being inspected, serviced, repaired or replaced. A level working space not less than 30 inches deep and 30 inches wide (762 mm by 762 mm) shall be provided in front of the control side to service an *appliance*. 506.3.2.2 Duct-to-hood joints. Duct-to-hood joints shall be made with continuous internal or external liquid-tight welded or brazed joints. Such joints shall be smooth, ~~accessible~~ available for inspection, and without grease traps.		
M15	3 - General	307.2.5 Drain line maintenance. Condensate drain lines shall be configured to ~~permit~~ allow access to ~~the~~ clearing of blockages in both directions of the drain line and to perform~~ance of~~ maintenance without requiring the drain line to be cut, severed, disconnected or pulled apart.	Failed	**ASA Position:** **Oppose** - Unclear if it is the product needs to have the accessibility or is the responsibility lie with the installer. Also not clear how accessibility is achieved based on the proposal and all types of materials used for condensate lines. **ICC Hearing Results** It was noted based on existing code, there should not be any unglued joints. Also noted that the revisions would now include multi-family dwellings.

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				Motion to disapprove passed with a vote of 9 yes and 1 no
M 17	4 - Ventilation	401.4 Intake opening location. Air intake openings shall comply with all of the following: 5. Dwelling unit outdoor air ventilation system intake openings that are installed on an exterior wall and have a louver, grille, or screen intake opening nominal size less than ½" shall be located to allow maintenance from an outdoor opening, an exterior egress or balcony, a deck, or without the use of a ladder, from the finished ground level.	Failed	**ICC Hearing Results** Motion to disapprove was passed by a vote of 11 yes, 0 no
M 18	4 - Ventilation	SUPPLY AIR SYSTEM. An assembly of connected ducts, *plenums*, fittings, registers and grilles through which air, ~~heated or cooled~~ conditioned or unconditioned is conducted from the supply unit to the space or spaces to be ~~heated or cooled~~ conditioned or unconditioned (see also Return air system). 403.1 Ventilation system. Mechanical ventilation shall be provided by a method of supply air and return or *exhaust air* ~~except that mechanical ventilation air requirements for Group R-2, R-3 and R-4 *occupancies* shall be provided by an exhaust system, supply system or combination thereof~~. The amount of supply air shall be approximately equal to the amount of return and *exhaust air*. The system shall not be prohibited from producing negative or positive pressure. The system to convey *ventilation air* shall be designed and installed in accordance with Chapter 6. Exception: Systems that are in accordance with Section 403.3.2.1.	Failed	**ICC Hearing Results** Motion to disapprove passed by a vote of 10 yes, 1 no
M 19	4 - Ventilation	403.2.1 Other buildings intended to be occupied. The design of local exhaust systems and ventilation systems for outdoor air for *occupancies* other than Group R-2, R-3 and R-4 ~~three stories and less above grade plane~~ shall comply with Sections 403.3.1.1 through 403.3.1.4.	Approved as Modified	**ICC Hearing Results**

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		403.3.2 Group R-2, R-3 and R-4 occupancies~~, three stories and less~~. The design of local exhaust systems and ventilation systems for outdoor air in Group R-2, R-3 and R-4 *occupancies* ~~three stories and less in height above grade plane~~ shall comply with Sections 403.3.2.1 through 403.3.2.5.		Modification presented to revise QQA formula to 0.03 instead of 0.01 Motion to approve as modified passed by a vote of 7 yes, 4 no
M 20	4 - Ventilation	Update Table 403.3.1.1 Minimum Ventilation Rates to add a new Occupancy Classification, Room with adult changing stations.	Approved	**ASA Position** Neutral **ICC Hearing Results** Motion to approve as submitted passed by a vote of 11 yes, 0 no
M 21	4 - Ventilation	Update Table 403.3.1.1 Minimum Ventilation Rates to be consistent with ASHRAE 62.1.	Approved as Modified	**ICC Hearing Results** Modification to proposal to cite ASHRAE/ASHE 170 correctly Motion to approve as modified passed by a vote of 11 yes, 0 no
M 22	4 - Ventilation	Add following footnote to Table 403.1.1 Minimum Ventilation Rates for Warehouses: The occupiable floor area in warehouses shall not include the floor area of self-storage units, floor areas under rack storage, or designated palletized storage floor areas.	Approve	**ICC Hearing Results** Motion to approve passed with a vote of 11 yes to 0 no

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M 23	2 – Definitions 4 - Ventilation	-BALANCED VENTILATION SYSTEM. ~~Any combination of concurrently operating mechanical supply whereby the total mechanical exhaust airflow rate is within 10 percent of the total mechanical supply airflow rate.~~ A ventilation system where the total mechanical supply airflow and total mechanical exhaust airflow are simultaneously within 10 percent of their average. The balanced ventilation system airflow is the average of the mechanical supply and mechanical exhaust airflows.	Fail	**ICC Hearing Results** Motion is poorly worded and confusing. Motion to disapprove based passed 11 yes to 0 no
M24	4 - Ventilation	Change exhaust rate capacity (ERC) in Table 403.3.2.3 Minimum Required Local Exhaust Rates for Group R-2, R-3 and R-4 Occupancy. Revision would change continuous ERC r kitchens and bathrooms/toilet rooms from 25 cfm to 50 cfm.	Approve	**ICC Hearing Results** Would be consistent with ASHRAE 62.1. Motion to approve passed with 11 yes to 0 no
M 25	4 - Ventilation	Add Following: 403.4 Clean Air Delivery Capability. Each mechanical system shall meet the requirements in 403.4.1. Each occupiable space shall meet the requirements in 403.4.2. Exception: Occupiable spaces where 100% of the supply air meets High-efficiency Particulate Air filtration. 403.4.1 Airflow for Increased Filtration. Mechanical systems shall be sized to accommodate a design airflow at a total static pressure drop which assumes the utilization of a supply air filter with a Minimum Efficiency Reporting Value of no less than 13. 403.4.2 Zonal Filtration or Disinfection Capability. Each occupiable space shall have 120-volt receptacles which provide at least 0.2 watts per square foot of occupiable space above the requirements of the National Electrical Code to support supplemental air cleaning devices.	Approve as Modified	**ICC Hearing Results** Modified to add Group R occupancies under exceptions for 403.4, Second modification presented is to move the entire section into an informative Annex. Third modification submitted to modify 403.3.2 to be consistent with NFPA 70 Motion to approve as modified (all 3 modifications) passed with

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		Exception: Rooms with less than 500 square feet of occupiable space.		a vote of 6 yes and 5 no and 1 abstention
M 26	4 - Ventilation	405.2 Demand Control Ventilation. Each occupiable space shall be equipped with a carbon dioxide sensor which meets the requirements in and 405.2.3. Mechanical equipment serving each zone(s) shall be equipped with controls which meet the requirements in 405.2.2. 405.2.1 Carbon Dioxide Sensor Performance Specifications. Each carbon dioxide sensor installed in accordance with Section 405.2 shall meet the following carbon dioxide measurement specifications as certified by the equipment manufacturer: 1 Range lower bound less than or equal to 400 parts per million 2 Range upper bound greater than or equal to 2,000 parts per million 3 Accuracy within ±75 parts per million at a reading of 1,000 parts per million 4 Output resolution less than or equal to 5 parts per million 405.2.2 Mechanical System Controls. Controls installed in accordance with Section 405.2 shall: 1. Receive data from the carbon dioxide sensor in the occupiable zone(s) at least once per 5 minutes 2. Be calibrated to provide pre-established outdoor airflow rates, or be equipped with the necessary instrumentation to measure outdoor airflow 3. Be capable of adjusting the outdoor airflow in response to an adjustable outdoor airflow setpoint 4. Increase the amount of outdoor air provided to each occupiable zone until the carbon dioxide level in each occupiable zone falls below a maximum threshold as defined by the user	Failed	**ICC Hearing Results** Add exception to 405.2 for Group R occupancies. Also modified presented to move to an informative Annex. Additional modification changes item 4 to show an output resolution less than 20 ppm. Concern noted that applying this to “each occupiable space” is too broad. No clarity on who the user is; no standard on the CO2 devices; etc. Motion to disapprove passed with a vote of 10 yes to 1 no

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		405.2.3 Ventilation Rate Alarming. When carbon dioxide levels are above a maximum level as defined by the user, sensors installed in accordance with Section 405.2 shall alert the occupants with a visual and audible indication in the zone or through a building monitoring system. 405.2.3.1 Default Carbon Dioxide Threshold Level. The threshold level for carbon dioxide measurement above which triggers an alert in accordance with Section 405.2.3 shall be set to 1,100 parts per million by default.		
M 27	4 - Ventilation	Provides an ***entirely new section*** 408 titled P*rocessing and Extraction Facilities* with the following general scoping statement: 408.1 General. Plant processing or extraction facilities shall comply with this section, the International Building Code and Chapter 39 of the International Fire Code. The extraction process includes the act of extraction of the oils and fats by use of a solvent, desolventizing of the raw material, production of the miscella, distillation of the solvent from the miscella and solvent recovery. Post-extraction processing includes winterization, solvent recovery, distillation, decarboxylation, isolation, chromatography and similar processes. The use, storage, transfilling and handling of hazardous materials in these facilities shall comply with this code, the International Building Code and the International Fire Code.	Failed	**ICC Hearing Results** Concern with incorporation of "existing buildings". Motion to disapprove passed with a vote of 11 yes to 0 no
M61	9 – Specific Appliances, Fireplaces and Solid Fuel-Burning	912.1 General. Permanently installed electric infrared radiant space heaters shall ~~comply~~ be listed and labeled in accordance with ~~UL 499~~ UL 2021, and installed in accordance with the manufacturer's instructions.	Approve	**ICC Hearing Results** Approve as submitted on a vote of 10 yes, 0 no
M62	9 – Specific Appliances, Fireplaces and	Add new definition as follows: STEAM BATH EQUIPMENT. Includes steam bath generators, combination room and steam generator systems, and steam bath cabinets intended for high-humidity concentrated heating at elevated temperatures for personal bathing	Approve	**ICC Hearing Results** Approve as submitted on a vote of 10 yes, 0 no

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	Solid Fuel-Burning	Add new text as follows: SECTION 931 STEAM BATH EQUIPMENT. 931.1 General. Steam bath equipment shall be *listed* and *labeled* in accordance with UL 499 and shall be installed in accordance with their listing and the manufacturer's instructions.		
M63	Section 10. Boilers, Water Heaters and Pressure Vessels	1001.1 Scope. This chapter shall govern the installation, *alteration* and repair of boilers, water heaters and pressure vessels. Exceptions: 1. Pressure vessels used for unheated water supply. 2. Portable unfired pressure vessels and Interstate Commerce Commission containers. 3. Containers for bulk oxygen and medical gas. 4. Unfired pressure vessels having a volume of 5 cubic feet (0.14 m^3) or less operating at pressures not exceeding 250 pounds per square inch (psi) (1724 kPa) and located within *occupancies* of Groups B, F, H, M, R, S and U. 5. Pressure vessels used in refrigeration systems that are regulated by Chapter 11 of this code. 6. Pressure tanks used in conjunction with coaxial cables, telephone cables, power cables and other similar humidity control systems. 7. Any boiler or pressure vessel subject to inspection by federal or state inspectors. 8. Pressure vessels used in specific appliances and equipment that are regulated by Chapter 9 of this code.	Approve	**ICC Hearing Results** Motion to approve passed 10 yes to 0 no
M64	Section 10. Boilers, Water	1002.4 Water heater pan required. Where a storage type water heater or a hot water storage tank is installed in a location where water leakage from the tank will cause damage, the tank shall be installed in a pan constructed by one of the following:	Approve as Modified	**ICC Hearing Results**

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	Heaters and Pressure Vessels	1. Galvanized steel or aluminum of not less than 0.0236 inch (0.6010 mm) in thickness. 2. Plastic of not less than 0,036 inch (0.9 mm) in thickness. 3. Other approved materials. 4. A plastic pan installed beneath a water heater shall be constructed of material having a flame spread index of 25 or less and a smoked developed index of 450 or less when tested in accordance with ASTM E-84 or UL-723		Modification submitted that deleted item 4 and put it into item 3 Motion to accept as modified passed based on a vote of 11 yes and 0 no
M65	Section 10. Boilers, Water Heaters and Pressure Vessels	1006.6 Safety and relief valve discharge. Safety and relief valve discharge pipes shall be of rigid pipe that is *approved* for the temperature of the system. High-pressure-steam safety valves shall be vented to the outside of the structure. The discharge piping serving pressure relief valves, temperature relief valves and combinations of such valves shall: 7. Discharge to a termination point that is readily observable by the building occupants. Where the discharge termination point is not readily observable, discharge monitoring is required.		**ICC Hearing Results** Modification presented – "Discharge to a termination point that is readily visible and observable by the building occupants. If the discharge termination point is not readily visible and observable, a device for leak detection monitoring with alarm notification (not automatic shut-off) is required." Motion to approve as modified passed with a vote of 11 yes and 0 no
M66	Part I – IMC Section 10. Boilers, Water	1006.6 Safety and relief valve discharge. Safety and relief valve discharge pipes shall be of rigid pipe that is *approved* for the temperature of the system. High-pressure-steam safety valves shall be vented to the outside of the structure. The discharge piping serving pressure relief valves, temperature relief valves and combinations of such valves shall:	Approve as Modified	**ICC Hearing Results** Modification submitted as follows: "Terminate not

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	Heaters and Pressure Vessels	10. ~~Not terminate~~ Terminate not more than 6 inches (152 mm) and not less than two times the discharge pipe diameter above the floor or flood level rim of the waste receptor.		more than 6 in ~~and not less than two times the discharge pipe diameter~~ above the floor or flood level rim ….” Motion to approve as modified passed with a vote of 11 yes and 0 no
	Part II – IRC M2002.4	M2002.4 Pressure relief valve. Boilers shall be equipped with pressure relief valves with minimum rated capacities for the equipment served. Pressure relief valves shall be set at the maximum rating of the boiler. ~~Discharge shall be piped to drains by gravity to within 18 inches (457 mm) of the floor or to an open receptor.~~ M2002.4.1 Requirements for discharge pipe. . The discharge piping serving a pressure relief valve, temperature relief valve or combination valve shall: 1. Not be directly connected to the drainage system. 2. Discharge through an air gap located in the same room as the boiler. 3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the air gap. 4. Serve a single relief device and shall not connect to piping serving any other relief device or equipment. 5. Discharge to the floor, to the pan serving the water heater or storage tank, to a waste receptor or to the outdoors. 6. Discharge in a manner that does not cause personal injury or structural damage. 7. Discharge to a termination point that is readily observable by the building occupants.	Failed	**ASA Position** **Oppose** - The added item goes beyond just boilers since other pressurized systems have PRV TRV etc. Item 5 seems to allow just about any location for discharge. Item 6 is unenforceable. **ICC Hearing Results** Proposed modification submitted to delete item 15. Concern noted it is attempting to take water

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		8. Not be trapped. 9. Be installed to flow by gravity. 10. Terminate not more than 6 inches (152 mm) and not less than two times the discharge pipe diameter above the floor or waste receptor flood level rim. 11. Not have a threaded connection at the end of the piping. 12. Not have valves or tee fittings. 13. Be constructed of those materials indicated in Section P2906.5 or materials tested, rated and approved for such use in accordance with ASME A112.4.1. 14. Be one nominal size larger than the size of the relief-valve outlet, where the relief-valve discharge piping is installed with insert fittings. The outlet end of such tubing shall be fastened in place. 15. The end of the discharge pipe shall be cut at a 45-degree angle.		heater requirements for boiler systems. Motion to disapprove passed
M67	10. Boilers, Water Heaters and Pressure Vessels	1006.6 Safety and relief valve discharge. Safety and relief valve discharge pipes shall be of rigid pipe that is *approved* for the temperature of the system. High-pressure-steam safety valves shall be vented to the outside of the structure. The discharge piping serving pressure relief valves, temperature relief valves and combinations of such valves shall: 13. ~~Be constructed of those materials listed in Section 605.4 of the *International Plumbing Code* or materials tested, rated and approved for such use in accordance with ASME A112.4.1.~~ Utilize piping material complying with Section 1202.	Approve	**ICC Hearing Results** Motion to approve passed with a vote of 11 yes to 0 no
M68	11. Refrigeration	1101.1 Scope. This chapter shall govern the design, installation, construction and repair of refrigeration systems ~~that vaporize and liquefy a fluid during the refrigerating cycle~~. Permanently installed refrigerant storage systems and other components shall be considered as part of the refrigeration system to which they are attached. 1101.6 Maintenance. ~~Mechanical r~~Refrigeration systems shall be maintained in proper operating condition, free from accumulations of oil, dirt, waste, excessive corrosion, other debris and leaks.	Approve	**ICC Hearing Results** Motion to approve passed with a vote of 11 yes to 0 no

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		~~REFRIGERATION SYSTEM, MECHANICAL. A combination of interconnected refrigeration containing parts constituting one closed refrigerant circuit in which a refrigerant is circulated for the purpose of extracting heat and in which a compressor is used for compressing the refrigerant vapor.~~		
M69	11. Refrigeration	1101.1.1 Refrigerants other than ammonia. Refrigerant piping design and installation for systems containing a refrigerant other than ammonia, including pressure vessels and pressure relief devices, shall comply with this chapter and ASHRAE 15. Refrigeration systems containing carbon dioxide as the refrigerant shall also comply with BSR/IIAR CO2.	Approve	**ICC Hearing Results** Modification was made to update standard reference to IIAR CO2 Motion to approve passed with a vote of 11 yes and 0 no
M 70	11. Refrigeration	1101.1.2 Ammonia refrigerant. Refrigeration systems using ammonia as the refrigerant shall comply with IIAR 2, IIAR 3, IIAR 4, ~~and~~ IIAR 5, and IIAR 6 and shall not be required to comply with this chapter.	Approve	**ICC Hearing Results** Motion to approve passed 11 yes and 0 no
M 71	11. Refrigeration	Delete the following from Table 1102.1 - Refrigeration fittings, including press-connect, flared and threaded UL 109 and UL 207	Approve	**ICC Hearing Results** Motion to approve passed 11 yes and 0 no
M 72	11. Refrigeration	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.	Approve	**ICC Hearing Results** Motion to approve passed 11 yes and 0 no
M 73	11. Refrigeration	Add new definition as follows: Refrigerant Designation. The unique identifying alphanumeric value or refrigerant number assigned to an individual refrigerant and published in ASHRAE Standard 34. Delete and substitute as follows:	Approve	**ICC Hearing Results** Some minor issues were raised that the TC suggested could be fixed in public comment.

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		~~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 change of refrigerant shall be approved by the owner. 2. The change in refrigerant shall be in accordance with one of the following. Written instructions of the original equipment manufacturer. An evaluation of the system by a registered design professional or by an approved agency that validates safety and suitability of the replacement refrigerant. Approved by the code official. Where the replacement refrigerant is classified into the same safety group, requirements that were applicable to the existing system shall continue to apply. 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: The addition of a second refrigerant is allowed by the equipment manufacturer and is in accordance with the manufacturer's written instructions. The resulting mixture does not change the refrigerant safety group.		Motion to approve passed 10 yes and 1 no.

INTERNATIONAL MECHANICAL CODE				
Proposal	**Chapter**	**Summary of Proposed Revision**	**ICC TC Vote**	**Comments**
M 74	11. Refrigeration	Delete following footnote to table 1103.1 Refrigerant Classification, Amount and OEL ~~The ASHRAE Standard 34 flammability classification for this refrigerant is 2L, which is a subclass of Class 2.~~ And also adds new refrigerants to the table to bring the table in sync with ASHRAE 34.	Approved as Modified	**ICC Hearing Results** Modification submitted to delete R 717 (Ammonia) from the table since it is not covered under the IMC.
M 75	11. Refrigeration	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: Listed equipment for residential occupancies containing a maximum of 6.6 pounds (3 kg) of refrigerant. Listed equipment for commercial occupancies containing a maximum of 22 pounds (10 kg) of refrigerant. 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 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.	Approved as Modified	**ICC Hearing Results** Editorially modified to be consistent with text in ASHRAE 15.
M 76	11. Refrigeration	1104.3.3 All occupancies. The total of all Group A2, B2, A3 and B3 refrigerants shall not exceed 1,100 pounds (499 kg) except where *approved*.	Rejected	**ICC Hearing Results** Motion to reject passed by a vote of 11 yes to 0 no.

INTERNATIONAL MECHANICAL CODE				
Proposal	**Chapter**	**Summary of Proposed Revision**	**ICC TC Vote**	**Comments**
		Exception: The total of Group A2L refrigerants in industrial occupancies shall not be limited provided the quantity in a single independent circuit would not exceed 25 percent of the lower flammability limit (LFL) upon release to the space.		
M 77	11. Refrigeration	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.~~	Approve	**ICC Hearing Results** Motion to approve passed with a vote of 11 yes to 0 no
M 78	11. Refrigeration	~~1106.4 Special requirements for Group A2L refrigerant machinery rooms. *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.~~ 1106.4 Group A2L and B2L Refrigerant. 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 Temperatures. Open flame-producing devices or continuously operating hot surfaces over 1290 °F (700 °C) shall not be permanently installed in the room. Delete and substitute as follows: ~~1106.4.2 Emergency ventilation system. 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.~~	Approve	**ICC Hearing Results** Motion to approve with a vote of 11 yes and 0 no

INTERNATIONAL MECHANICAL CODE

<table>
<tr><th>Proposal</th><th>Chapter</th><th>Summary of Proposed Revision</th><th>ICC TC Vote</th><th>Comments</th></tr>
<tr><td></td><td></td><td>
Add Following:

1106.4.2 Refrigerant Detector. 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.

TABLE 1106.4.2 GROUP A2L and B2L DETECTOR ACTIVATION
<table>
<tr><th>Activation Level</th><th>Maximum Response Time (seconds)</th><th>ASHRAE 1 Level</th></tr>
<tr><td>Less than or equal to the OEL in Table 1103.1</td><td>300</td><td>1</td></tr>
<tr><td>Less than or equal to the refrigerant concentration level in Table 1103.1</td><td>15</td><td>2</td></tr>
</table>
Delete Table 1106.4.2, Minimum Exhaust Rates, without substitution and add following revisions:

~~1106.4.3 Emergency ventilation system discharge. 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*.~~
</td><td></td><td></td></tr>
</table>

INTERNATIONAL MECHANICAL CODE				
Proposal	**Chapter**	**Summary of Proposed Revision**	**ICC TC Vote**	**Comments**
		1106.4.3 Mechanical Ventilation. The machinery room shall have a mechanical ventilation system complying with ASHRAE 15.		
M 79	11. Refrigeration	Proposal deletes the terms "refrigerant" and "refrigerating" in Sections 1107, 1109 and 1110 and replace the terms with the term "refrigeration"	Approve as Modified	**ICC Hearing Results** Modification submitted to make same edits to Section 1102. Motion to approve as modified passed with a vote of 11 yes to 0 no

INTERNATIONAL PLUMBING CODE					
Proposal	**Section(s)**	**Proponent(s)**	**Summary of Proposed Revision**	**ICC TC Vote**	**Comments**
P46	Section 4. Fixtures, Faucets and Fixture Fittings	ASSE	412.10 **Head shampoo sink faucets.** Head shampoo sink faucets shall be supplied with hot water that is limited to not more than 120°F (49°C). Each faucet shall have integral check valves to prevent crossover flow between the hot and cold water supply connections. The means for regulating the maximum temperature shall be one of the following: 1. A limiting device conforming to ASSE 1070/ASME A112.1070/CSA B125.70. 2. A water heater conforming to ASSE ~~1082~~ 1084. 3. A temperature-actuated, flow-reduction device conforming to ASSE 1062.	Approve as Modified	**ICC Hearing Results** Approved as modified. Modification was to remove strikeout of 1082. Motion passed on a vote of 14 yes, 0 no
P48	Section 4. Fixtures, Faucets and Fixture Fittings	ASSE	412.5 **Bathtub and whirlpool bathtub valves**. Bathtubs and whirlpool bathtub valves shall have or be supplied by a water-temperature-limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70 or by a water heater complying with ~~ASSE 1082 or~~ ASSE 1084, except where such valves are combination tub/shower valves in accordance with Section 412.3. The water-temperature-limiting device required by this section shall be equipped with a means to limit the maximum setting of the device to 120°F (49°C), and, where adjustable, shall be field adjusted in accordance with the manufacturer's instructions to provide hot water at a temperature not to exceed 120°F (49°C). Access shall be provided to water-temperature-limiting devices that conform to ASSE 1070/ASME A112.1070/CSA B125.70. Exception: *Access* shall not be required for nonadjustable water-temperature-limiting devices that conform to ASSE 1070/ASME A112.1070/CSA B125.70 and are integral with a fixture fitting, provided that the fixture fitting itself can be accessed for replacement.	Reject	**ICC Hearing Results** Motion to disapprove based on ASSE 1014 being the appropriate standard. Motion passed based on a vote of 14 yes to 0 no
P54	5. Water Heaters	NSF	Add new text as follows: 501.9 Lead Content. Water heaters shall comply with NSF 372 and shall have a weighted average lead content of 0.25% or less.	Approved	**ASA Position** Support

INTERNATIONAL PLUMBING CODE					
					ICC Code Hearing Results: Modification submitted to require water heaters comply with both NSF 61 and NSF 372. ASA STRONGLY opposed. This did not go forward Another modification was made to limit to water heaters in the PW system comply with NSF 372. This modification passed 10 yes and 4 no Motion was made to approve as modified (second modification) with a vote of 13 yes to 1 no
P55	Section 504	G McMann	504.7 Required pan. Where a storage tank-type water heater or a hot water storage tank is installed in a location where water leakage from the tank will cause damage, the tank shall be installed in a pan constructed of one of the following: 1. Galvanized steel or aluminum of not less than 0.0236 inch (0.6010 mm) in thickness. 2. Plastic not less than 0.036 inch (0.9 mm) in thickness. 4. Other *approved* materials. 5. A plastic pan installed beneath a gas fired water heater shall be constructed of material having a flame spread index of 25 or less and a smoked developed index of 450 or less when tested in accordance with ASTM E84 or UL 723. 6. 5. Water heaters installed in pans shall comply with Section 314.2.3.2 ~~A plastic pan shall not be installed beneath a gas-fired water heater.4~~	Approve as Modified	**ASA Position** **Oppose** - Issue is reference 314.2.3.2 due to it referencing evaporator cooling coil systems where a pan is used to accumulate water where a water heater tank pan is not intended for that purpose. Simply stated, no need for an auxiliary drain. **ICC Hearings Results** Motion approved as modified (editorial modifications). After review, it appears original ASA position was incorrect since item 314.2.3.2 does not specify

INTERNATIONAL PLUMBING CODE					
					auxiliary drains but simply calls for the water heater to be elevated to allow access to the pan.
P56			504.7 Required pan. Where a storage tank-type water heater or a hot water storage tank is installed in a location where water leakage from the tank will cause damage, the tank shall be installed in a pan constructed of one of the following: 1, Galvanized steel or aluminum of not less than 0.0236 inch (0.6010 mm) in thickness. 2. Plastic not less than 0.036 inch (0.9 mm) in thickness. 3, Other *approved* materials. A plastic pan installed beneath a gas-fired water heater shall be constructed of a material having a flame spread index of 25 0r less and a smoke-developed index of 450 or less when tested in accordance with ASTM E84 or UL 723.		Proposal was withdrawn
P57	Section 504	PMGCAC	504.7.1 Pan size and drain. The pan shall be not less than $1^1/_2$ inches (38 mm) in depth and shall be of sufficient size and shape to receive all dripping or condensate from the tank or water heater. The pan shall be drained by an indirect waste pipe having a diameter of not less than $^3/_4$ inch (19 mm). Piping for safety pan drains shall be of those materials listed in Table 605.3 or Table 605.4.	Failed	**ICC Hearing Results:** Concern noted that the allowance of additional drainage pipe material not rated for an elevated temperature could create an issue. Motion to disapprove proposal based on a vote of 9 yes to 5 no.
P88	606.5 Water Pressure Booster Systems		Add new text as follows: 606.5.11 Pressurized potable water storage tanks. Pressurized potable water tanks shall comply with WSC PST.	Failed	**ASA Position:** **Oppose** - WSC PST standard is only covers pressurized storage for service and water well systems

INTERNATIONAL PLUMBING CODE					
					however; proposal all tanks need to comply. Scope of the standard states, "min. performance and construction requirements for pressurized storage tanks for service in water well systems …" **ICC Code Hearing:** Motion to disapprove since reference to the standard is in the wrong section of the code and the standard only goes up to a certain size tank. Vote was 14 yes to 0 no

PROPOSED CHANGES TO THE RESIDENTIAL CODE					
Proposal	**Section(s)**	**Proponent(s)**	**Summary of Proposed Revision**	**ICC TC Vote**	**Comments**
RP10	P2901, Water Supply and Distribution	NRDC	Revise as follows: P2905.3 Hot water supply to fixtures. The *developed length* of hot water piping, from the source of the hot water to the fixtures that require hot water, shall not exceed 75 ~~100~~ feet (22 860 ~~30 480~~ mm). Water heaters and recirculating system piping shall be considered to be sources of hot water.	Failed	**ASA Position** **Oppose** - Concern with further limiting length in a residential setting and no technical justification supporting the reduction in length without looking at pipe diameter. Would consider if a table is provided that (similar to the one in the IPC).

PROPOSED CHANGES TO THE RESIDENTIAL CODE					
					ICC Position: Motion to disapprove passed.

M1-21

IMC: SECTION 202

Proponents: Robby Schwarz, BUILDTank, Inc., representing BUILDTank, Inc. (robby@btankinc.com)

2021 International Mechanical Code

SECTION 202 GENERAL DEFINITIONS.

Revise as follows:

AIR-HANDLING UNIT. A blower or fan used for the purpose of distributing supply and return air to a room, space or area.

Reason Statement: Return air distribution and movement around the building is equally if not more important than distributing supply air around the building. Return air is under a negative pressure which may cause back drafting issues or pull air from outside or from adjacent assemblies or units. It is important to recognize that the air handler unit impacts both supply and return air distribution around any building and the potential consequences, good or bad, of that distribution.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
A air handler pushes and pull, blows and sucks, supplies and returns air. More fully defining what an air handler does will not impact the cost of construction since it already supplies and returns air back to it to be conditioned.

M2-21

IMC: SECTION 202

Proponents: Joseph J. Summers, Chair of the PMGCAC, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

International Mechanical Code

2021 International Mechanical Code

Revise as follows:

CONDENSING UNIT. ~~A specific refrigerating machine combination for a given refrigerant, consisting of one or more power-driven compressors, condensers and, where required, liquid receivers, and the regularly furnished accessories.~~
A factory-made assembly of refrigeration components designed to compress and liquefy a specific refrigerant. The unit consists of one or more power-driven compressors, condensers, liquid receivers (where required) and factory-supplied accessories.

Reason Statement: There are two different definitions in the I-codes for “condensing unit”. The IECC definition does not identify the compressors as “power-driven”, whereas the IMC definition does. The proposed common definition for use in the I-codes is an amalgamation of the IECC and IMC definitions, which also correlate with the definition of this term in the two refrigeration standards referenced in the I-codes, ASHRAE 15 and UL 60335-2-40.

For information purposes, the following are the other definitions:

From the**IECC: CONDENSING UNIT**. A factory-made assembly of refrigeration components designed to compress and liquefy a specific refrigerant. The unit consists of one or more refrigerant compressors, refrigerant condensers (air-cooled, evaporatively cooled, or water-cooled), condenser fans and motors(where used) and factory-supplied accessories.
From the IMC: CONDENSING UNIT. A specific refrigerating machine combination for a given refrigerant, consisting of one or more power-driven compressors, condensers and, where required, liquid receivers, and the regularly furnished accessories.

From ASHRAE 15: CONDENSING UNIT a combination of one or more power-driven compressors, condensers, liquid receivers (when required), and regularly furnished accessories. From UL 60335-2-40: CONDENSING UNIT factory-made assembly that includes one or more motor-compressors, CONDENSER in cooling mode and motor-driven fan, blower or pump to circulate the heat transfer fluid through the CONDENSER with associated operational controls in addition to the necessary wiring

A change in Group B will be needed for IECC

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal only provides clarity and consistency for the use of this term throughout the I-codes.

M4-21 Part I

IMC: SECTION 202

Proponents: Joseph J. Summers, Chair of the PMGCAC, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART I WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART II WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES

2021 International Mechanical Code

Delete and substitute as follows:

~~**HEAT PUMP.** A refrigeration system that extracts heat from one substance and transfers it to another portion of the same substance or to a second substance at a higher temperature for a beneficial purpose.~~

HEAT PUMP. A refrigeration system or factory-made appliance that utilizes refrigerant to transfer heat into a space or substance.

M4-21 Part II

IRC: SECTION 202

Proponents: Joseph J. Summers, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART 2 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES

2021 International Residential Code

Delete and substitute as follows:

~~**[MP] HEAT PUMP.** An *appliance* having heating or heating and cooling capability and that uses refrigerants to extract heat from air, liquid or other sources.~~

[MP] HEAT PUMP.
A refrigeration system or factory-made appliance that utilizes refrigerant to transfer heat into a space or substance.

Reason Statement: There are two different definitions in the I-codes for "heat pump". The IRC definition identifies heat pumps as an appliance, and the IMC identifies heat pumps as are refrigeration system. This definition is clarifying that a heat pump could be either an appliance or a refrigeration system. This definition is also simplified that a heat pump is transferring heat into a space or substance. The reference to "beneficial purpose" in the IMC is commentary. The proposed new common definition is closely aligned with the term used in the two refrigeration standards referenced in the I-codes, ASHRAE 15 and UL 60335-2-40.
For information purposes, the following are the other definitions:

From the IRC: [MP] HEAT PUMP. An appliance having heating or heating and cooling capability and that uses refrigerants to extract heat from air, liquid or other sources.

From the IMC: HEAT PUMP. A refrigeration system that extracts heat from one substance and transfers it to another portion of the same substance or to a second substance at a higher temperature for a beneficial purpose.

From ASHRAE 15: HEAT PUMP a refrigerating system used to transfer heat into a space or substance.
From UL 60335-2-40: HEAT PUMP appliance which takes up heat at a certain temperature and releases heat at a higher temperature

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal will not increase or decrease the cost of construction. This proposal provides clarity and consistency for the use of this term throughout the I-codes.

M5-21

IMC: SECTION 202

Proponents: Joseph J. Summers, Chair of the PMGCAC, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

LOWER FLAMMABLE LIMIT (REFRIGERANT) (LFL). The minimum concentration of refrigerant ~~that is~~ at which a flame is capable of propagating ~~a flame~~ through a homogeneous mixture of refrigerant and air under specific test conditions in accordance with ASHRAE 34.

Reason Statement: The current definition implies that it is the concentration that is the substance capable of propagating the flame, instead of the flame being what is capable. This proposal clarifies that the flame propagation is determined under specific test conditions in ASHRAE 34.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The clarification of this definition does not change what is required by the code and as such, it doesn't change the materials or labor required to comply with the code.

M6-21

IMC: SECTION 202

Proponents: Tim Earl, representing GBH International (tearl@gbhinternational.com)

2021 International Mechanical Code

Revise as follows:

NONCOMBUSTIBLE MATERIALS. A material that passes ASTM E136. ~~Materials that, when tested in accordance with ASTM E136, have not fewer than three of four specimens tested meeting all of the following criteria:~~

1. ~~The recorded temperature of the surface and interior thermocouples shall not at any time during the test rise more than 54°F (30°C) above the furnace temperature at the beginning of the test.~~
2. ~~There shall not be flaming from the specimen after the first 30 seconds.~~
3. ~~If the weight loss of the specimen during testing exceeds 50 percent, the recorded temperature of the surface and interior thermocouples shall not at any time during the test rise above the furnace air temperature at the beginning of the test, and there shall not be flaming of the specimen.~~

Reason Statement: This proposal revises the definition of NONCOMBUSTIBLE to match the other codes. The current definition contains specific test details taken from ASTM E136 which is unnecessary. ASTM E136 contains clear pass/fail criteria, so the new definition is accurate, and consistent with the other ICC codes which were revised last cycle.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This simply revises the definition to make it simpler, with no impact on cost.

M7-21

IMC: SECTION 202

Proponents: Robert Schwarz, representing BUILDTank, Inc. (robby@btankinc.com)

International Mechanical Code

2021 International Mechanical Code

Revise as follows:

PLENUM. An enclosed portion of the building structure, other than an *occupiable space* being conditioned, that is designed to allow for passive *air transfer* ~~movement~~ or active, ducted, air transport from the *air handling unit*, and thereby serve as part of an air distribution system.

Reason Statement: The current definition of Plenum has led to its use in the code to define not only the space within buildings where wires, ducts, and pipes can be run, but also the portion of HVAC system that actually transports pressurized air around the building to heat, cool or ventilate the structure. These two examples of plenums are very different. The intent of the proposal it to ensure that building cavities are no longer used as pressurized duct systems, but rather as an enclosed area of the structure where duct can be run to move pressurized air from the air handling equipment. The proposal continues to allow for passive air transfer as defined in the IMC. This will create alignment between the IECC and the IMC. It is impossible to control the air that is being pushed and pulled through building cavities that are used as ducts. When you pan a floor system or used a drop ceiling as duct for example, the air that is returning to the furnace comes from many more places than the intended room. Air, being a transport mechanism for moisture, energy, and pollutants, needs to be better controlled than is possible by using building cavities as duct work, and therefore HVAC systems need to be fully ducted. The IECC recognizes the building durability, efficiency, and safety concerns associated with allowing building cavities to be used as pressurized duct systems and that we gain better control and predictability of air flow that is being pushed and pulled by the air handling equipment by prohibiting such practices. Moisture control, energy control, pollutant control, house and room pressure control are all gained by fully ducting HVAC systems and not allowing building cavities to be used as duct work.

Cost Impact: The code change proposal will increase the cost of construction
The code change proposal may increase cost in commercial and multifamily projects higher than 3 stories as it is still somewhat common for plenums to carry pressurized air from or two the air handler. However, building durability, and health and safety is ensured by containing and controlling air that transports heat, moisture and pollutants.

M8-21 Part I

IMC: SECTION 202

Proponents: Joseph J. Summers, Chair of the PMGCAC, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A THREE PART CODE CHANGE. PART I WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART II WILL BE HEARD BY THE INTERNATIONAL FIRE CODE COMMITTEE AND PART III WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES

2021 International Mechanical Code

Delete and substitute as follows:

~~**REFRIGERANT.** A substance utilized to produce refrigeration by its expansion or vaporization.~~

REFRIGERANT. The fluid used for heat transfer in a refrigeration system that undergoes a change of state to absorb heat.

M8-21 Part II

IFC: SECTION 202

Proponents: Joseph J. Summers, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A THREE PART CODE CHANGE. PART 1 WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART 2 WILL BE HEARD BY THE INTERNATIONAL FIRE CODE COMMITTEE AND PART 3 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES

2021 International Fire Code

Revise as follows:

REFRIGERANT. The fluid used for heat transfer in a refrigeration system~~; the refrigerant~~ that undergoes a change of state to absorb heat.

M8-21 Part III

IRC: SECTION 202

Proponents: Joseph J. Summers, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A THREE PART CODE CHANGE. PART 1 WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART 2 WILL BE HEARD BY THE INTERNATIONAL FIRE CODE COMMITTEE AND PART 3 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES

2021 International Residential Code

Delete and substitute as follows:

~~**[MP] REFRIGERANT.** A substance used to produce refrigeration by its expansion or evaporation.~~

[MP] REFRIGERANT. The fluid used for heat transfer in a refrigeration system that refrigerant undergoes a change of state to absorb heat.

Reason Statement: There are three different definitions in the I-codes for “refrigerant”. This proposal is to use the current definition for the term in the IFC. The IFC definition provides the best detail as to what a refrigerant is, and aligns with ASHRAE 15, which is referenced in the IMC. The IRC and IMC definitions are not as precise.
For information purposes, the following are the other definitions:

From the IRC: [MP] REFRIGERANT. A substance used to produce refrigeration by its expansion or evaporation.

From the IMC: REFRIGERANT. A substance utilized to produce refrigeration by its expansion or vaporization.

From ASHRAE 15: REFRIGERANT the fluid used for heat transfer in a refrigerating system; the refrigerant absorbs heat and transfers it at a higher temperature and a higher pressure, usually with a change of state.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal will not increase or decrease the cost of construction. This proposal provides clarity and consistency for the use of this term throughout the I-codes.

M9-21

IMC: SECTION 202

Proponents: Joseph J. Summers, Chair of the PMGCAC, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

REFRIGERANT SAFETY GROUP CLASSIFICATION. The ~~alphabetical/numerical~~ alphanumeric designation that indicates both the toxicity and flammability classifications of refrigerants in accordance with ASHRAE 34.

Delete without substitution:

~~**TOXICITY CLASSIFICATION (REFRIGERANT).** An alphabetical designation used to identify the toxicity of refrigerants. Class A indicates a refrigerant with low toxicity. Class B indicates a refrigerant with high toxicity.~~

~~**FLAMMABILITY CLASSIFICATION (REFRIGERANT).** The alphabetical/numerical designation used to identify the flammability of refrigerants.~~

Reason Statement: This proposal clarifies that the method for determining the various flammability and toxicity classifications are in accordance with Chapter 6 of ASHRAE 34. Relocating the definitions for “flammability classification” and “toxicity classification” as sub-definitions directly under the definition “refrigerant safety classification” provides for easier use and application of the code. These two relocated terms only apply to the main definition.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal will not increase or decrease the cost of construction. This proposal provides clarity as to what specific conditions differentiate between the various flammability and toxicity classes of refrigerants.

M10-21 Part I

IMC: SECTION 202; IFC: SECTION 202

Proponents: Joseph J. Summers, Chair of the PMGCAC, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART I WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART II WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES

2021 International Mechanical Code

Revise as follows:

REFRIGERATION ~~REFRIGERATING~~ SYSTEM. A combination of interconnected parts in which a refrigerant is enclosed and ~~refrigerant-containing parts constituting one closed refrigerant circuit in which a refrigerant~~ is circulated for the purpose of extracting then rejecting heat.

2021 International Fire Code

Revise as follows:

[M] ~~REFRIGERATION~~ ~~(~~REFRIGERATION~~)~~ SYSTEM. A combination of interconnected parts in which a refrigerant is enclosed and ~~refrigerant-containing parts constituting one closed refrigerant circuit in which a refrigerant~~ is circulated for the purpose of extracting then rejecting heat.

M10-21 Part II

IRC: SECTION 202

Proponents: Joseph J. Summers, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE AND FIRE CODE COMMITTEE. PART 2 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Residential Code

Revise as follows:

[MP] ~~REFRIDGERATING~~ REFRIGERATION SYSTEM. A combination of interconnected parts ~~forming a closed circuit~~ in which refrigerant is enclosed and is circulated for the purpose of extracting, then rejecting, heat. ~~A direct refrigerating system is one in which the evaporator or condenser of the refrigerating system is in direct contact with the air or other substances to be cooled or heated. An indirect refrigerating system is one in which a secondary coolant cooled or heated by the refrigerating system is circulated to the air or other substance to be cooled or heated.~~

Reason Statement: The proposal will better correlate the I-Codes with the industry standards, ASHRAE 15, for using the term refrigeration system rather than refrigerating systems. No technical change is intended.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change proposal will not increase or decrease the cost of construction. This proposal provides clarity and consistency for the use of this term throughout the I-codes.

M11-21

IMC: 304.7.1 (New)

Proponents: Guy McMann, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

2021 International Mechanical Code

Add new text as follows:

304.7.1 Garage conditioning. Where private garages are required to be conditioned, HVAC systems shall be dedicated to the garage and serve no other spaces. Return air from forced air systems shall be in accordance with Section 601.5.

Reason Statement: Reason. The IMC is silent when it comes to co-mingling HVAC systems with a private garage. The garage must not share supply or return air with the residence for obvious safety reasons. This language simply spells out that if the garage is to be conditioned it must be accomplished with its own dedicated system. Regardless of the fuel source, the return air requirements are the same.

Cost Impact: The code change proposal will decrease the cost of construction
There are no new requirements here to increase cost. This is editorial in nature.

M12-21

IMC: TABLE 305.4

Proponents: Lance MacNevin, Plastics Pipe Institute, representing Plastics Pipe Institute (lmacnevin@plasticpipe.org)

2021 International Mechanical Code

Revise as follows:

TABLE 305.4
PIPING SUPPORT SPACING[a]

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (feet)	MAXIMUM VERTICAL SPACING (feet)
ABS pipe	4	10[c]
Aluminum pipe and tubing	10	15
Cast-iron pipe[b]	5	15
Copper or copper-alloy pipe	12	10
Copper or copper-alloy tubing	8	10
CPVC pipe or tubing, 1 inch and smaller	3	10[c]
CPVC pipe or tubing, $1^1/_4$-inches and larger	4	10[c]
Lead pipe	Continuous	4
~~PB pipe or tubing~~	~~$2^2/_3$ (32 inches)~~	~~4~~
PE-RT 1 inch and smaller	$2^2/_3$ (32 inches)	10[c]
PE-RT $1^1/_4$ inches and larger	4	10[c]
PEX tubing 1 inch and smaller	$2^2/_3$ (32 inches)	10[c]
PEX tubing $1^1/_4$ inches and larger	4	10[c]
Polypropylene (PP) pipe or tubing, 1 inch and smaller	$2^2/_3$ (32 inches)	10[c]
Polypropylene (PP) pipe or tubing, $1^1/_4$ inches and larger	4	10[c]
PVC pipe	4	10[c]
Steel pipe	12	15
Steel tubing	8	10

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. See Section 301.18.

b. The maximum horizontal spacing of cast-iron pipe hangers shall be increased to 10 feet where 10-foot lengths of pipe are installed.

c. Mid-story guide.

Reason Statement: Polybutylene (PB) tubing has not been manufactured for sale in the US since the late 1990s. PB was previously removed from Table 1202.4 “Hydronic Pipe” at some time before 2015. The referenced product standard, ASTM D3309 “Polybutylene (PB) Plastic Hot- and Cold-Water Distribution Systems” was withdrawn in 2010.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
PB pipe or tubing is no longer available and has already been removed from other sections of the IMC.

M12-21

M15-21

IMC: 307.2.5

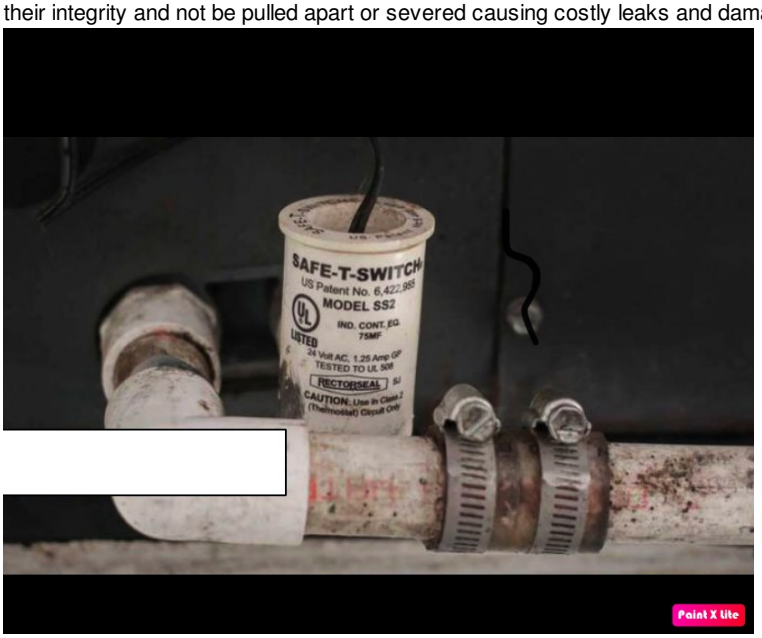
Proponents: Amanda Hickman, representing Rectorseal (amanda@thehickmangroup.com)

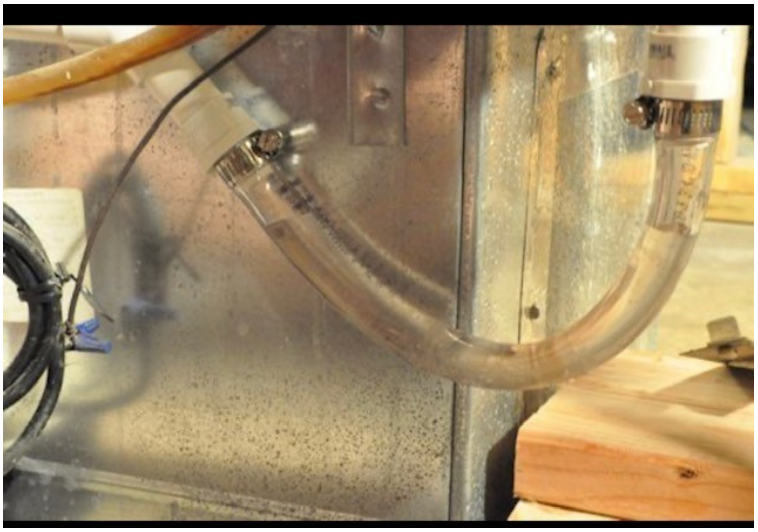
2021 International Mechanical Code

Revise as follows:

307.2.5 Drain line maintenance. Condensate drain lines shall be configured to ~~permit~~ allow access to ~~the~~ clear~~ing of~~ blockages in both directions of the drain line and to perform~~ance of~~ maintenance without requiring the drain line to be cut, severed, disconnected or pulled apart.

Reason Statement: Routine maintenance and the clearing of blockages is a common and routine occurrence for condensate lines. Unfortunately, due to typical configurations, service personnel often must pull apart lines to clear blockages and flush out the lines. This often leads to leaks which can cause damage to the surrounding area. This proposal will ensure that the proper configuration is installed so that condensate lines can maintain their integrity and not be pulled apart or severed causing costly leaks and damage when service is needed.





P6-21 Part III

IMC: 305.5.1 (New), 305.5, 504.8, 504.8.1 (New), 1109.3.1, 1109.3.1.1 (New)

Proponents: Joseph J. Summers, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2021 International Mechanical Code

Add new text as follows:

305.5.1 Shield plates. Shield plates shall be of steel material having a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 gage).

Revise as follows:

305.5 Protection against physical damage. In concealed locations where piping, other than cast-iron or steel, is installed through holes or notches in studs, joists, rafters or similar members less than ~~1 1/2 inches (38 mm)~~ 1 1/4 inches (32 mm) from the nearest edge of the member, the pipe shall be protected by shield plates. Protective steel shield plates ~~having a minimum thickness of 0.0575 inch (1.463 mm) (No. 16 gage)~~ shall cover the area of the pipe where the member is notched or bored, and shall extend not less than 2 inches (51 mm) above sole plates and below top plates.

504.8 Protection ~~required~~ against physical damage. Protective shield plates shall be placed where nails or screws from finish or other work are likely to penetrate the clothes dryer exhaust duct. Shield plates shall be placed on the finished face of all framing members where there is less than $1^1/_4$ inches (32 mm) between the duct and the finished face of the framing member. Protective shield plates shall ~~be constructed of steel, have a thickness of 0.062 inch (1.6 mm) and~~ extend not less than 2 inches (51 mm) above sole plates and below top plates.

Add new text as follows:

504.8.1 Shield plates. Shield plates shall be of steel material having a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 gage).

Revise as follows:

1109.3.1 ~~Pipe protection~~ Protection against physical damage. In addition to the requirements of Section 305.5, aluminum, copper and steel tube used for Group A2L and B2L refrigerants and located in concealed locations where tubing is installed in studs, joists, rafters or similar member spaces, and located less than ~~1 1/2 inches (38 mm)~~ 1 1/4 inches (32 mm) from the nearest edge of the member, shall be continuously protected by shield plates. Protective steel shield plates h~~aving a minimum thickness of 0.0575 inch (1.46 mm) (No. 16 gage)~~ shall cover the area of the tube plus the area extending not less than 2 inches (51 mm) beyond both sides of the tube.

Add new text as follows:

1109.3.1.1 Shield plates. Shield plates shall be of steel material having a thickness of not less than 0.0575 inch (1.463 mm) (No. 16 gage).

G1-21 Part V

PART V - IMC: 306.1, 506.3.2.2; IFGC: [M]306.1; ICCPC: SECTION 202 (New)

Proponents: Mike Nugent, Chair, representing ICC Building Code Action Committee (bcac@iccsafe.org); Michael O'Brian, representing FCAC (fcac@iccsafe.org); Joseph J. Summers, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

306.1 Access. *Appliances*, controls devices, heat exchangers and HVAC system components that utilize energy shall ~~be accessible~~ provide access for inspection, service, repair and replacement without disabling the function of a fire-resistance-rated assembly or removing permanent construction, other appliances, venting systems or any other piping or ducts not connected to the *appliance* being inspected, serviced, repaired or replaced. A level working space not less than 30 inches deep and 30 inches wide (762 mm by 762 mm) shall be provided in front of the control side to service an *appliance*.

506.3.2.2 Duct-to-hood joints. Duct-to-hood joints shall be made with continuous internal or external liquid-tight welded or brazed joints. Such joints shall be smooth, ~~accessible~~ available for inspection, and without grease traps.

Exceptions: This section shall not apply to:

1. A vertical duct-to-hood collar connection made in the top plane of the hood in accordance with all of the following:
   1.1. The hood duct opening shall have a 1-inch-deep (25 mm), full perimeter, welded flange turned down into the hood interior at an angle of 90 degrees (1.57 rad) from the plane of the opening.
   1.2. The duct shall have a 1-inch-deep (25 mm) flange made by a 1-inch by 1-inch (25 mm by 25 mm) angle iron welded to the full perimeter of the duct not less than 1 inch (25 mm) above the bottom end of the duct.
   1.3. A gasket rated for use at not less than 1,500ºF (816ºC) is installed between the duct flange and the top of the hood.
   1.4. The duct-to-hood joint shall be secured by stud bolts not less than $^1/_4$ inch (6.4 mm) in diameter welded to the hood with a spacing not greater than 4 inches (102 mm) on center for the full perimeter of the opening. The bolts and nuts shall be secured with lockwashers.
2. *Listed* and *labeled* duct-to-hood collar connections installed in accordance with Section 304.1.

2021 International Fuel Gas Code

Revise as follows:

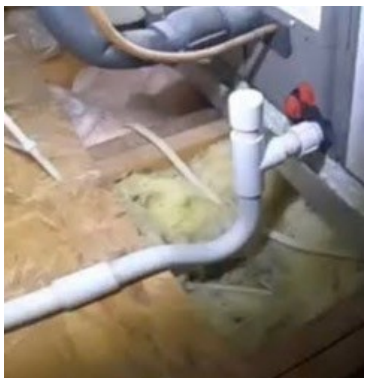
[M] 306.1 Access for maintenance and replacement. Appliances, control devices, heat exchangers and HVAC components that utilize energy shall~~be accessible~~ have access for inspection, service, repair and replacement without disabling the function of a fire-resistance-rated assembly or removing permanent construction, other appliances, or any other *piping* or ducts not connected to the *appliance* being inspected, serviced, repaired or replaced. A level working space not less than 30 inches (762 mm) deep and 30 inches (762 mm) wide shall be provided in front of the control side to service an *appliance*.

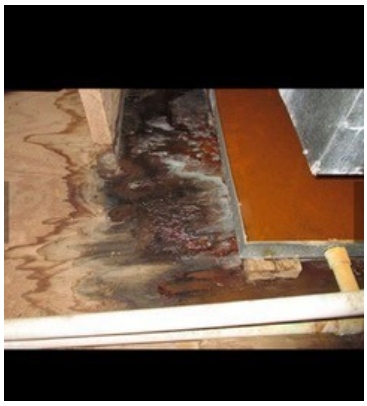
2021 International Code Council Performance Code

Add new definition as follows:

ACCESS (TO). That which enables a device, appliance or equipment to be reached by ready access or by a means that first requires the removal or movement of a panel or similar obstruction [see also Ready access (to)].

READY ACCESS (TO). . That which enables a device, appliance or equipment to be directly reached, without requiring the removal or movement of any panel or similar obstruction [see Access (to)].





Cost Impact: The code change proposal will increase the cost of construction
The added materials may cost between $10-15.

M15-21

M17-21

IMC: 401.4

Proponents: Joseph Summers, Chair, representing Chair of PMGCAC (PMGCAC@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

401.4 Intake opening location. Air intake openings shall comply with all of the following:

1. Intake openings shall be located not less than 10 feet (3048 mm) from lot lines or buildings on the same lot.
2. Mechanical and gravity outdoor air intake openings shall be located not less than 10 feet (3048 mm) horizontally from any hazardous or noxious contaminant source, such as vents, streets, alleys, parking lots and loading docks, except as specified in Item 3 or Section 501.3.1. Outdoor air intake openings shall be permitted to be located less than 10 feet (3048 mm) horizontally from streets, alleys, parking lots and loading docks provided that the openings are located not less than 25 feet (7620 mm) vertically above such locations. Where openings front on a street or public way, the distance shall be measured from the closest edge of the street or public way.
3. Intake openings shall be located not less than 3 feet (914 mm) below contaminant sources where such sources are located within 10 feet (3048 mm) of the opening. Separation is not required between intake air openings and living space *exhaust air* openings of an individual *dwelling unit* or *sleeping unit* where an approved factory-built intake/exhaust combination termination fitting is used to separate the air streams in accordance with the manufacturer's instructions.
4. Intake openings on structures in flood hazard areas shall be at or above the elevation required by Section 1612 of the *International Building Code* for utilities and attendant *equipment*.
5. Dwelling unit outdoor air ventilation system intake openings that are installed on an exterior wall and have a louver, grille, or screen intake opening nominal size less than ½" shall be located to allow maintenance from an outdoor opening, an exterior egress or balcony, a deck, or without the use of a ladder, from the finished ground level.

Reason Statement: During normal operation, ventilation air intakes can become clogged with debris and should be installed to permit easy maintenance by occupants or service providers. Presumably, ventilation air intake openings located on roofs will be serviced by technicians who have access to the roof, and so no special requirements are proposed for access in this case. Ventilation air intake openings that are located on an exterior wall should be serviceable from either indoors (thought an outdoor opening), or from an exterior horizontal surface. An exception is provided for intake openings with louvers, grilles, or screens with an opening dimension of less than ½". Larger opening dimensions (i.e., those complying with Table 401.5 with a nominal opening size of ½") are less likely to clog with debris and should not require service as frequently.
This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 36A.

Cost Impact: The code change proposal will increase the cost of construction
In the case that providing access for maintenance requires installers to increase the length of the ventilation air intake duct to avoid the use of portable ladders or access equipment, the estimated increase in cost is $9.20/ft of supply duct. This cost is derived from Mechanical Costs with R.S. Means Data, 2020 edition, 23 33 46.10.1940, and is the total installed cost per foot for insulated 6" flex duct, including overhead and profit.

M18-21

IMC: SECTION 202, 403.1, 403.3.2.1

Proponents: Joseph J. Summers, Chair of the PMGCAC, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

SUPPLY AIR SYSTEM. An assembly of connected ducts,*plenums*, fittings, registers and grilles through which air, ~~heated or cooled~~ conditioned or unconditioned is conducted from the supply unit to the space or spaces to be ~~heated or cooled~~ conditioned or unconditioned (see also Return air system).

403.1 Ventilation system. Mechanical ventilation shall be provided by a method of supply air and return or *exhaust air* ~~except that mechanical ventilation air requirements for Group R-2, R-3 and R-4 *occupancies* shall be provided by an exhaust system, supply system or combination thereof~~. The amount of supply air shall be approximately equal to the amount of return and *exhaust air*. The system shall not be prohibited from producing negative or positive pressure. The system to convey *ventilation air* shall be designed and installed in accordance with Chapter 6.

Exception: Systems that are in accordance with Section 403.3.2.1.

403.3.2.1 Outdoor air for dwelling units. An outdoor air ventilation system consisting of a mechanical exhaust system, supply system or combination thereof shall be installed for each *dwelling unit*. Local exhaust or supply systems, including outdoor air ducts connected to the return side of an air handler, are permitted to serve as such a system. The outdoor air ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the building is occupied. The minimum continuous outdoor airflow rate shall be determined in accordance with Equation 4-9.

$$Q_{OA} = 0.01 A_{floor} + 7.5(N_{br} + 1) \quad \textbf{(Equation 4-9)}$$

where:

Q_{OA} = outdoor airflow rate, cfm

A_{floor} = floor area, ft^2

N_{br} = number of bedrooms; not to be less than one

Exceptions:

1. The outdoor air ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average outdoor airflow rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.
2. The minimum mechanical ventilation rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:

   2.1. A ducted system supplies ventilation air directly to each bedroom and to one or more of the following rooms:

      2.1.1. Living room.

      2.1.2. Dining room.

      2.1.3. Kitchen.

   2.2. The whole-house ventilation system is a *balanced ventilation* system.

Reason Statement: Section 1020.5 of the IBC prohibits corridors from serving as “ventilation air ducts”. However, changes to the 2012 IMC introduced approval of mechanical ventilation systems that do not comply with this requirement. Specifically, when an exhaust-only ventilation system is specified to provide outdoor air for a dwelling unit whose entrance door is not located on an exterior wall (i.e., a dwelling unit opening onto a corridor that is not open to the atmosphere, referred to as a “corridor” within this rationale), we can expect much of the ventilation air to be conveyed through the corridor. This claim is supported by a study showing that for recently constructed dwelling units, approximately 40% of dwelling unit leakage area is to the corridor.* Operating an exhaust-only outdoor air ventilation system in a dwelling unit with an entrance door located on a corridor can be expected to establish a pressure differential with respect to the corridor, forcing a large percentage of the dwelling unit ventilation air to be conveyed by the corridor, in violation of IBC Section 1020.5. To coordinate IBC Section 1020.5 with IMC Sections 403.3.2.1 and 403.1, this proposal reestablishes the pre-2012 requirement for mechanical ventilation systems to supply outdoor ventilation air to the dwelling units without using the corridor to convey the outdoor ventilation air.

This proposal also modifies the IMC definition of “supply air system” to ensure that it can apply to ventilation systems as well as heating and cooling systems. The term “supply air system” is used only once within the body of the 2021 IMC, and its use is not italicized; so the definition of “supply air system” does not currently apply anywhere within the IMC and its modification would not affect any other section (see the Preface section of the IMC for more information on use of italicized terms).

This proposal coordinates the IBC Section 1020.5 requirements with the IMC while maintaining the ability to use exhaust-only ventilation systems for provision of outdoor air for a dwelling unit whose entrance door is located on an exterior wall. The IBC defines an Exterior Wall as follows: “EXTERIOR WALL. A wall, bearing or nonbearing, that is used as an enclosing wall for a building, other than a fire wall, and that has a slope of 60 degrees (1.05 rad) or greater with the horizontal plane.”

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 34.

Bibliography: Bohac D., and Sweeney L. 2020. Energy Code Field Studies: Low-Rise Multifamily Air Leakage Testing. Prepared by the Center for Energy and Environment, Ecotope, and The Energy Conservatory. Prepared for the U.S. Department of Energy Office of Energy Efficiency & Renewable Energy. https://www.energycodes.gov/sites/default/files/documents/LRMF_AirLeakageTesting_FinalReport_2020-07-06.pdf. [See Table 45, which shows average leakage to “common” area of 42%. The report also notes, “for buildings in this study, “common areas” are made up almost completely of corridors and a few small rooms such as mechanical closets and elevator rooms.]

Cost Impact: The code change proposal will not increase or decrease the cost of construction
IBC Section 1020.5 prohibits corridors from serving as “ventilation air ducts”. So presumably, the more restrictive provision of this section of the IBC would prevail over the permissive language in IMC 403.3.2.1 that permits the use of an exhaust system for provision of outdoor air for any Group R-2, R-3, or R-4 dwelling unit. Because this change only coordinates IMC requirements with what the (more restrictive) IBC already requires, no additional material or labor costs are associated with this proposal.

M18-21

M19-21

IMC: 403.3.1, 403.3.2, 403.3.2.1

Proponents: Joseph Summers, representing Chair of PMGCAC (PMGCAC@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

403.3.1 Other buildings intended to be occupied. The design of local exhaust systems and ventilation systems for outdoor air for *occupancies* other than Group R-2, R-3 and R-4 ~~three stories and less above grade plane~~ shall comply with Sections 403.3.1.1 through 403.3.1.4.

403.3.2 Group R-2, R-3 and R-4 occupancies~~, three stories and less~~. The design of local exhaust systems and ventilation systems for outdoor air in Group R-2, R-3 and R-4 *occupancies* ~~three stories and less in height above grade plane~~ shall comply with Sections 403.3.2.1 through 403.3.2.5.

403.3.2.1 Outdoor air for dwelling units. An outdoor air ventilation system consisting of a mechanical exhaust system, supply system or combination thereof shall be installed for each*dwelling unit*. Local exhaust or supply systems, including outdoor air ducts connected to the return side of an air handler, are permitted to serve as such a system. The outdoor air ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the building is occupied. The minimum continuous outdoor airflow rate shall be determined in accordance with Equation 4-9.

$$Q_{OA} = 0.01 A_{floor} + 7.5(N_{br} + 1) \quad \textbf{(Equation 4-9)}$$

where:

Q_{OA} = outdoor airflow rate, cfm

A_{floor} = <u>conditioned</u> floor area, ft^2

N_{br} = number of bedrooms; not to be less than one

Exceptions:

1. The outdoor air ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average outdoor airflow rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.
2. The minimum mechanical ventilation rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:

   2.1. A ducted system supplies ventilation air directly to each bedroom and to one or more of the following rooms:

      2.1.1. Living room.

      2.1.2. Dining room.

      2.1.3. Kitchen.

   2.2. The whole-house ventilation system is a *balanced ventilation* system.

Reason Statement: Prior to 2015, the IMC used the same mechanical ventilation outdoor airflow rate calculation procedure for all R-2, R-3, and R-4 dwelling units. Beginning in 2015, a new calculation procedure was introduced in the IMC for low-rise R-2, R-3, and R-4 dwelling units. This 2015 calculation procedure was based on the airflow equation used in ASHRAE 62.2-2010, which was developed for leaky, detached, single-family homes (bad assumption!). Applying this ventilation equation and associated assumptions to tight, attached, low-rise R-2, R-3, and R-4 dwelling units results in extremely low flow rates that are a fraction of what was previously required by the IMC (1/3 less), what is currently required by ASHRAE 62.2 (1/3 less), and what is currently required by ASHRAE 62.1 (1/2 less).
Since 2015, ASHRAE 62.2 has revised its airflow rate calculation procedure for attached dwelling units, based on infiltration assumptions that are relevant to attached dwelling units, and the result is much closer to that required by required by the 2012 IMC for all private dwelling units and by the 2021 IMC for all private dwelling units that are not in low-rise R-2, R-3, and R-4 buildings. The rate required for IMC low-rise R-2, R-3, and R-4 dwelling units should also be revised to avoid under-ventilation that can lead to poor IAQ and negative health outcomes. Avoiding under-ventilating is especially important for IAQ in high-density multifamily dwelling units.

Following are calculations showing the outdoor airflow rate (QOA) required by various methods and demonstrating the deficiency of the ventilation rates for IMC low-rise R-2, R-3, and R-4 dwelling units. The rate calculated is for a 2-bedroom, 800 ft2 apartment with 8 ft ceilings (volume = 6400

ft3)

Method A: 2015-2021 IMC, dwelling units in low-rise R-2, R-3, and R-4 buildings (same equation used in ASHRAE 62.2-2010):

QOA = 0.01 cfm/ft2*ConditionedFloorArea + 7.5*(NumberBedrooms + 1)

= 0.01*800 + 7.5*(2+1)

= 8 + 22.5

= 30.5 cfm [This rate is 1/3 less than the 2012 IMC, 1/3 less than ASHRAE 62.2-2019, and ½ less than ASHRAE 62.1-2019]

Method B: 2012 IMC, all private dwelling units (same equation used in 2021 IMC for all private dwelling units that are not in low-rise R-2, R-3, and R-4 buildings):

QOA = Max [0.35 ACH, (15 cfm/person)*(2 persons for first bedroom and 1 person for second bedroom)]

= Max [0.35ACH*(6400 ft3)*(1-hr/60-min), 45]

= Max [37, 45]

= 45 cfm

Method C: ASHRAE 62.2-2019, all non-transient vertically attached dwelling units

QOA = 0.03 cfm/ft2*ConditionedFloorArea + 7.5*(NumberBedrooms + 1)

= 0.03*800 + 7.5*(2+1)

= 24 + 22.5

= 46.5 cfm [This method is proposed within this proposal. Note that this method produces values that are very close to those in Method B (i.e., the 2012 IMC for all private dwelling units and the 2021 IMC for all private dwelling units that are not in low-rise R-2, R-3, and R-4 buildings]

Method D: ASHRAE 62.1-2019, all transient dwelling units:

QOA = 0.06 cfm/ft2*ConditionedFloorArea + (5 cfm/person)*(2 persons for first bedroom and 1 person for second bedroom)

= 0.06*800 + 5*3

= 0.06*800 + 5*3

= 48 + 15

= 63 cfm

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 38.

Cost Impact: The code change proposal will increase the cost of construction
An increase in required ventilation rate could, in some situations, require a “step up” to the next size of ventilation equipment or a “step up” to the

next duct size in some parts of systems. Generally, next size “step-ups” will have some increased material costs but this would not always be the case for every project.

M19-21

M20-21

IMC: TABLE 403.3.1.1

Proponents: Julius Ballanco, representing Adult Changing Table Committee (JBEngineer@aol.com)

2021 International Mechanical Code

Revise as follows:

TABLE 403.3.1.1
MINIMUM VENTILATION RATES

Portions of table not shown remain unchanged.

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]
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	—
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) [g]	—	—	—	50/20 [f]
Smoking lounges [b]	70	60	—	—
Toilet rooms — public [g]	—	—	—	50/70 [e]
Room with adult changing station			.	50/70[e]

For SI: 1 cubic foot per minute = 0.0004719 m ^{3}/s, 1 ton = 908 kg, 1 cubic foot per minute per square foot = 0.00508 m ^{3}/(s • m ^{2}), °C = [(°F) – 32]/1.8, 1 square foot = 0.0929 m ^{2}.

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 or adult changing station. 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 . For occupancies other than science laboratories, where there is a wheel - type energy recovery ventilation (ERV) unit in the exhaust system design, the volume of air leaked from the exhaust airstream into the outdoor airstream within the ERV shall be less than 10 percent of the outdoor air volume. 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.

Reason Statement: This change is being submitted by the Adult Changing Table Committee of ICC A117.1. There are proposals to the Building Code and Plumbing Code related to the adult changing stations. The Committee believed that the ventilation requirements in the Mechanical Code needed to address the additional ventilation for an adult changing station. Since the station involves the changing of adult diapers, it was believed that the ventilation should mirror the requirements for a public toilet room. The proposed change is consistent with the ventilation required for each water closet and urinal. It adds "adult changing station" as the third item for determining the ventilation rate.

Cost Impact: The code change proposal will increase the cost of construction
This change will mandate a level of ventilation of a rooms having an adult changing station. The net increase in ventilation will add cost to construction.

M20-21

M21-21

IMC: TABLE 403.3.1.1

Proponents: Emily Toto, ASHRAE, representing ASHRAE (etoto@ashrae.org)

2021 International 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]
Animal Facilities				
Animal exam room (veterinary office)	20	10	0.12	-
Animal imaging (MRI/CT/PET)	20	10	0.18	0.9
Animal operating rooms	20	10	0.18	3.00
Animal postoperative recovery room	20	10	0.18	1.50
Animal preparation rooms	20	10	0.18	1.50
Animal procedure room	20	10	0.18	2.25
Animal surgery scrub	20	10	0.18	1.50
Large-animal holding room	20	10	0.18	2.25
Necropsy	20	10	0.18	2.25
Small-animal cage room (static cages)	20	10	0.18	2.25
Small-animal-cage room (ventilated cages)	20	10	0.18	1.50
Correctional facilities				
Booking/waiting	50	7.5	0.06	—
Cells without plumbing fixtures with plumbing fixtures [g]	25 25	5 5	0.12 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	5	0.12	—
Storage, pick up	30	7.5	0.12	—
Education				
Art classroom [g]	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 [g]	—	—	—	0.25
Media center	25	10	0.12	—
Multiuse assembly	100	7.5	0.06	—
Music/theater/dance	35	10	0.06	—
Science laboratories [g]	25	10	0.18	1.0

Science laboratories	20	10	0.18	1.0
Smoking lounges [b]	70	60	—	—
Sports locker rooms [g]	—	—	—	0.5
Wood/metal shops [g]	20	10	0.18	0.5
Food and beverage service				
Bars, cocktail lounges	100	7.5	0.18	—
Break rooms	25	5	0.06	-
Cafeteria, fast food	100	7.5	0.18	—
Coffee stations	20	5	0.06	-
Corridors	-	-	0.06	-
Dining rooms	70	7.5	0.18	—
Kitchens (cooking) [b]	20	7.5	0.12	0.7
Occupiable storage rooms for liquids or gels	2	5	0.12	-
Hotels, motels, resorts and dormitories				
Bathrooms/toilet—private [g]	—	—	—	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	—
Laundry rooms, central	10	5	0.12	-
Laundry rooms within dwelling units	10	5	0.12	-
Lobbies/prefunction	30	7.5	0.06	—
Multipurpose assembly	120	5	0.06	—
Offices				
Break rooms	50	5	0.12	-
Conference rooms	50	5	0.06	—
Main entry lobbies	10	5	0.06	—
Occupiable storage rooms for dry materials	2	5	0.06	-
Office spaces	5	5	0.06	—
Reception areas	30	5	0.06	—
Telephone/data entry	60	5	0.06	—
Outpatient healthcare facilities[i,j]				
Birthing room	15	10	0.18	-
Class 1 imaging room	5	5	0.12	-
Dental operatory[k]	20	10	0.18	-
General examination room	20	7.5	0.12	-
Other dental treatment areas	5	5	0.06	-
Physical therapy exercise area	7	20	0.18	-
Physical therapy individual room	20	10	0.06	-
Physical therapeutic pool area	-	-	0.48	-
Prosthetics and orthotics room	20	10	0.18	-
Psychiatric consultation room	20	5	0.06	-
Psychiatric examination room	20	5	0.06	-
Psychiatric group room	50	5	0.06	-
Psychiatric seclusion room	5	10	0.06	-
Speech therapy room	20	5	0.06	

Speech therapy room	20	5	0.06	-
Urgent care examination room	20	7.5	0.12	-
Urgent care observation room	20	5	0.06	-
Urgent care treatment room	20	7.5	0.18	-
Urgent care triage room	20	10	0.18	-
Private dwellings, single and multiple				
Garages, common for multiple units [b]	—	—	—	0.75
Kitchens [b]	—	—	—	50 /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]	—	—	—	25 /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	—
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) [g]	—	—	—	50/20 [f]
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
Banks or lobbies	15	7.5	0.06	-
Barber	25	7.5	0.06	0.5
Beauty salons[b]	25	20	0.12	0.6
Embalming room[b]	—	—	—	2.0
Nail salons[b, h]	25	20	0.12	0.6
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				
Refrigerated warehouses/freezers (<50°F)	—	10	—	0.75
Repair garages, enclosed parking garages[b, d]	—	—	—	0.75
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				
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
Manufacturing where hazardous materials are not used	7	10	0.18	-
Manufacturing where hazarous materials are used (excludes heavy industrial and chemical processes)	7	10	0.18	-
Meat processing [c]	10	15	—	—
Pharmacy (prep. area)	10	5	0.18	—
Photo studios	10	5	0.12	—
Sorting, packing, light assembly	7	7.5	0.12	-
Telephone closets	-	-	0.00	-

For SI: 1 cubic foot per minute = 0.0004719 m^3/s, 1 ton = 908 kg, 1 cubic foot per minute per square foot = 0.00508 $m^3/(s \cdot m^2)$, °C = [(°F) – 32]/1.8, 1 square foot = 0.0929 m^2.

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 . For occupancies other than science laboratories, where there is a wheel - type energy recovery ventilation (ERV) unit in the exhaust system design, the volume of air leaked from the exhaust airstream into the outdoor airstream within the ERV shall be less than 10 percent of the outdoor air volume. 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. Outpatient facilities to which the rates apply are freestanding birth centers, urgent care centers, neighborhood clinics and physicians' offices, Class 1 imaging facilities, outpatient psychiatric facilities, outpatient rehabilitation facilities, and outpatient dental facilities.

j. The requirements of this table provide for acceptable IAQ. The requirements of this table do not address the airborne transmission or airborne viruses, bacteria, and other infectious contagions.

k. These rates are intended only for outpatient dental clinics where the amount of nitrous oxide is limited. They are not intended for dental operatories in institutional buildings where nitrous oxide is piped.

Reason Statement: This proposal seeks to update the existing ventilation rate table in the IMC. Standard 62.1 is the source material for this table, and this updates table 403.3.1.1 to match the appropriate ventilation rates in 62.1-2019.

Bibliography: ASHRAE Standard 62.1-2019, Ventilation for Acceptable Indoor Air Quality

Cost Impact: The code change proposal will decrease the cost of construction
This proposal revises ventilation rates for specific spaces within varying occupancy classifications. However, this does not dictate system design to meet those requirements and therefore does not increase the cost of construction.

M21-21

M22-21

IMC: TABLE 403.3.1.1

Proponents: Andrew Klein, representing Self Storage Association (andrew@asklein.com)

2021 International Mechanical Code

Revise as follows:

TABLE 403.3.1.1
MINIMUM VENTILATION RATES

Portions of table not shown remain unchanged.

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]
Storage				
Refrigerated warehouses/freezers	—	10	—	0.75
Repair garages, enclosed parking garages[b, d]	—	—	—	0.75
Warehouses[i]	—	10	0.06	—

For SI: 1 cubic foot per minute = 0.0004719 m ^{3}/s, 1 ton = 908 kg, 1 cubic foot per minute per square foot = 0.00508 m ^{3}/(s • m ^{2}), °C = [(°F) – 32]/1.8, 1 square foot = 0.0929 m ^{2}.

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 . For occupancies other than science laboratories, where there is a wheel - type energy recovery ventilation (ERV) unit in the exhaust system design, the volume of air leaked from the exhaust airstream into the outdoor airstream within the ERV shall be less than 10 percent of the outdoor air volume. 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. <u>The occupiable floor area in warehouses shall not include the floor area of self-storage units, floor areas under rack storage, or designated palletized storage floor areas.</u>

Reason Statement: This proposal clarifies the application of Section 403.3.1.1, regarding required minimum outdoor airflow rates, in storage occupancies. The current code language is inconsistently applied when there are fixed storage areas that do not change without a permit. Examples of such floor areas may include those dedicated to high-piled rack storage, self-storage facility units that are not fully partitioned off from interior corridors, and other floor areas that are designated solely for storage.
Ignoring the volume taken up by storage and the thermal mass it provides in helping with temperature regulation results in the oversizing of HVAC equipment, increasing energy use and limiting the effectiveness of humidity control that properly-sized systems provide. By adding this footnote, the minimum outdoor airflow rates for occupiable space in storage occupancies can be properly calculated and consistently enforced.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This code change is simply a clarificatoin of how occupiable floor area in storage occupancies is to be calculated. This code change proposal will decrease the cost of construction from when the occupiable floor area in warehouses was incorrectly calculated, due to smaller mechanical system requirements.

M22-21

M23-21

IMC: SECTION 202, 403.3.2.1

Proponents: Mike Moore, Stator LLC, representing Broan-NuTone (mmoore@statorllc.com)

2021 International Mechanical Code

Revise as follows:

BALANCED VENTILATION SYSTEM. ~~Any combination of concurrently operating mechanical exhaust and mechanical supply whereby the total mechanical exhaust airflow rate is within 10 percent of the total mechanical supply airflow rate.~~ A ventilation system where the total mechanical supply airflow and total mechanical exhaust airflow are simultaneously within 10 percent of their average. The balanced ventilation system airflow is the average of the mechanical supply and mechanical exhaust airflows.

403.3.2.1 Outdoor air for dwelling units. An outdoor air ventilation system consisting of a mechanical exhaust system, supply system or combination thereof shall be installed for each *dwelling unit*. Local exhaust or supply systems, including outdoor air ducts connected to the return side of an air handler, are permitted to serve as such a system. The outdoor air ventilation system shall be designed to provide the required rate of outdoor air continuously during the period that the building is occupied. The minimum continuous outdoor airflow rate shall be determined in accordance with Equation 4-9.

$$Q_{OA} = 0.01 A_{floor} + 7.5(N_{br} + 1) \quad \textbf{(Equation 4-9)}$$

where:

Q_{OA} = outdoor airflow rate, cfm

A_{floor} = floor area, ft^2

N_{br} = number of bedrooms; not to be less than one

Exceptions:

1. The outdoor air ventilation system is not required to operate continuously where the system has controls that enable operation for not less than 1 hour of each 4-hour period. The average outdoor airflow rate over the 4-hour period shall be not less than that prescribed by Equation 4-9.
2. The minimum mechanical ventilation rate determined in accordance with Equation 4-9 shall be reduced by 30 percent provided that both of the following conditions apply:

   2.1. A ducted system supplies ventilation air directly to each bedroom and to one or more of the following rooms:

      2.1.1. Living room.

      2.1.2. Dining room.

      2.1.3. Kitchen.

   2.2. The whole-house ventilation system is a *balanced ventilation* ~~system~~ *system*.

Reason Statement: The 2021 versions of the IMC and IRC introduced a 30% ventilation rate credit for dwelling units with systems providing balanced ventilation. Because these changes were based on the approval of multiple proposals, their approval resulted in different definitions for *balanced ventilation* and *balanced ventilation system* across the IRC and IMC. This proposal and its companion proposal to the IRC are correlation proposals that will align the terminology, definitions, and their application across both codes. The change that is proposed in Section 403.3.2.1 is italicizing the word "system" within the phrase "*balanced ventilation system*" so that the user is directed to the corresponding definition.

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

M23-21

M24-21

IMC: TABLE 403.3.2.3

Proponents: Joseph Summers, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (PMGCAC@iccsafe.org)

2021 International Mechanical Code

Revise as follows:

TABLE 403.3.2.3
MINIMUM REQUIRED LOCAL EXHAUST RATES FOR GROUP R-2, R-3 AND R-4 OCCUPANCIES

AREA TO BE EXHAUSTED	EXHAUST RATE CAPACITY
Kitchens	100 cfm intermittent or ~~25~~ 50 cfm continuous
Bathrooms and toilet rooms	50 cfm intermittent or ~~20~~ 25 cfm continuous

For SI: 1 cubic foot per minute = 0.0004719 m^3/s.

Reason Statement: Consistency with IMC Table 403.3.1.1 (which is consistent with ASHRAE 62.1)
This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 39.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Builders specifying exhaust equipment that is sized to meet the intermittent rate requirement will see no increase in the cost of construction. Builders specifying in-suite exhaust equipment that is sized to meet the continuous rate should also see no increase in the cost of exhaust fans, which typically have a nominal rated flow of at least 50 cfm. Builders electing to use central exhaust equipment serving multiple dwelling units and using the continuous rate may see an increase in the cost of equipment; however, such equipment is often provisioned with high speed settings that can achieve flow rates that are 2-3x that provided by the low speed setting. So, there are multiple paths to implement this code change proposal without increasing the cost of construction.

M24-21

M25-21

IMC: SECTION 403, 403.4 (New), 403.4.1 (New), 403.4.2 (New)

Proponents: Mark Lessans, Johnson Controls, representing Johnson Controls (mark.lessans@jci.com)

2021 International Mechanical Code

SECTION 403 MECHANICAL VENTILATION.

Add new text as follows:

403.4 Clean Air Delivery Capability. Each mechanical system shall meet the requirements in 403.4.1. Each occupiable space shall meet the requirements in 403.4.2.

Exception: Occupiable spaces where 100% of the supply air meets High-efficiency Particulate Air filtration.

403.4.1 Airflow for Increased Filtration. Mechanical systems shall be sized to accommodate a design airflow at a total static pressure drop which assumes the utilization of a supply air filter with a Minimum Efficiency Reporting Value of no less than 13.

403.4.2 Zonal Filtration or Disinfection Capability. Each occupiable space shall have 120-volt receptacles which provide at least 0.2 watts per square foot of occupiable space above the requirements of the National Electrical Code to support supplemental air cleaning devices.

Exception: Rooms with less than 500 square feet of occupiable space.

Reason Statement: This proposal seeks to “ready” buildings for retrofits and other changes if indoor clean air delivery needs to be increased – such as in response to mitigating an airborne contaminant – per ASHRAE and CDC guidance on reopening buildings during the COVID-19 pandemic. If the mechanical system is not designed with a MERV 13 filter, it would at least be sized to accommodate the use of one later on without having to redesign or replace the system. This is important, as MERV 13 filters are often at the balance point between filtration effectiveness and energy efficiency. However, these filters are thicker and have a larger airflow resistance when compared to conventional filters, and often existing systems cannot accommodate them. This proposal also requires that occupiable spaces be equipped with the electrical infrastructure needed to increase clean air delivery at the zonal level, such as using a HEPA room air cleaning machine.

Cost Impact: The code change proposal will increase the cost of construction
These additional requirements will result in a modest increase in construction costs, but this cost pales in comparison to the burden of adding them post-construction.

M26-21

IMC: 405.2 (New), 405.2.1 (New), 405.2.2 (New), 405.2.3 (New), 405.2.3.1 (New)

Proponents: Mark Lessans, Johnson Controls, representing Johnson Controls (mark.lessans@jci.com)

International Mechanical Code

2021 International Mechanical Code

Add new text as follows:

405.2 Demand Control Ventilation. Each occupiable space shall be equipped with a carbon dioxide sensor which meets the requirements in 405.2.1 and 405.2.3. Mechanical equipment serving each zone(s) shall be equipped with controls which meet the requirements in 405.2.2.

405.2.1 Carbon Dioxide Sensor Performance Specifications. Each carbon dioxide sensor installed in accordance with Section 405.2 shall meet the following carbon dioxide measurement specifications as certified by the equipment manufacturer:

1. Range lower bound less than or equal to 400 parts per million
2. Range upper bound greater than or equal to 2,000 parts per million
3. Accuracy within ±75 parts per million at a reading of 1,000 parts per million
4. Output resolution less than or equal to 5 parts per million

405.2.2 Mechanical System Controls. Controls installed in accordance with Section 405.2 shall:

1. Receive data from the carbon dioxide sensor in the occupiable zone(s) at least once per 5 minutes
2. Be calibrated to provide pre-established outdoor airflow rates, or be equipped with the necessary instrumentation to measure outdoor airflow
3. Be capable of adjusting the outdoor airflow in response to an adjustable outdoor airflow setpoint
4. Increase the amount of outdoor air provided to each occupiable zone until the carbon dioxide level in each occupiable zone falls below a maximum threshold as defined by the user

405.2.3 Ventilation Rate Alarming. When carbon dioxide levels are above a maximum level as defined by the user, sensors installed in accordance with Section 405.2 shall alert the occupants with a visual and audible indication in the zone or through a building monitoring system.

405.2.3.1 Default Carbon Dioxide Threshold Level. The threshold level for carbon dioxide measurement above which triggers an alert in accordance with Section 405.2.3 shall be set to 1,100 parts per million by default.

Reason Statement: Several recently published studies[1,2] have demonstrated that a large portion of indoor occupied spaces to not meet minimum requirements for ventilation as set in ASHRAE Standard 62.1, and have documented the impacts on occupant health, comfort, and productivity. Additionally, providing adequate ventilation is the most effective first step in mitigating the transmission of viruses carried by airborne particulates, an issue that has been highlighted during the COVID-19 pandemic.

This proposal seeks to ensure building occupants have access to adequate ventilation by bringing Demand Control Ventilation (DCV) to each occupiable zone and managing carbon dioxide levels – the best proxy we have for determining inadequate ventilation and/or above-normal occupancy. The proposal requires that every occupiable zone have a basic CO2 sensor, that the CO2 sensor communicate with the building mechanical system, and that the mechanical system be capable of adjusting airflow rates to keep CO2 levels (and therefore ventilation adequacy) within acceptable levels. It also requires that the CO2 sensor notify either the occupants, or the building manager, when ventilation is inadequate. This can be especially helpful first step in helping building occupants understand when indoor may be at unhealthy levels and take mitigating action.

If successfully deployed, this proposal would go a long way toward maintaining adequate ventilation, as well as assist in saving energy by preventing overventilation of spaces.

Bibliography: [1]University of California at Davis, Ventilation rates in California classrooms: Why many recent HVAC retrofits are not delivering sufficient ventilation, January 2020
[2]United States Government Accountability Office, School Districts Frequently Identified Multiple Building Systems Needing Updates or Replacement, June 2020

Cost Impact: The code change proposal will increase the cost of construction
This proposal will increase the cost of construction as additional sensors will be required.

M27-21

IMC: SECTION 408 (New), 408.1 (New), 408.2 (New), 408.3 (New), 408.3.1 (New), 408.3.2 (New), 408.3.3 (New), 408.3.4 (New), 408.4 (New), 408.5 (New), 408.6 (New), 408.7 (New), 408.8 (New), 408.9 (New), 502.21 (New), 502.21.1 (New), 502.21.2 (New), UL Chapter 15 (New)

Proponents: Joseph Summers, Chair, representing Chair of PMGCAC (PMGCAC@iccsafe.org)

2021 International Mechanical Code

Add new text as follows:

SECTION 408 PROCESSING AND EXTRACTION FACILITIES.

408.1 General. Plant processing or extraction facilities shall comply with this section, the International Building Code and Chapter 39 of the International Fire Code. The extraction process includes the act of extraction of the oils and fats by use of a solvent, desolventizing of the raw material, production of the miscella, distillation of the solvent from the miscella and solvent recovery. Post-extraction processing includes winterization, solvent recovery, distillation, decarboxylation, isolation, chromatography and similar processes. The use, storage, transfilling and handling of hazardous materials in these facilities shall comply with this code, the International Building Code and the International Fire Code.

408.2 Existing buildings or facilities. Existing buildings or facilities used for the processing of plants shall comply with this code, the International Building Code and the International Fire Code. Existing extraction processes where the medium of extraction or solvent is changed shall comply with this section.

408.3 Mechanical ventilation. Natural ventilation shall not be permitted. Mechanical ventilation shall be designed and installed in accordance with Section 403 in this code and Chapter 39 of the International Fire Code. The exhaust airflow rate shall be provided in accordance with the requirements of 408.3.1 through 408.3.4.

408.3.1 Extraction processes using flammable gases or flammable liquids. Continuous mechanical exhaust ventilation shall provide a minimum airflow rate of not less than 5 cfm/ft2 (0.0038 m3/(s*m2)) of floor area to prevent an accumulation of flammable vapors from exceeding 25 percent of the lower explosive limit (LEL). Recirculation of such air shall be prohibited.

Exception: Where the registered design professional demonstrates that an engineered mechanical exhaust ventilation system design will prevent the maximum concentration of contaminants from exceeding 25% of the LEL, the minimum required rate of exhaust shall be reduced in accordance with such engineered system design.

408.3.2 Extraction processes using compressed asphyxiant or inert gases. Continuous mechanical exhaust ventilation shall be provided in accordance with Chapter 39 of the International Fire Code. Recirculation of such air shall be prohibited.

408.3.3 Post-extraction processes using flammable or combustible liquids or gases. Where flammable liquids, combustible liquids heated above their flashpoint, or flammable gases are used in post-extraction processing, the room or area shall be provided with continuous mechanical exhaust in accordance with Chapter 39 of the International Fire Code.

408.3.4 Interlocks. Electrical equipment and appliances used in processes that generate flammable vapors or gases shall be interlocked with ventilation fans so that the equipment cannot be operated unless the exhaust ventilation fans are in operation.

408.4 Exhaust fan discharge. Exhaust fans shall be positioned so that the discharge will not impinge on the roof, other equipment or appliances or parts of the structure. A vertical discharge fan shall be manufactured with an approved drain outlet at the lowest point of the housing to permit drainage of oils or byproducts to an approved location.

408.5 Exhaust fan mounting. Upblast fans serving plant processing or extraction facilities and installed in a vertical or horizontal position shall be hinged, supplied with a flexible weatherproof electrical cable to permit inspection and cleaning and shall be equipped with a means of restraint to limit the swing of the fan on its hinge. The ductwork shall extend not less than 18 inches (457 mm) above the roof surface.

408.6 Clearances. Exhaust equipment serving a plant processing or extraction facilities shall have a clearance to combustible construction of not less than 18 inches (457 mm).

Exception: Factory-built exhaust equipment installed in accordance with Section 304.1 and listed for a lesser clearance.

408.7 Termination location. The outlet of exhaust equipment serving plant processing or extraction facilities shall be in accordance with Section 501.3 of this code.

Exception: The minimum horizontal distance between vertical discharge fans and parapet-type building structures shall be 2 feet (610 mm), provided that such structures are not higher than the top of the fan discharge opening.

408.8 Ducts. Exhaust duct construction shall comply with Chapter 6.

408.9 Hazardous Exhaust Systems. When the exhaust system is determined to be a hazardous exhaust system by this code, the International Building Code or the International Fire Code, that system shall be installed in accordance with Section 510 of this code.

502.21 Processing and Extraction Facilities. Processing and extraction Facilities shall be provided with an exhaust system in accordance with of Section 408 of this code and Chapter 39 of the International Fire Code.

502.21.1 Operation. The exhaust system for processing and extraction Facilities shall have controls that operate the system continuously when the space is occupied.

502.21.2 Post-processing. Post-processing operations, including dispensing of flammable liquids between containers, shall be performed within a hazardous exhaust fume hood rated for exhausting flammable vapors and listed in accordance with UL 1805. Electrical equipment used within the hazardous exhaust fume hood shall be rated for use in flammable atmospheres.

Exception: A hazardous exhaust fume hood shall not be required where an approved exhaust system is installed in accordance with NFPA 91.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook IL 60062-2096

1805-2002: Standard for Laboratory Hoods and Cabinets (Ed.1)

Staff Analysis: A review of the standards proposed for inclusion in the code, UL 1805-2002: Standard for Laboratory Hoods and Cabinets, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement: These facilities are becoming common in numerous states and these requirements are based of best practices and ensure basic fire and life safety measures. The requirements in this section provide requirements for hazardous and non-hazardous facilities. The development of these requirements was done in collaboration with the PMGCAC and FCAC. Most of these requirements are existing in current code we are only creating sections that provide an understandable path for compliance.

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 10.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
These requirements already exist in the IBC and IFC. Adding these requirements to the IMC only provides guidance for the design and installation of systems that comply with existing code requirements. As such, this proposal does not require additional material or labor costs that would impact the cost of construction.

M27-21

M61-21

IMC: SECTION 912, 912.1, 912.3, 912.2, UL Chapter 15 (New)

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com)

2021 International Mechanical Code

Revise as follows:

SECTION 912 ~~INFRARED RADIANT~~ ELECTRIC SPACE HEATERS.

912.1 General. Permanently installed electric ~~infrared radiant~~ space heaters shall ~~comply~~ be listed and labeled in accordance with ~~UL 499~~ UL 2021, and installed in accordance with the manufacturer's instructions.

912.3 Clearances. Heaters shall be installed with *clearances* from combustible material in accordance with the manufacturer's installation instructions.

Revise as follows:

912.2 Support. ~~Infrared radiant~~ Electric space heaters shall be fixed in a position independent of ~~fuel and~~ electric supply lines. Hangers and brackets shall be noncombustible material.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook IL 60062-2096

UL 2021-15: Fixed and Location-Dedicated Electric Room Heaters (with revisions through December 14, 2016)

Staff Analysis: A review of the standards proposed for inclusion in the code, UL 2021: Fixed and Location-Dedicated Electric Room Heaters (with revisions through December 14, 2016), with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement: UL 499 is a general heating appliance and equipment standard, whereas UL 2021 is specifically for electric space heaters that are fixed in place and dedicated to a room. Infrared is a technology, not an application. There are other means for providing the heat. The reference to fuel lines is removed from Section 912.2, because the fuel-fired infrared heaters are covered in Section 630 of the IFGC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
Clarifies the use of the standards to list these types of heaters.

M61-21

M62-21

IMC: (New), SECTION 931 (New), 931.1 (New)

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com)

2021 International Mechanical Code

Add new definition as follows:

STEAM BATH EQUIPMENT. Includes steam bath generators, combination room and steam generator systems, and steam bath cabinets intended for high-humidity concentrated heating at elevated temperatures for personal bathing

Add new text as follows:

SECTION 931 STEAM BATH EQUIPMENT.

931.1 General. Steam bath equipment shall be *listed* and *labeled* in accordance with UL 499 and shall be installed in accordance with their listing and the manufacturer's instructions.

Reason Statement: This proposal provides introduces requirements for steam bath equipment listings, and installation criteria. This section is being proposed since steam bath equipment is acting as a boiler and not a water heater and therefore should be located in the IMC.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This does not require the installation of steam bath equipment, but provides requirements where installed.

M63-21

IMC: 1001.1

Proponents: Jonathan Roberts, representing UL LLC (jonathan.roberts@ul.com)

2021 International Mechanical Code

Revise as follows:

1001.1 Scope. This chapter shall govern the installation,*alteration* and repair of boilers, water heaters and pressure vessels.

Exceptions:

1. Pressure vessels used for unheated water supply.
2. Portable unfired pressure vessels and Interstate Commerce Commission containers.
3. Containers for bulk oxygen and medical gas.
4. Unfired pressure vessels having a volume of 5 cubic feet (0.14 m^3) or less operating at pressures not exceeding 250 pounds per square inch (psi) (1724 kPa) and located within *occupancies* of Groups B, F, H, M, R, S and U.
5. Pressure vessels used in refrigeration systems that are regulated by Chapter 11 of this code.
6. Pressure tanks used in conjunction with coaxial cables, telephone cables, power cables and other similar humidity control systems.
7. Any boiler or pressure vessel subject to inspection by federal or state inspectors.
8. Pressure vessels used in specific appliances and equipment that are regulated by Chapter 9 of this code.

Reason Statement: The specific appliances and equipment that are regulated by Chapter 9 of the IMC have specific requirements within the referenced standards that address any pressure vessels or parts subject to pressure within those appliances and equipment. This aligns with the Exception 5 in this section.
The applicable referenced standards in Chapter 9 that address the requirements for Pressure Vessels and Parts Subject to Pressure are UL 197 (Section 41), UL 499 (Section 30), UL 1261 (Section 6), UL 1995 (Section 34), and UL 60335-2-40 (Section 22).

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The requirements for pressure vessels are already covered with the referenced standards for the specific appliances and equipment regulated by Chapter 9.

M64-21

IMC: 1002.4 (New)

Proponents: Guy McMann, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

2021 International Mechanical Code

Add new text as follows:

1002.4 Water heater pan required. Where a storage type water heater or a hot water storage tank is installed in a location where water leakage from the tank will cause damage, the tank shall be installed in a pan constructed by one of the following:

1. Galvanized steel or aluminum of not less than 0.0236 inch (0.6010 mm) in thickness.
2. Plastic of not less than 0.036 inch (0.9 mm) in thickness.
3. Other approved materials.
4. A plastic pan installed beneath a water heater shall be constructed of material having a flame spread index of 25 or less and a smoked developed index of 450 or less when tested in accordance with ASTM E-84 or UL-723

Reason Statement: REASON: This language will make the IMC consistent with the IPC, IRC and IFGC regardless of the fuel or energy source. Water heaters are notorious for leaking at some point. The IMC is silent on this matter.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change is editorial in nature and is for consistency reasons only. There are no new requirements.

M65-21

IMC: 1006.6

Proponents: Chris Haldiman, Watts Water Technologies, representing Watts Water Technologies (chris.haldiman@wattswater.com)

2021 International Mechanical Code

Revise as follows:

1006.6 Safety and relief valve discharge. Safety and relief valve discharge pipes shall be of rigid pipe that is *approved* for the temperature of the system. High-pressure-steam safety valves shall be vented to the outside of the structure. The discharge piping serving pressure relief valves, temperature relief valves and combinations of such valves shall:

1. Not be directly connected to the drainage system.
2. Discharge through an air break located in the same room as the *appliance*.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the air break.
4. Serve a single relief device and shall not connect to piping serving any other relief device or *equipment*.
5. Discharge to the floor, to the pan serving the boiler or storage tank, to a waste receptor or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants. Where the discharge termination point is not readily observable, discharge monitoring is required.
8. Not be trapped.
9. Be installed so as to flow by gravity.
10. Not terminate more than 6 inches (152 mm) above the floor or waste receptor.
11. Not have a threaded connection at the end of such piping.
12. Not have valves or tee fittings.
13. Be constructed of those materials listed in Section 605.4 of the *International Plumbing Code* or materials tested, rated and approved for such use in accordance with ASME A112.4.1.

Reason Statement: Continuous low-level discharge (“dribble”) of T&P valve due to over-pressure (failed expansion tank, lack of secondary pressure relief device for thermal expansion, etc.) with hard water conditions can cause build-up of scale in the relief valve discharge port. Such obstruction of discharge port can compromise the relieving capacity of the valve and pose a safety risk to building occupants. Remote monitoring of relief valve discharge will ensure that the condition is immediately known.

Cost Impact: The code change proposal will increase the cost of construction
If the discharge piping is not readily visible this addition will increase the cost of construction but will also provide added safety for the occupants.

M66-21 Part I

IMC: 1006.6

Proponents: Joseph Summers, representing Chair of PMGCAC (PMGCAC@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART I WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART II WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES

2021 International Mechanical Code

Revise as follows:

1006.6 Safety and relief valve discharge. Safety and relief valve discharge pipes shall be of rigid pipe that is *approved* for the temperature of the system. High-pressure-steam safety valves shall be vented to the outside of the structure. The discharge piping serving pressure relief valves, temperature relief valves and combinations of such valves shall:

1. Not be directly connected to the drainage system.
2. Discharge through an air break located in the same room as the *appliance*.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the air break.
4. Serve a single relief device and shall not connect to piping serving any other relief device or *equipment*.
5. Discharge to the floor, to the pan serving the boiler or storage tank, to a waste receptor or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants.
8. Not be trapped.
9. Be installed so as to flow by gravity.
10. ~~Not terminate~~ Terminate not more than 6 inches (152 mm) and not less than two times the discharge pipe diameter above the floor or flood level rim of the waste receptor.
11. Not have a threaded connection at the end of such piping.
12. Not have valves or tee fittings.
13. Be constructed of those materials listed in Section 605.4 of the *International Plumbing Code* or materials tested, rated and approved for such use in accordance with ASME A112.4.1.

M66-21 Part II

IRC: M2002.4, M2002.4.1 (New)

Proponents: Joseph J. Summers, representing Chair of PMGCAC (pmgcac@iccsafe.org)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART 2 WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Residential Code

Revise as follows:

M2002.4 Pressure relief valve. Boilers shall be equipped with pressure relief valves with minimum rated capacities for the equipment served. Pressure relief valves shall be set at the maximum rating of the boiler. ~~Discharge shall be piped to drains by gravity to within 18 inches (457 mm) of the floor or to an open receptor.~~

M2002.4.1 Requirements for discharge pipe. . The discharge piping serving a pressure relief valve, temperature relief valve or combination valve shall:

1. Not be directly connected to the drainage system.
2. Discharge through an air gap located in the same room as the boiler.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the air gap.
4. Serve a single relief device and shall not connect to piping serving any other relief device or equipment.
5. Discharge to the floor, to the pan serving the water heater or storage tank, to a waste receptor or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants.
8. Not be trapped.
9. Be installed to flow by gravity.
10. Terminate not more than 6 inches (152 mm) and not less than two times the discharge pipe diameter above the floor or waste receptor flood level rim.
11. Not have a threaded connection at the end of the piping.
12. Not have valves or tee fittings.
13. Be constructed of those materials indicated in Section P2906.5 or materials tested, rated and approved for such use in accordance with ASME A112.4.1.
14. Be one nominal size larger than the size of the relief-valve outlet, where the relief-valve discharge piping is installed with insert fittings. The outlet end of such tubing shall be fastened in place.
15. The end of the discharge pipe shall be cut at a 45-degree angle.

Reason Statement: Part I REASONING: The text for the requirements for a discharge pipe from any pressure (or temperature) relief valve should be identical between all the codes that have such requirements. It doesn't matter what the relief valve is protecting. Uniformity across the codes on these requirements will improve compliance.
PART II REASONING: Oddly, Section M2002.4 has minimal requirements for pressure relief valve discharge pipes. A boiler doesn't "know" what type of building it is located in. The requirements for a pressure relief valve discharge pipe should be identical to what is in the IMC for the same application. Uniformity across the codes on these requirements will improve compliance.

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 31.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The relief valve piping already has to be installed and if relief valve manufacturers' instructions are being followed, many of these requirements are already being followed.

M67-21

IMC: 1006.6

Proponents: Julius Ballanco, JB Engineering and Code Consulting, P.C., representing Self (JBENGINEER@aol.com)

2021 International Mechanical Code

Revise as follows:

1006.6 Safety and relief valve discharge. Safety and relief valve discharge pipes shall be of rigid pipe that is *approved* for the temperature of the system. High-pressure-steam safety valves shall be vented to the outside of the structure. The discharge piping serving pressure relief valves, temperature relief valves and combinations of such valves shall:

1. Not be directly connected to the drainage system.
2. Discharge through an air break located in the same room as the *appliance*.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the air break.
4. Serve a single relief device and shall not connect to piping serving any other relief device or *equipment*.
5. Discharge to the floor, to the pan serving the boiler or storage tank, to a waste receptor or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants.
8. Not be trapped.
9. Be installed so as to flow by gravity.
10. Not terminate more than 6 inches (152 mm) above the floor or waste receptor.
11. Not have a threaded connection at the end of such piping.
12. Not have valves or tee fittings.
13. ~~Be constructed of those materials listed in Section 605.4 of the *International Plumbing Code* or materials tested, rated and approved for such use in accordance with ASME A112.4.1.~~ Utilize piping material complying with Section 1202.

Reason Statement: It is inappropriate to reference the Plumbing Code potable water piping section to regulate the piping material for boiler relief valves. The appropriate reference is to the hydronic piping section in the Mechanical Code. One of the differences is the allowance of black steel pipe. Prior to the change made during the last cycle, black steel pipe was always permitted to be used for a relief valve discharge pipe. This material has been used on boilers for relief valve discharge for many years. No problem were presented during the last cycle whereby black steel pipe did not properly perform as a discharge pipe for a relief valve. There were only perceptions that galvanized steel pipe should be used rather than black steel pipe. Section 1202, referenced in the new text, is the hydronic piping material section.

Cost Impact: The code change proposal will decrease the cost of construction
Black steel pipe costs less than galvanized steel pipe. Hence, the allowance of black steel pipe will lower the cost of construction.

M67-21

M68-21

IMC: 1101.1, 1101.6, SECTION 202

Proponents: Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com)

2021 International Mechanical Code

Revise as follows:

1101.1 Scope. This chapter shall govern the design, installation, construction and repair of refrigeration systems ~~that vaporize and liquefy a fluid during the refrigerating cycle~~. Permanently installed refrigerant storage systems and other components shall be considered as part of the refrigeration system to which they are attached.

1101.6 Maintenance. ~~Mechanical r~~Refrigeration systems shall be maintained in proper operating condition, free from accumulations of oil, dirt, waste, excessive corrosion, other debris and leaks.

Delete without substitution:

~~**REFRIGERATION SYSTEM, MECHANICAL.** A combination of interconnected refrigeration-containing parts constituting one closed refrigerant circuit in which a refrigerant is circulated for the purpose of extracting heat and in which a compressor is used for compressing the refrigerant vapor.~~

Reason Statement: Changes are intended for clarity and simplification. The scope of Chapter 11 needn't repeat what is already in the definition of "refrigeration/refrigerating system" and includes the concept of fluid phase change. This recommendation is consistent with revised definitions related to refrigeration submitted by PMGCAC, but was not picked up in time for PMGCAC to address the revision in their changes.
In addition, following PMGCAC's work on the topic, I noticed that the term "refrigeration system, mechanical" contains an inaccuracy related to only being a single circuit, but rather than fixing that, it made more sense to simply delete the definition. The term is only used once in the code (1101.6), and it really doesn't belong there as a limitation. All refrigeration systems, whether mechanical, absorption, or whatever, should be properly maintained per the requirements in 1101.6.

Although I represent IIAR on some issues related to refrigeration systems, this proposal is submitted on my own behalf. It does not impact IIAR and IIAR had no input to this submittal.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal has no connection to construction, so there is no construction cost impact.

M69-21

IMC: 1101.1.1, IIAR Chapter 15 (New)

Proponents: Jeffrey Shapiro, representing IIAR (jeff.shapiro@intlcodeconsultants.com)

2021 International Mechanical Code

Revise as follows:

1101.1.1 Refrigerants other than ammonia. Refrigerant piping design and installation for systems containing a refrigerant other than ammonia, including pressure vessels and pressure relief devices, shall comply with this chapter and ASHRAE 15. Refrigeration systems containing carbon dioxide as the refrigerant shall also comply with BSR/IIAR CO2.

Add new standard(s) as follows:

IIAR

International Institute of Ammonia Refrigeration
1001 N. Fairfax Street, Suite 503
Arlington VA 22314

BSR/IIAR CO2-2021: Safety Standard for Closed-Circuit Carbon Dioxide Refrigeration Systems

Staff Analysis: A review of the standards proposed for inclusion in the code, BSR/IIAR CO2: Safety Standard for Closed-Circuit Carbon Dioxide Refrigeration Systems, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement: BSR/IIAR CO2 is in the process of completion for issuance in 2021. It is a new standard governing refrigeration systems that use carbon dioxide as the refrigerant, and it is designed to be a companion to ASHRAE 15, providing additional design requirements that are unique to carbon dioxide systems to supplement ASHRAE 15 and going beyond the scope of ASHRAE 15 by regulating the complete life-cycle of carbon dioxide systems. Carbon dioxide has become increasingly popular as an industrial refrigerant because it is considered efficient and climate friendly. Including IIAR's new standard will assure that these systems are properly regulated.

Cost Impact: The code change proposal will increase the cost of construction
The new standard includes requirements that reflect industry good practice but are not currently mandatory. By including the standard as a mandatory reference standard in the IMC, following industry good practice will no longer be optional for carbon dioxide systems.

M70-21

IMC: 1101.1.2, IIAR Chapter 15 (New)

Proponents: Jeffrey Shapiro, representing IIAR (jeff.shapiro@intlcodeconsultants.com)

2021 International Mechanical Code

Revise as follows:

1101.1.2 Ammonia refrigerant. Refrigeration systems using ammonia as the refrigerant shall comply with IIAR 2, IIAR 3, IIAR 4, ~~and~~ IIAR 5, and IIAR 6 and shall not be required to comply with this chapter.

Add new standard(s) as follows:

IIAR

International Institute of Ammonia Refrigeration
1001 N. Fairfax Street, Suite 503
Arlington VA 22314

ANSI/IIAR 6-2019: Standard for Inspection, Testing, and Maintenance of Closed-Circuit Ammonia Refrigeration Systems

Staff Analysis: A review of the standards proposed for inclusion in the code, IIAR 6: Standard for Inspection, Testing, and Maintenance of Closed-Circuit Ammonia Refrigeration Systems, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement: IIAR 6 is a new standard covering inspection, testing and maintenance of closed-circuit ammonia refrigeration systems and is part of the suite of IIAR standards regulating ammonia refrigeration systems referenced by the IFC and IMC. Because this standard addresses system maintenance, which is part of the IMC scope in Section 101.2, it is important to have the standard referenced by the IMC. It adds mandatory system maintenance regulations covering ammonia refrigeration to the IMC to help assure safe operation of these systems and provides inspectors with a needed tool for ensuring compliance.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The proposed standard is scoped to inspection, testing and maintenance and does not impact construction.

M71-21

IMC: 1101.2, TABLE 1101.2

Proponents: Julius Ballanco, representing Daikin US (JBENGINEER@aol.com)

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 at the same time that the refrigerant piping rewrite was added. This resulted in refrigerant fitting requirements appearing in two locations. The appropriate location for referencing fitting requirements in in Section 1107. It should be noted that UL 207 is included in 1107.5. By deleting this row, it avoids confusion in which section applies.

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.

M71-21

M72-21

IMC: 1101.2.1 (New), UL Chapter 15

Proponents: Helen Walter-Terrinoni, AHRI, representing AHRI; Julius Ballanco, representing Daikin US (JBENGINEER@aol.com); Andrew Klein, representing The Chemours Company (andrew@asklein.com); Joe Nebbia, Newport Partners, representing Natural Resources Defense Council (jnebbia@newportpartnersllc.com)

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

Staff Analysis: A review of the standards proposed for inclusion in the code, UL/CSA 60335-2-40-2019: Household and Similar Electrical Appliances—Safety—Part 2-40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

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 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.

NRDC Reason:

By adding a requirement for A2L, A2, A3, and B1 to comply with UL 484, UL/CSA 60335-2-40 or UL/CSA 60335-2-89, the code will clarify for the user what safety standards should be used for equipment with these refrigerants. The proposed update of referenced standard UL 484, UL/CSA 60335-2-40 to the 2019 version provides new safety measures for equipment using the A2L refrigerant class, which were not separately addressed in earlier versions of the standard. These changes are especially important in the case of A2L refrigerants, which are expected to increase in use as a substitute for hydrofluorocarbon (HFC) refrigerants. HFCs are extremely potent greenhouse gases and in December 2020 the U.S. Congress passed a new law that will require an 85% economy-wide phasedown of HFC refrigerants over the next 15 years. The phasedown is expected to avoid HFC emissions of 900 million metric tons of CO2-equivalent by 2035. In addition, 9 states - 8 of which adopt the ICC codes - have already prohibited the use of HFC refrigerants in several high volume applications.1 Human comfort systems account for more HFC use than any other end-use application in the U.S., so a large portion of the HFC reductions are expected to come from them. A2L refrigerants have significantly lower global warming potential than A1-class HFCs, so A2L use is a key part of the HFC reduction plan. These restrictions on the supply of HFC refrigerant will drive up consumption of A2L substitutes. Permitting use of alternative refrigerants, including A2L refrigerants, in high probability systems for human comfort will enable states and local jurisdictions to meet their heating and cooling needs while also complying with applicable HFC regulations. Without this change, jurisdictions adopting the code will be forced to enact their own amendments to the code in order to support their HFC reduction goals. This change allows the ICC to provide an off the shelf solution to those jurisdictions.

Cost Impact: 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.

M73-21

IMC: 202 (New), 1101.7, 1102.2.1

Proponents: Emily Toto, ASHRAE, representing ASHRAE (etoto@ashrae.org)

2021 International Mechanical Code

Add new definition as follows:

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

Delete and substitute 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 change of refrigerant shall be approved by the owner.
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.

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).

Bibliography: 1. ANSI/ASHRAE 15-2019, Safety Standard for Refrigeration Systems
2. ANSI/ASHRAE 34-2019, Designation and Safety Classification of Refrigerants

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.

M74-21

IMC: TABLE 1103.1

Proponents: Emily Toto, ASHRAE, representing ASHRAE (etoto@ashrae.org)

2021 International Mechanical Code

Revise as follows:

TABLE 1103.1
REFRIGERANT CLASSIFICATION, AMOUNT AND OEL

CHEMICAL REFRIGERANT	FORMULA	CHEMICAL NAME OF BLEND	REFRIGERANT SAFETY GROUP CLASSIFICATION	AMOUNT OF REFRIGERANT PER OCCUPIED SPACE						OEL[g]
				RCL			LFL			
				~~Pounds per 1,000 cubic feet~~ lb/MCf	ppm	g/m^3	lb/MCf	ppm	g/m^3	~~OEL[g]~~ ppm
R-11[d,c]	CCl_3F	trichlorofluoromethane	A1	0.39	1,100	~~6.2~~ 6.1				~~C~~1,00
R-12[d,c]	CCl_2F_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_3I	trifluoroiodomethane	A1	1.0	2,000	16				500
R-14	CF_4	tetrafluoromethane (carbon tetrafluoride)	A1	25	110,000	400				1,000
R-22	$CHClF_2$	chlorodifluoromethane	A1	13	59,000	210				1,000
R-23	CHF_3	trifluoromethane (fluoroform)	A1	7.3	41,000	120				1,000
R-30	CH_2Cl_2	dichloromethane (methylene chloride)	B1	—	—	—				—
R-31	CH_2ClF	chlorofluoromethane	—	—	—	—				—
R-32	CH_2F_2	difluoromethane (methylene fluoride)	A2L~~A2~~[e]	4.8	36,000	77	19.1	144,000	306	1,000
R-40	CH_3Cl	chloromethane (methyl chloride)	B2	—	—	—				—
R-41	CH_3F	fluoromethane (methyl fluoride)	—	—	—	—				—
R-50	CH_4	methane	A3	—	—	—		50,000		1,000
R-113[d,c]	CCl_2FCClF_2	1,1,2-trichloro-1,2,2-trifluoroethane	A1	1.2	2,600	20				1,000
R-114[d,c]	$CClF_2CClF_2$	1,2-dichloro-1,1,2,2-tetrafluoroethane	A1	8.7	20,000	140				1,000
R-115	$CClF_2CF_3$	chloropentafluoroethane	A1	47	120,000	760				1,000
R-116	CF_3CF_3	hexafluoroethane	A1	34	97,000	550				1,000
R-123	$CHCl_2CF_3$	2,2-dichloro-1,1,1-trifluoroethane	B1	3.5	9,100	57				50
R-124	$CHClFCF_3$	2-chloro-1,1,1,2-tetrafluoroethane	A1	3.5	10,000	56				1,000
R-125	CHF_2CF_3	pentafluoroethane	A1	23	75,000	370				1,000
R-134a	CH_2FCF_3	1,1,1,2-tetrafluoroethane	A1	13	50,000	210				1,000
R-141b	CH_3CCl_2F	1,1-dichloro-1-fluoroethane	—	0.78	2,600	12	17.8	60,000	287	500
R-142b	CH_3CClF_2	1-chloro-1,1-difluoroethane	A2	5.1	20,000	~~83~~ 82	20.4	80,000	329	1,000
R-143a	CH_3CF_3	1,1,1-trifluoroethane	A2L~~A2~~[e]	~~4.5~~ 4.4	21,000	70	17.5	82,000	282	1,000
R-152a	CH_3CHF_2	1,1-difluoroethane	A2	2.0	12,000	32	8.1	48,000	130	1,000
R-170	CH_3CH_3	ethane	A3	0.54	7,000	~~8.7~~ 8.6	2.4	31,000	38	1,000
R-E170	CH_3OCH_3	Methoxymethane (dimethyl ether)	A3	1.0	8,500	16	4.0	34,000	64	1,000
R-218	$CF_3CF_2CF_3$	octafluoropropane	A1	43	90,000	690				1,000

R-227ea	CF_3CHFCF_3	1,1,1,2,3,3,3-heptafluoropropane	A1	36	84,000	580				1,000
R-236fa	$CF_3CH_2CF_3$	1,1,1,3,3,3-hexafluoropropane	A1	21	55,000	340				1,000
R-245fa	$CHF_2CH_2CF_3$	1,1,1,3,3-pentafluoropropane	B1	12	34,000	190				300
R-290	$CH_3CH_2CH_3$	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-400~~d~~ c	zeotrope	R-12/114 (50.0/50.0)	A1	10	28,000	160				1,000
R-400~~d~~ c	zeotrope	R-12/114 (60.0/40.0)	A1	11	30,000	170				1,000
R-401A	zeotrope	R-22/152a/124 (53.0/13.0/34.0)	A1	6.6	27,000	110				1,000
R-401B	zeotrope	R-22/152a/124 (61.0/11.0/28.0)	A1	7.2	30,000	120				1,000
R-401C	zeotrope	R-22/152a/124 (33.0/15.0/52.0)	A1	5.2	20,000	84				1,000
R-402A	zeotrope	R-125/290/22 (60.0/2.0/38.0)	A1	17	66,000	270				1,000
R-402B	zeotrope	R-125/290/22 (38.0/2.0/60.0)	A1	15	63,000	240				1,000
R-403A	zeotrope	R-290/22/218 (5.0/75.0/20.0)	A2	7.6	33,000	120				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-404A	zeotrope	R-125/143a/134a (44.0/52.0/4.0)	A1	31	130,000	500				1,000
R-405A	zeotrope	R-22/152a/142b/C318 (45.0/7.0/5.5/42.5)	—	16	57,000	260				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
R-407A	zeotrope	R-32/125/134a (20.0/40.0/40.0)	A1	19	83,000	300				1,000
R-407B	zeotrope	R-32/125/134a (10.0/70.0/20.0)	A1	21	79,000	330				1,000
R-407C	zeotrope	R-32/125/134a (23.0/25.0/52.0)	A1	18	81,000	290				1,000
R-407D	zeotrope	R-32/125/134a (15.0/15.0/70.0)	A1	16	68,000	250				1,000
R-407E	zeotrope	R-32/125/134a (25.0/15.0/60.0)	A1	17	80,000	280				1,000
R-407F	zeotrope	R-32/125/134a (30.0/30.0/40.0)	A1	20	95,000	320				1,000
R-407G	zeotrope	R-32/125/134a (2.5/2.5/95.0)	A1	13	52,000	210				1,000
R-407H	zeotrope	R-32/125/134a (32.5/15.0/52.5)	A1	19	92,000	300				1,000
R-407I	zeotrope	R-32/125/124a (19.5/8.5/72.0)	A1	16	71,100	250				1,000
R-408A	zeotrope	R-125/143a/22 (7.0/46.0/47.0)	A1	21	~~95,000~~ 94,000	~~340~~ 330				1,000
R-409A	zeotrope	R-22/124/142b (60.0/25.0/15.0)	A1	7.1	29,000	110				1,000
R-409B	zeotrope	R-22/124/142b (65.0/25.0/10.0)	A1	7.3	30,000	120				1,000
R-410A	zeotrope	R-32/125 (50.0/50.0)	A1	26	140,000	420				1,000
R-410B	zeotrope	R-32/125 (45.0/55.0)	A1	27	140,000	430				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-414A	zeotrope	R-22/124/600a/142b (51.0/28.5/4.0/16.5)	A1	6.4	26,000	100				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-415A	zeotrope	R-22/152a (82.0/18.0)	A2	2.9	14,000	47	11.7	56,000	187.9	1,000

~~R-415A~~	~~zeotrope~~	~~R-22/152a (82.0/18.0)~~	~~A2~~	~~2.9~~	~~14,000~~	~~47~~	~~11.7~~	~~56,000~~	~~187.9~~	~~1,000~~
R-415B	zeotrope	R-22/152a (25.0/75.0)	A2	2.1	12,000	34	8.4	47,000	135.1	1,000
R-416A	zeotrope	R-134a/124/600 (59.0/39.5/1.5)	A1	3.9	14,000	62				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-417C	zeotrope	R-125/134a/600 (19.5/78.8/1.7)	A1	5.4	21,000	87				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-421A	zeotrope	R-125/134a (58.0/42.0)	A1	17	61,000	280				1,000
R-421B	zeotrope	R-125/134a (85.0/15.0)	A1	21	69,000	330				1,000
R-422A	zeotrope	R-125/134a/600a (85.1/11.5/3.4)	A1	18	63,000	290				1,000
R-422B	zeotrope	R-125/134a/600a (55.0/42.0/3.0)	A1	16	56,000	250				1,000
R-422C	zeotrope	R-125/134a/600a (82.0/15.0/3.0)	A1	18	62,000	290				1,000
R-422D	zeotrope	R-125/134a/600a (65.1/31.5/3.4)	A1	16	58,000	260				1,000
R-422E	zeotrope	R-125/134a/600a (58.0/39.3/2.7)	A1	16	57,000	260				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-425A	zoetrope	R-32/134a/227ea (18.5/69.5/12.0)	A1	16	72,000	260				1,000
R-426A	zeotrope	R-125/134a/600a/601a (5.1/93.0/1.3/0.6)	A1	5.2	20,000	83				990
R-427A	zeotrope	R-32/125/143a/134a (15.0/25.0/10.0/50.0)	A1	18	79,000	290				1,000
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
R-432A	zeotrope	R-1270/E170 (80.0/20.0)	A3	0.13	1,200	2.1	2.4	22,000	39.2	~~700~~ 550
R-433A	zeotrope	R-1270/290 (30.0/70.0)	A3	0.34	3,100	5.5	2.4	20,000	32.4	~~880~~ 760
R-433B	zeotrope	R-1270/290 (5.0-95.0)	A3	~~0.51~~ 0.39	~~4,500~~ 3,500	~~8.1~~ 6.3	2.0	18,000	32.1	950
R-433C	zeotrope	R-1270/290 (25.0-75.0)	A3	0.41	~~3,600~~ 3,700	~~6.6~~ 6.5	2.0	18,000	83.8	790
R-434A	zeotrope	R-125/143a/600a (63.2/18.0/16.0/2.8)	A1	20	73,000	320				1,000
R-435A	zeotrope	R-E170/152a (80.0/20.0)	A3	1.1	8,500	17	4.3	34,000	68.2	1,000
~~R-436A~~	~~zeotrope~~	~~R-290/600a (56.0/44.0)~~	~~A3~~	~~0.50~~	~~4,000~~	~~8.1~~	~~2.0~~	~~16,000~~	~~32.3~~	~~1,000~~

~~R-436A~~	~~zeotrope~~	~~R-290/600a (56.0/44.0)~~	~~A3~~	~~0.50~~	~~4,000~~	~~8.1~~	~~2.0~~	~~16,000~~	~~32.3~~	~~1,000~~
R-436B	zeotrope	R-290/600a (52.0/48.0)	A3	0.51	4,000	~~8.1~~ 8.2	2.0	16,000	32.7	1,000
R-436C	zeotrope	R-290/600a (95.0/5.0)	A3	0.57	5,000	9.1	2.3	20,000	36.5	1,000
R-437A	zeotrope	R-125/134a/600/601 (19.5/78.5/1.4/0.6)	A1	~~5.0~~ 5.1	19,000	82				990
R-438A	zeotrope	R-32/125/134a/600/601a (8.5/45.0/44.2/1.7/0.6)	A1	4.9	20,000	79				990
R-439A	zeotrope	R-32/125/600a (50.0/47.0/3.0)	A2	4.7	26,000	76	18.9	104,000	303.3	~~990~~ 1,000
R-440A	zeotrope	R-290/134a/152a (0.6/1.6/97.8)	A2	1.9	12,000	31	7.8	46,000	124.7	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	2.0	16,000	31.7	1,000
R-442A	zeotrope	R-32/125/134a/152a/227ea (31.0/31.0/30.0/3.0/5.0)	A1	21	100,000	330				1,000
R-443A	zeotrope	R-1270/290/600a (55.0/40.0/5.0)	A3	0.19	1,700	3.1	2.2	20,000	35.6	~~580~~ 640
R-444A	zeotrope	R-32/152a/1234ze(E) (12.0/5.0/83.0)	A2L~~A2~~*	5.1	21,000	81	19.9	82,000	324.8	850
R-444B	zeotrope	R-32/152a/1234ze(E) (41.5/10.0/48.5)	A2L~~A2~~*	4.3	23,000	69	17.3	93,000	277.3	~~890~~ 930
R-445A	zeotrope	R-744/134a/1234ze(E) (6.0/9.0/85.0)	A2L~~A2~~*	4.2	16,000	67	2.7	63,000	347.4	930
R-446A	zeotrope	R-32/1234ze(E)/600 (68.0/29.0/3.0)	A2L~~A2~~*	2.5	16,000	39	13.5	62,000	217.4	960
R-447A	zeotrope	R-32/125/1234ze(E) (68.0/3.5/28.5)	A2L~~A2~~*	2.6	16,000	42	18.9	65,000	303.5	~~900~~ 960
R-447B	zeotrope	R-32/125/1234ze(E) (68.0/8.0/24.0)	A2L~~A2~~*	~~23~~ 2.6	~~30,000~~ 16,000	~~360~~ 42	20.6	121,000	312.7	970
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-449B	zeotrope	R-32/125/1234yf/134a (25.2/24.3/23.2/27.3)	A1	23	100,000	370				850
R-449C	zeotrope	R-32/125/1234yf/134a (20.0/20.0/31.0/29.0)	A1	23	98,000	360				800
R-450A	zeotrope	R-134a/1234ze(E) (42.0/58.0)	A1	20	72,000	320				880
R-451A	zeotrope	R-1234yf/134a (89.8/10.2)	A2L~~A2~~*	~~5.3~~ 5.0	18,000	81	20.3	70,000	326.6	~~520~~ 530
R-451B	zeotrope	R-1234yf/134a (88.8/11.2)	A2L~~A2~~*	~~5.3~~ 5.0	18,000	81	20.3	70,000	326.6	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~~A2~~*	~~23~~ 4.8	30,000	~~360~~ 77	19.3	119,000	310.5	870
R-452C	zeotrope	R-32/125/1234yf (12.5/61.0/26.5)	A1	27	100,000	430				~~800~~ 810
R-453A	zeotrope	R-32/125/134a/227ea/600/601a (20.0/20.0/53.8/5.0/0.6/0.6)	A1	7.8	34,000	120				1,000
R-454A	zeotrope	R-32/1234yf (35.0/65.0)	A2L~~A2~~*	~~28~~ 3.2	16,000	~~450~~ 52	18.3	63,000	293.9	690

R-454B	zeotrope	R-32/1234yf (68.9/31.1)	A2L~~A2~~[e]	~~22~~ 3.1	19,000	~~360~~ 49	22.0	77,000	352.6	850
R-454C	zeotrope	R-32/1234yf (21.5/78.5)	A2L~~A2~~[e]	~~29~~ 4.4	19,000	~~460~~ 71	18.0	62,000	289.5	620
R-455A	zeotrope	R-744/32/1234yf (3.0/21.5/75.5)	A2L~~A2~~[e]	~~23~~ 4.9	~~30,000~~ 22,000	~~380~~ 79	26.9	118,000	432.1	650
R-456A	zeotrope	R-32/134a/1234ze(E) (6.0/45.0/49.0)	A1	20	77,000	320				900
R-457A	zeotrope	R-32/1234yf/152a (18.0/70.0/12.0)	A2L~~A2~~[e]	~~25~~ 3.4	15,000	~~400~~ 54	13.5	60,000	216.3	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-458A	zeotrope	R-32/125/134a/227ea/236fa (20.5/4.0/61.4/13.5/0.6)	A1	18	76,000	280				1,000
R-459A	zeotrope	R-32/1234yf/1234ze(E) (68.0/26.0/6.0)	A2L~~A2~~[e]	~~23~~ 4.3	27,000	~~360~~ 69	17.4	107,000	278.7	870
R-459B	zeotrope	R-32/1234yf/1234ze(E) (21.0/69.0/10.0)	A2L~~A2~~[e]	30	~~16,000~~ 25,000	~~470~~ 92	23.3	99,000	373.5	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-460B	zeotrope	R-32/125/134a/1234ze(E) (28.0/25.0/20.0/27.0)	A1	25	120,000	400				950
R-460C	zeotrope	R-32/125/134a/1234ze(E) (2.5/2.5/46.0/49.0)	A1	20	73,000	310				900
R-461A	zeotrope	R-125/143a/134a/227ea/600a (55.0/5.0/32.0/5.0/3.0)	A1	17	61,000	270				1,000
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	16.6	105,000	265.8	1,000
R-463A	zeotrope	R-744/32/125/1234yf/134a (6.0/36.0/30.0/14.0/14.0)	A1	19	98,000	300				990
R-464A	zeotrope	R-32/125/1234ze(E)/227ea (27.0/27.0/40.0/6.0)	A1	27	120,000	430				930
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-32/125/13I1 (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	18,000	66				610
R-469A	zeotrope	R-744/R-32/R-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	77,000	270				1,100
R-470B	zeotrope	R-744/32/125/134a/1234ze(E)/227ea (10.0/17.0/19.0/7.0/44.0/3.0)	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[e] [d]	azeotrope	R-12/152a (73.8/26.2)	A1	~~7.6~~ 7.4	~~30,000~~ 29,000	120				1,000
R-501[d] [c]	azeotrope	R-22/12 (75.0/25.0)	A1	13	54,000	210				1,000

R-502~~e~~ d	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~~d~~ c	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-508A	azeotrope	R-23/116 (39.0/61.0)	A1	14	55,000	220				1,000
R-508B	azeotrope	R-23/116 (46.0/54.0)	A1	13	52,000	200				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-513A	azeotrope	R-1234yf/134a (56.0/44.0)	A1	20	72,000	320				650
R-513B	azeotrope	R-1234yf/134a (58.5/41.5)	A1	21	74,000	330				640
R-514A	azeotrope	R-1336mzz(S)/1130(E) (74.7/25.3)	B1	0.86	2,400	14				320
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	$CH_3CH_2CH_2CH_3$	butane	A3	0.15	1,000	2.4	3.0	20,000	48	1,000
R-600a	$CH(CH_3)_2CH_3$	2-methylpropane (isobutane)	A3	0.59	4,000	~~9.6~~ 9.5	2.4	16,000	38	1,000
R-601	$CH_3CH_2CH_2$ CH_2CH_3	pentane	A3	0.18	1,000	2.9	2.2	12,000	35	600
R-601a	$(CH_3)_2CHCH_2CH_3$	2-methylbutane (isopentane)	A3	0.18	1,000	2.9	2.4	13,000	38	600
R-610	$CH_3CH_2OCH_2CH_3$	ethoxyethane (ethyl ether)	—	—	—	—				400
R-611	$HCOOCH_3$	methyl formate	B2	—	—	—				100
R-717	NH_3	ammonia	B2L	0.014	320	0.22	7.2	167,000	116	25
R-718	H_2O	water	A1	—	—	—				—
R-744	CO_2	carbon dioxide	A1	4.5	40,000	72				5,000
R-1130(E)	CHCl=CHCl	trans-1,2-dichloroethene	~~B1~~ B2	0.25	1,000	4	16	65,000	258	200
R-1132a	$CF_2=CH_2$	1,1-difluoroethylene	A2	2.0	13,000	33	8.1	50,000	131	500
R-1150	$CH_2=CH_2$	ethene (ethylene)	A3	—	—	—	2.2	31,000	36	200
R-1224yd(Z)	$CF_3CF=CHCl$	(Z)-1-chloro-2,3,3,3-tetrafluoroethylene	A1	23	60,000	~~360~~ 370				1,000
R-1233zd(E)	$CF_3CH=CHCl$	trans-1-chloro-3,3,3-trifluoro-1-propene	A1	5.3	16,000	85				800
R-1234yf	$CF_3CF=CH_2$	2,3,3,3-tetrafluoro-1-propene	A2L~~A2~~ ~~e~~	~~4.7~~ 4.5	16,000	75	18.0	62,000	289	500
R-1234ze(E)	$CF_3CH=CHF$ $CF_3CH=CFH$	trans-1,3,3,3-tetrafluoro-1-propene	A2L~~A2~~ ~~e~~	4.7	16,000	~~75~~ 76	18.8	65,000	303	800
R-1270	$CH_3CH=CH_2$	Propene (propylene)	A3	0.1	1,000	1.7				500
R-1336mzz(E)	$CF_3CHCHCF_3$	trans 1,1,1,4,4,4-hexafluoro-2-butene	A1	3.0	7,200	48				400
R-1336mzz(Z)	$CF_3CHCHCF_3$	cis-1,1,1,4,4,4-hexaflouro-2-butene	A1	~~5.4~~ 5.2	13,000	~~87~~ 84				500

For SI: 1 pound = 0.454 kg, 1 cubic foot = 0.0283m^3

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.~~

c d. Class I ozone depleting substance; prohibited for new installations.

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

Reason Statement: The Refrigerant Classifications (except Degrees of Hazard) are determined by ASHRAE SSPC 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.

Bibliography: ASHRAE Standard 34-2019, Designation and Safety Classification of Refrigerants, with addenda c, d, e, f, g, h, l, m, p, t, u, x, y - https://www.ashrae.org/standards-research--technology/standards-addenda

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.

M74-21

M75-21

IMC: 1104.3.1, 1104.3.2, TABLE 1104.3.2

Proponents: Helen Walter-Terrinoni, AHRI, representing AHRI (helen.a.walter-terrinoni@outlook.com); Julius Ballanco, representing Daikin US (JBENGINEER@aol.com); Andrew Klein, representing The Chemours Company (andrew@asklein.com); Joe Nebbia, Newport Partners, representing Natural Resources Defense Council (jnebbia@newportpartnersllc.com)

International Mechanical Code

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:

~~TABLE 1104.3.2~~
~~MAXIMUM PERMISSIBLE QUANTITIES OF REFRIGERANTS~~

~~TYPE OF REFRIGERATION SYSTEM~~	~~MAXIMUM POUNDS FOR VARIOUS OCCUPANCIES~~			
	~~Institutional~~	~~Public a ssembly~~	~~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.

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 system used for human comfort. There is no impact to the cost of construction.

M75-21

M76-21

IMC: 1104.3.3

Proponents: Greg Johnson, representing Codes & Standards International (gjohnsonconsulting@gmail.com); Jay Peters, representing Vertiv (peters.jay@me.com); Barry Greive, representing Target Corporation (barry.greive@target.com); David Collins, representing The Preview Group, Inc. (dcollins@preview-group.com)

2021 International Mechanical Code

Revise as follows:

1104.3.3 All occupancies. The total of all Group A2, B2, A3 and B3 refrigerants shall not exceed 1,100 pounds (499 kg) except where*approved*.

> **Exception:** The total of Group A2L refrigerants in industrial occupancies shall not be limited provided the quantity in a single independent circuit would not exceed 25 percent of the lower flammability limit (LFL) upon release to the space.

Reason Statement: The code currently does not clearly identify A2L refrigerants as being a separate classification from Group A2 refrigerants. For example, Section 1106.3 provides specific requirements for Groups A2, A3, B2 and B3 refrigerants but then creates an exception for A2L refrigerants leaving the user to infer that Group A2L must be a subset of Group A2.
This proposal clarifies that refrigerant limits applicable to Group A2 refrigerants are not applicable to Group A2L refrigerants used in industrial occupancies where a refrigerant release would not exceed 25 percent of the lower flammability limit.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
No actual changes in construction are associated with this change.

M77-21 Part I

IMC: 1106.3

Proponents: Julius Ballanco, representing Daikin US (JBENGINEER@aol.com)

THIS IS A TWO PART CODE CHANGE. PART I WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART II WILL BE HEARD BY THE INTERNATIONAL RESIDENTIAL MECHANICAL/PLUMBING CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES

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.~~

M77-21 Part II

IFC: [M] 608.17

Proponents: Julius Ballanco, representing Daikin US (jbengineer@aol.com)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART 2 WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Fire Code

Revise as follows:

[M] 608.17 Electrical equipment. Where refrigerant of Groups A2, A3, B2 and B3, as defined in the *International Mechanical Code*, are used, refrigeration machinery rooms shall conform to the Class I, Division 2, hazardous location classification requirements of NFPA 70.

~~**Exceptions**~~ **Exception:**

1. Ammonia machinery rooms that are provided with ventilation in accordance with Section 1101.1.2, Exception 1 of the International Mechanical Code.
2. ~~Machinery rooms for systems containing Group A2L refrigerants that are provided with ventilation in accordance with Section 608.18.~~

Reason Statement: The second exception in the Fire Code and the exception in the Mechanical Code are no long necessary with the revision in the 2021 International Mechanical Code regarding refrigerant classification. A2L is a separate group of refrigerant. Both sections state that the requirements apply to A2, A3, B2, and B3. Hence, A2L is not included in the requirements so the two exceptions proposed for deletion no longer are needed.
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.

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.

M78-21 Part I

IMC: 1106.4, 1106.4.1 (New), 1106.4.2, TABLE 1106.4.2 (New), TABLE 1106.4.2, 1106.4.3

Proponents: Emily Toto, ASHRAE, representing ASHRAE (etoto@ashrae.org)

THIS IS A TWO PART CODE CHANGE. PART I WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART II WILL BE HEARD BY THE INTERNATIONAL FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Mechanical Code

Delete and substitute as follows:

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

1106.4 Group A2L and B2L Refrigerant. 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 Temperatures. Open flame-producing devices or continuously operating hot surfaces over 1290 °F (700 °C) shall not be permanently installed in the room.

Delete and substitute as follows:

~~**1106.4.2 Emergency ventilation system.** 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.~~

1106.4.2 Refrigerant Detector. 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

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

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~~

Delete and substitute as follows:

~~**1106.4.3 Emergency ventilation system discharge.** 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*.~~

1106.4.3 Mechanical Ventilation. The machinery room shall have a mechanical ventilation system complying with ASHRAE 15.

M78-21 Part I

M78-21 Part II

IMC: [F] 1106.4.1

Proponents: Emily Toto, ASHRAE, representing ASHRAE (etoto@ashrae.org)

THIS IS A TWO PART CODE CHANGE. PART 1 WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. PART 2 WILL BE HEARD BY THE INTERNATIONAL FIRE CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

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 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 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-only-versions-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.

Bibliography: 1. ANSI/ASHRAE 15-2019, Safety Standard for Refrigeration Systems.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This change clarifies the requirements for ventilation of a machinery room. The use of A2L refrigerant is optional.

M79-21

IMC: 1107.3, 1107.6, 1107.7, 1108.1, 1108.3.3, 1109.8.1, 1109.8.2, 1110.3, 1110.5.1

Proponents: Emily Toto, ASHRAE, representing ASHRAE (etoto@ashrae.org)

2021 International Mechanical Code

Revise as follows:

1107.3 Materials rating. Materials, joints and connections shall be rated for the operating temperature and pressure of the refrigerant system. Materials shall be suitable for the type of refrigerant and type of lubricant in the ~~refrigerant~~ refrigeration system. Magnesium alloys shall not be used in contact with any halogenated refrigerants. Aluminum, zinc, magnesium and their alloys shall not be used in contact with R-40 (methyl chloride).

1107.6 Valves. Valves shall be of materials that are compatible with the type of piping material, refrigerants and oils in the system. Valves shall be *listed* and *labeled* and rated for the temperatures and pressures of the ~~refrigerant~~ refrigeration systems in which the valves are installed.

1107.7 Flexible connectors, expansion and vibration compensators. Flexible connectors and expansion and vibration control devices shall be *listed* and *labeled* for use in ~~refrigerant~~ refrigeration systems.

1108.1 Approval. Joints and connections shall be of an *approved* type. Joints and connections shall be tight for the pressure of the ~~refrigerant~~ refrigeration system when tested in accordance with Section 1110.

1108.3.3 Soldered joints. Joint surfaces to be soldered shall be cleaned and a flux conforming to ASTM B813 shall be applied. The joint shall be soldered with a solder conforming to ASTM B32. Solder joints shall be limited to ~~refrigerant~~ refrigeration systems using Group A1 refrigerant and having a pressure of less than or equal to 200 psi (1378 kPa).

1109.8.1 ~~Refrigerating~~ Refrigeration systems containing more than 6.6 pounds (3.0 kg) of refrigerant. Stop valves shall be installed in the following locations on ~~refrigerating~~ refrigeration systems containing more than 6.6 pounds (3.0 kg) of refrigerant:

1. The suction inlet of each compressor, compressor unit or condensing unit.
2. The discharge outlet of each compressor, compressor unit or condensing unit.
3. The outlet of each liquid receiver.

1109.8.2 ~~Refrigerating~~ Refrigeration systems containing more than 100 pounds (45 kg) of refrigerant. In addition to stop valves required by Section 1109.8.1, systems containing more than 100 pounds (45 kg) of refrigerant shall have stop valves installed in the following locations:

1. Each inlet of each liquid receiver.
2. Each inlet and each outlet of each condenser where more than one condenser is used in parallel.

Exceptions:

1. Stop valves shall not be required at the inlet of a receiver in a condensing unit nor at the inlet of a receiver that is an integral part of the condenser.
2. Systems utilizing nonpositive displacement compressors.

1110.3 Test gases. The medium used for pressure testing the ~~refrigerant~~ refrigeration system shall be one of the following inert gases: oxygen-free nitrogen, helium or argon. For R-744 ~~refrigerant~~ refrigeration systems, carbon dioxide shall be allowed as the test medium. For R-718 ~~refrigerant~~ refrigeration systems, water shall be allowed as the test medium. Oxygen, air, combustible gases and mixtures containing such gases shall not be used as a test medium. Systems erected on the premises with tubing not exceeding $^{5}/_{8}$ inch (15.9 mm) outside diameter shall be allowed to use the refrigerant identified on the nameplate label or marking as the test medium.

1110.5.1 Joints and refrigerant-containing parts in air ducts. Joints and all refrigerant-containing parts of a ~~refrigerating~~ refrigeration system located in an air duct of an air-conditioning system that conveys conditioned air to and from human-occupied spaces shall be tested at a pressure of 150 percent of the higher of the design pressure or pressure relief device setting.

Reason Statement: This proposed change cleans up the language added during the last cycle. ASHRAE 15 has used refrigerant systems and refrigeration systems interchangeably for many years. ASHRAE SSPC 15 has voted to convert all of the text in the standard to “refrigeration systems.” This change will keep the Mechanical Code consistent with ASHRAE 15.

Bibliography: ASHRAE 15-2019, Safety Standard for Refrigeration Systems

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This proposal is editorial text clarification only.

P46-21

IPC: 412.10

Proponents: Jason Shank, ASSE International, representing ASSE International (jshank@plumbers55.com)

2021 International Plumbing Code

Revise as follows:

412.10 Head shampoo sink faucets. Head shampoo sink faucets shall be supplied with hot water that is limited to not more than 120°F (49°C). Each faucet shall have integral check valves to prevent crossover flow between the hot and cold water supply connections. The means for regulating the maximum temperature shall be one of the following:

1. A limiting device conforming to ASSE 1070/ASME A112.1070/CSA B125.70.
2. A water heater conforming to ASSE ~~1082~~ 1084.
3. A temperature-actuated, flow-reduction device conforming to ASSE 1062.

Reason Statement: ASSE 1082 is designed for the following - This standard is for water heaters that control the outlet temperature to specific limits and are installed within a hot water distribution system but not at point-of-use.
Being this code section is in regards to point of use the ASSE 1082 is the wrong application. The correct application is the ASSE 1084 which is designed for the following - Water heaters covered by this standard have a cold water inlet connection, a means of heating the water, a means of controlling the water temperature, a means of limiting the temperature to a maximum of 120 °F (48.9 °C), and have an outlet connection to connect to downstream fixture fittings.
This water heater is intended to supply tempered water at point of use in order to reduce and control the risks of scalding. This water heater is not intended to limit thermal shock. This water heater is not a substitute for an automatic compensative valve complying with ASSE 1016 / ASME A112.1016 / CSA B125.16.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The change still is requiring a TLD.

P48-21

IPC: 412.5

Proponents: Jason Shank, ASSE International, representing ASSE International

2021 International Plumbing Code

Revise as follows:

412.5 Bathtub and whirlpool bathtub valves. Bathtubs and whirlpool bathtub valves shall have or be supplied by a water-temperature-limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70 or by a water heater complying with ~~ASSE 1082 or~~ ASSE 1084, except where such valves are combination tub/shower valves in accordance with Section 412.3. The water-temperature-limiting device required by this section shall be equipped with a means to limit the maximum setting of the device to 120°F (49°C), and, where adjustable, shall be field adjusted in accordance with the manufacturer's instructions to provide hot water at a temperature not to exceed 120°F (49°C). Access shall be provided to water-temperature-limiting devices that conform to ASSE 1070/ASME A112.1070/CSA B125.70.

Exception: *Access* shall not be required for nonadjustable water-temperature-limiting devices that conform to ASSE 1070/ASME A112.1070/CSA B125.70 and are integral with a fixture fitting, provided that the fixture fitting itself can be accessed for replacement.

Reason Statement: ASSE 1082 is designed for the following - This standard is for water heaters that control the outlet temperature to specific limits and are installed within a hot water distribution system but not at point-of-use.
ASSE 1082 is not for point of use which is what this section of the Code is addressing.

Bibliography: N/A

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

P54-21 Part I

IPC: 501.9 (New)

Proponents: Jeremy Brown, representing NSF International (brown@nsf.org)

2021 International Plumbing Code

Add new text as follows:

501.9 Lead Content. Water heaters shall comply with NSF 372 and shall have a weighted average lead content of 0.25% or less.

Reason Statement: Section 605.2.1 was created to implement lead content requirements of the US Safe Drinking Water Act (SDWA). In September 2020, the EPA finalized its final rule for interpreting the Safe Drinking Water Act. The final rule did change scope of products affected by the lead content requirements and cited water heaters as fixtures used for potable water according the final rule. See SDWA definition below: "Fixture means a receptacle or device that is connected to a water supply system or discharges to a drainage system or both. Fixtures used for potable uses shall include but are not limited to: (1) Drinking water coolers, drinking water fountains, drinking water bottle fillers, dishwashers; (2) Plumbed in devices, such as point-of-use treatment devices, coffee makers, and refrigerator ice and water dispensers; and (3) Water heaters, water meters, water pumps, and water tanks, unless such fixtures are not used for potable uses." Final rule is found at https://www.federalregister.gov/documents/2020/09/01/2020-16869/use-of-lead-free-pipes-fittings-fixturessolder-and-flux-for-drinking-water Water heaters are singled out for proposed code sections because they are not consistently interpreted as intended to convey or dispense drinking water. As such they need a specific code section to require lead content to be consistent with the SDWA. I have submitted this code change as well as a similar one to give the committee options for how this could be approved.

Bibliography: NSF/ANSI/CAN 372-2020 Drinking Water System Components-Lead Content

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The SDWA already mandates that water heaters be third party certified and lead free so this proposal does not increase the cost of construction.

P54-21 Part II

IRC: P2801.9 (New)

Proponents: Jeremy Brown, representing NSF International (brown@nsf.org)

THIS IS A 2 PART PROPOSAL. PART I WILL BE HEARD BY THE IPC COMMITTEE. PART II WILL BE HEARD BY THE IRC-P&M COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2021 International Residential Code

Add new text as follows:

P2801.9 Lead Content. Water heaters shall comply with NSF 372 and shall have a weighted average lead content of 0.25% or less.

Reason Statement: Section P2906.2.1 was created to implement lead content requirements of the US Safe Drinking Water Act (SDWA) and requires NSF 372. In September 2020, the EPA finalized its final rule for interpreting the Safe Drinking Water Act. The final rule did change scope of products affected by the lead content requirements and cited water heaters as fixtures used for potable water according the final rule. See SDWA definition below:
"Fixture means a receptacle or device that is connected to a water supply system or discharges to a drainage system or both. Fixtures used for potable uses shall include but are not limited to: (1) Drinking water coolers, drinking water fountains, drinking water bottle fillers, dishwashers; (2) Plumbed in devices, such as point-of-use treatment devices, coffee makers, and refrigerator ice and water dispensers; and (3) Water heaters, water meters, water pumps, and water tanks, unless such fixtures are not used for potable uses."

Final rule is found at https://www.federalregister.gov/documents/2020/09/01/2020-16869/use-of-lead-free-pipes-fittings-fixturessolderand-flux-for-drinking-water Water heaters are singled out for proposed code sections because they are not consistently interpreted as intended to convey or dispense drinking water. As such they need a specific code section to require lead content to be consistent with the SDWA. I have submitted this code change as well as a similar one to give the committee options for how this could be approved.

NSF/ANSI/CAN 372 is the American and Canadian National Standards for determining lead content of drinking water system components.

Bibliography: NSF/ANSI/CAN 372-2020 Drinking Water System Components-Lead Content

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The SDWA already mandates that water heaters be third party certified and lead free so this proposal does not increase the cost of construction.

P55-21

IPC: 504.7, ASTM Chapter 15 (New), UL Chapter 15 (New)

Proponents: Guy McMann, representing Colorado Association of Plumbing and Mechanical Officials (CAPMO) (gmcmann@jeffco.us)

2021 International Plumbing Code

Revise as follows:

504.7 Required pan. Where a storage tank-type water heater or a hot water storage tank is installed in a location where water leakage from the tank will cause damage, the tank shall be installed in a pan constructed of one of the following:

1. Galvanized steel or aluminum of not less than 0.0236 inch (0.6010 mm) in thickness.
2. Plastic not less than 0.036 inch (0.9 mm) in thickness.
3. Other *approved* materials.
4. A plastic pan installed beneath a gas fired water heater shall be constructed of material having a flame spread index of 25 or less and a smoked developed index of 450 or less when tested in accordance with ASTM E84 or UL 723.
5. Water heaters installed in pans shall comply with Section 314.2.3.2

~~A plastic pan shall not be installed beneath a gas-fired water heater.4~~

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken PA 19428-2959

E84-2018B: Standard Test Methods for Surface Burning Characteristics of Building Materials

UL

UL LLC
333 Pfingsten Road
Northbrook IL 60062-2096

723-2018: Test for Surface Burning Characteristics of Building Materials

Staff Analysis: A review of the standard(s) proposed for inclusion in the code, ASTM E84-2018B and UL723-2018 with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 20, 2021.

Reason Statement: This language was installed during the 2018 cycle and will make the IPC consistent with what's in the IRC Section 2801.6 as there are now listed pans for this application.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
This language is editorial in nature and will not affect cost.

P56-21

IPC: 504.7

Proponents: Sidney Cavanaugh, Cavanaugh Consulting, representing IPS Corp. (sidneycavanaugh@yahoo.com)

2021 International Plumbing Code

Revise as follows:

504.7 Required pan. Where a storage tank-type water heater or a hot water storage tank is installed in a location where water leakage from the tank will cause damage, the tank shall be installed in a pan constructed of one of the following:

1. Galvanized steel or aluminum of not less than 0.0236 inch (0.6010 mm) in thickness.
2. Plastic not less than 0.036 inch (0.9 mm) in thickness.
3. Other *approved* materials. A plastic pan installed beneath a gas-fired water heater shall be constructed of a material having a flame spread index of 25 0r less and a smoke-developed index of 450 or less when tested in accordance with ASTM E84 or UL 723.

~~A plastic pan shall not be installed beneath a gas-fired water heater.~~

Reason Statement: This code change simply adds wording that currently exist in the IRC which allows plastic pans meeting ASTM E84 or UL 723 for flame spread index and smoke- developed index to be used under a gas-fired water heater. This installation is currently allowed by the IRC, the NFGC and the UPC.

Bibliography: ASTM E84-13a: Test for Surface Burning Characteristics of Building Materials
UL723: Standard for Test for Surface Burning Characteristics of Building Materials

Cost Impact: The code change proposal will not increase or decrease the cost of construction
There should be no additional cost impact as these pans are currently being used across the country and throughout Canada.

P57-21

IPC: 504.7.1

Proponents: Joseph Summers, Chair, representing Chair of PMGCAC (PMGCAC@iccsafe.org)

2021 International Plumbing Code

Revise as follows:

504.7.1 Pan size and drain. The pan shall be not less than $1^1/_2$ inches (38 mm) in depth and shall be of sufficient size and shape to receive all dripping or condensate from the tank or water heater. The pan shall be drained by an indirect waste pipe having a diameter of not less than $^3/_4$ inch (19 mm). Piping for safety pan drains shall be of those materials listed in Table 605.3 or Table 605.4.

Reason Statement: The need for drain pan piping to be of piping material that is rated for 180 degrees F at pressure is unfounded. PVC drainage piping is rated for conveying water at 140 degrees F by gravity (no pressure). A water heater tank that "springs a leak" is most often found to be only dripping from the bottom of the tank's housing. By the time the water reaches the outlet of the pan, the water temperature is much lower that the temperature of the water in the tank (which is typically not hotter than 140 degrees F.

This proposal is submitted by the ICC Plumbing/Mechanical/Gas Code Action Committee (PMG CAC). The PMG CAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2020, the PMG CAC has held several virtual meetings open to any interested party. Numerous interested parties attended the committee meetings and offered their input. Related documentation and reports are posted on the PMG CAC website at: https://www.iccsafe.org/products-and-services/i-codes/code-development-process/pmg-code-action-committee-pmgcac/ Reference PMGCAC Working Document Item 21.

Cost Impact: The code change proposal will decrease the cost of construction
Table 605.3 has piping materials that are less expensive than those in Table 605.4. Allowing use of less expensive materials will lower the cost of construction.

P88-21

IPC: 606.5.11 (New), WSC (New), ANSI/WSC PST 2000/2016 (New)

Proponents: Erin Coffman, representing Water Systems Council

2021 International Plumbing Code

Add new text as follows:

606.5.11 Pressurized potable water storage tanks. Pressurized potable water tanks shall comply with WSC PST.

Add new standard(s) as follows:

WSC

Water Systems Council
1101 30th St. NW - Suite 500
Washington D.C. 20007
USA

ANSI/WSC PST 2000/2016 Standard Pressurized Water Storage Tank.

Reason Statement: The current code language does not provide requirements for pressurized potable water storage tanks. These pressurized tanks are critical to water well supply systems. Requirements are necessary for safety aspects and dependable performance standards.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The equipment that is currently being installed on projects already complies with the standard. Therefore, requiring compliance to the standard doesn't affect the cost of construction.

P88-21

RP10-21

IRC: P2905.3

Proponents: Edward R. Osann, Natural Resources Defense Council, representing Natural Resources Defense Council (eosann@nrdc.org); sharon bonesteel, salt river project, representing salt river project (sharon.bonesteel@srpnet.com); Anthony Floyd, City of Scottsdale, representing City of Scottsdale (afloyd@scottsdaleaz.gov); David Collins, representing The Preview Group, Inc. (dcollins@preview-group.com)

2021 International Residential Code

Revise as follows:

P2905.3 Hot water supply to fixtures. The*developed length* of hot water piping, from the source of the hot water to the fixtures that require hot water, shall not exceed 75 ~~100~~ feet (22 860 ~~30 480~~ mm). Water heaters and recirculating system piping shall be considered to be sources of hot water.

Reason Statement: This proposal reduces the current limit on domestic hot water supply line length by 25%, from 100 feet to 75 feet. Lengthy hot water piping wastes water and energy while occupants wait for hot water to arrive at outlets for bathing, washing, and culinary purposes. Hot water in supply pipes cools down between draws, and the longer the pipe length, the more cooled-down hot water will need to be purged by the next user. The water sitting in the pipe will be purged, and a nearly equal volume of water will lose heat to the pipe wall on its way to the outlet, and be purged as well. Pipe insulation will partially reduce the volumes to be purged, but note that current I-Codes do not require insulation of piping less than 3/4", and 1/2" piping is widely used to supply sinks and showers. Reducing the maximum length from 100 feet to 75 feet will reduce the volume of water in DHW supply lines and the consequent volume of purged water. 75 feet will provide ample flexibility for designers to locate DHW outlets in sufficient proximity to the hot water heater to meet this requirement, more flexibility than the 50-foot limit on DHW pipe length currently in the IPC. Note also that reduced pipe length will reduce the waiting time for building occupants.

Cost Impact: The code change proposal will not increase or decrease the cost of construction
The code change proposal can be met through design changes without adding to construction costs. Reduced pipe length may result in cost savings for labor and materials.