



November 21, 2017

April Trafton
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Re: IAPMO Standards Council Decision
TIA UMC-003-18
Decision date: November 21, 2017**
Uniform Mechanical Code - Sections E 503.1.3, E 503.4.6 - E 503.5.11.3,

Dear Ms. Trafton:

I am transmitting to you herewith the following decision of the Standards Council. At its meeting on November 15, 2017, the Standards Council considered your written request for the issuance of proposed TIA UMC-003-18 in the 2018 edition of the Uniform Mechanical Code. The proposed Tentative Interim Amendment requested revisions to sections E 503.1.3 and E503.4.6 through E 503.5.11.3 as follows:

Table with 2 columns: ASHRAE and E 503.1.3 Alterations to Heating, Ventilating, Air-Conditioning, and Refrigeration in Existing Buildings. New HVACR equipment as a direct replacement of existing HVACR equipment shall be in accordance with the minimum requirements following sections as applicable to for the equipment being replaced: (1) Section E 503.3 (2) Section E 503.4 (3) Section E 503.4.6 (4) Section E 503.4.6.2 (5) Section E 503.4.6.3 (6) Section E 503.4.6.4 (7) Section E 503.4.6.8 (8) Section E 503.4.6.9 (9) Section E 503.4.6.11 (10) Section E 503.5.1 (11) Section E 503.5.3 (12) Section E 503.5.3.1 (13) Section E 503.5.6.1.2 (14) Section E 503.5.6.2 (15) Section E 503.5.6.5 (16) Section E 503.5.7 (17) Section E 503.5.7.2 (18) Section E 503.5.8.1. [ASHRAE 90.1:6.1.1.3.1] E 503.4.6 Zone Thermostatic Controls. The supply of heating and cooling energy to each zone shall be individually controlled by thermostatic controls responding to temperature within the zone. For the purposes of Section E 503.4.6, a dwelling unit shall be permitted to be considered a single zone. Exceptions: Independent perimeter systems that are designed to offset only building envelope loads shall be permitted to serve one or more zones also served by an interior system provided: (1) The perimeter system includes not less than one thermostatic control zone for each building exposure having exterior walls facing only one orientation for 50 contiguous feet (15 240 mm) or more; and (2) The perimeter system heating and cooling supply is controlled by a thermostatic control(s) located within the zone(s) served by the system. Exterior walls and semiexterior walls are considered to have different orientations where the directions exposures they face differ by more than 45 degrees (0.79 rad). [ASHRAE 90.1:6.4.3.1.1]

TABLE E 503.4.6.4.2
MAXIMUM DAMPER LEAKAGE
(cubic foot per minute per square foot) at 1.0 in. w.g
[ASHRAE 90.1: TABLE 6.4.3.4.3]

CLIMATE ZONE	VENTILATION AIR INTAKE		EXHAUST/RELIEF	
	NONMOTORIZED*	MOTORIZED	NONMOTORIZED*	MOTORIZED
0, 1, 2	–	–	–	–
any height	20	4	20	4

(portion of table not shown remain unchanged)

E 503.4.6.4.3 Ventilation Fan Controls. Fans with motors more than 0.75 hp (0.56 kW) shall have automatic controls in accordance with Section E 503.4.6.3.1 that are capable of and configured to shutting off fans where when not required.

Exception: HVAC systems intended to operate continuously. [ASHRAE 90.1:6.4.3.4.4]

E 503.4.6.8 Freeze Protection and Snow or Ice Melting Systems. Freeze protection systems, such as heat tracing of outdoor piping and heat exchangers, including self-regulating heat tracing, shall include automatic controls capable of and configured to shutting off the systems where when outdoor air temperatures are more than 40°F (4°C) or where when the conditions of the protected fluid will prevent freezing. Snow- and ice-melting systems shall include automatic controls capable of and configured to shutting off the systems where when the pavement temperature is more than 50°F (10°C) and no precipitation is falling, and an automatic or manual control that will allow shutoff where when the outdoor temperature is more than 40°F (4°C) so that the potential for snow or ice accumulation is negligible. [ASHRAE 90.1:6.4.3.7]

E 503.4.6.9 Ventilation Controls for High-Occupancy Areas. Demand control ventilation (DCV) shall be required for spaces that are more than 500 square feet (46.45 m²) and with a design occupancy for ventilation of not less than 25 people per 1000 square feet (92.9 m²) of floor area and served by systems with one or more of the following:

- (1) ~~An~~ Air-side economizer.
- (2) ~~An~~ Automatic modulating control of the outdoor air damper.
- (3) ~~A~~ Design outdoor airflow more than 3000 ft³/min (1.4158 m³/s).

Exceptions:

- (1) Systems with exhaust air energy recovery in accordance with Section E 503.5.10.
- (2) Multiple-zone systems without DDC of individual zones communicating with a central control panel.
- (3) Systems with a design outdoor airflow less than 750 ft³/min (0.3540 m³/s).
- (4) Spaces where more than 75 percent of the space design outdoor airflow is required for makeup air that is exhausted from the space or transfer air that is required for makeup air that is exhausted from other space(s).
- (5) Spaces with one of the following occupancy categories in accordance with Chapter 4 or ASHRAE 62.1: correctional cells, daycare sickrooms, science labs, barbers, beauty and nail salons, and bowling alley seating. [ASHRAE 90.1:6.4.3.8]

E 503.5 Prescriptive Path, Economizers. Cooling systems that have fans shall include either an air or water economizer or fluid economizer in accordance with Section E 503.5.1 through Section E 503.5.4.1.

Exceptions: Economizers shall not be required for the following systems:

- (1) Individual fan-cooling units with a supply capacity less than the minimum listed in Table E 503.5(1) ~~for~~ comfort cooling applications and Table E 503.5(2) for computer room applications.
- (2) Chilled-water cooling systems without a fan or that use induced airflow, where the total capacity of these systems is less than 1 000 000 Btu/h (293 kW) in Climate Zones 0, 1B, and 2 through 4; less than 1 400 000 Btu/h (410 kW) in Climate Zones 5 through 8; or any size in Climate Zone 1A.
- (23) Systems that include nonparticulate air treatment in accordance with ASHRAE 62.1.
- (34) In hospitals and ambulatory surgery centers, where more than 75 percent of the air designed to be supplied by the system is to spaces that are required to be humidified more than 35°F (2°C) dew-point temperature ~~in~~ accordance to comply with applicable codes or accreditation standards. ~~In~~ in all other buildings, where more than 25 percent of the air designed to be supplied by the system is to spaces that are designed to be humidified more than 35°F (2°C) dew-point temperature to satisfy process needs. This exception shall not apply to computer rooms.

- ASHRAE (45) Systems that include a condenser heat recovery system with a minimum capacity in accordance with Section E 503.5.10.1.2.
- ASHRAE (56) Systems that serve residential spaces where the system capacity is less than five times the requirement listed in Table E 503.5(1).
- ASHRAE (67) Systems that serve spaces whose sensible cooling load at design conditions, excluding transmission and infiltration loads, is less than or equal to transmission and infiltration losses at an outdoor temperature of 60°F (16°C).
- ASHRAE (78) Systems expected to operate less than 20 hours per week.
- ASHRAE (89) Where the use of outdoor air for cooling will affect supermarket open refrigerated casework systems.
- ASHRAE (910) For comfort cooling where the cooling efficiency is not less than the efficiency improvement requirements in accordance with Table E-503.5(3) E 503.5(2).
- ASHRAE (1011) Systems primarily serving computer rooms where in accordance with one of the following:
- ASHRAE (a) The total design cooling load of all computer rooms in the building is less than 3 000 000 Btu/h (879 kW) and the building in which they are located is not served by a centralized chilled water plant.
 - ASHRAE (b) The room total design cooling load is less than 600 000 Btu/h (176 kW) and the building in which they are located is served by a centralized chilled water plant.
 - ASHRAE (c) The local water authority does not permit cooling towers.
 - ASHRAE (d) Less than 600 000 Btu/h (176 kW) of computer room cooling equipment capacity is being added to an existing building.
- ASHRAE (1112) Dedicated systems for computer rooms where a minimum of 75 percent of the design load serves one of the following:
- ASHRAE (a) Spaces classified as an essential facility.
 - ASHRAE (b) Spaces having a mechanical cooling design of Tier IV in accordance with TIA 942.
 - ASHRAE (c) Spaces classified as eCritical oOperations pPower sSystems (COPS) in accordance with NFPA 70.
 - ASHRAE (d) Spaces where core clearing and settlement services are performed such that their failure to settle pending financial transactions is capable of systemic risk in accordance with “The Interagency Paper on Sound Practices to Strengthen the Resilience of the US Financial System” (April 7, 2003).” [ASHRAE 90.1:6.5.1]

TABLE E 503.5(1)
MINIMUM FAN-COOLING UNIT SIZE WHERE AN
ECONOMIZER IS REQUIRED FOR COMFORT COOLING
[ASHRAE 90.1: TABLE 6.5.1-1]

CLIMATE ZONES	COOLING CAPACITY WHERE AN ECONOMIZER IS REQUIRED
0a, 0b, 1a, 1b	No economizer requirement
2a, 2b, 3a, 4a, 5a, 6a, 3b, 3c, 4b, 4c, 5b, 5c, 6b, 7, 8	≥54 000 Btu/h

For SI units: 1000 British thermal units per hour = 0.293 kW

TABLE E 503.5(2)
MINIMUM FAN-COOLING UNIT SIZE WHERE AN
ECONOMIZER IS REQUIRED FOR COMPUTER ROOMS
[ASHRAE 90.1: TABLE 6.5.1-2]

CLIMATE ZONES	COOLING CAPACITY WHERE AN ECONOMIZER IS REQUIRED
1a, 1b, 2a, 3a, 4a	No economizer requirement
2b, 5a, 6a, 7, 8	≥135 000 Btu/h
3b, 3c, 4b, 4c, 5b, 5c, 6b	≥65 000 Btu/h

For SI units: 1000 British thermal units per hour = 0.293 kW

	TABLE E 503.5(3) 503.5(2) ELIMINATE REQUIRED ECONOMIZER FOR COMFORT COOLING BY INCREASING COOLING EFFICIENCY [ASHRAE 90.1: TABLE 6.5.1-3 6.5.1-2]
ASHRAE	<p>* Where a unit is rated with an IPLV, IEER or SEER, to eliminate the required air or water economizer, the minimum cooling efficiency of the HVAC unit shall be increased by the percentage shown. Where the HVAC unit is rated with a full load metric like EER or COP cooling, these shall be increased by the percentage shown.</p>
ASHRAE	<p>(portions of table not shown remain unchanged)</p>
ASHRAE	<p>E 503.5.1 Air Economizers, Design Capacity. Air economizer systems shall be capable of <u>and configured to</u> modulating modulate outdoor air and return air dampers to provide up to 100 percent of the design supply air quantity as outdoor air for cooling. [ASHRAE 90.1:6.5.1.1.1]</p>
ASHRAE	<p>E 503.5.1.1 Control Signal. Economizer dampers controls shall be capable of <u>and configured to being</u> being sequenced the dampers with the mechanical cooling equipment and shall not be controlled by only mixed air temperature.</p>
ASHRAE	<p>Exception: The use of mixed air temperature limit control shall be permitted for systems controlled from space temperature (such as single-zone systems). [ASHRAE 90.1:6.5.1.1.2]</p>
ASHRAE	<p>E 503.5.1.2 High-Limit Shutoff. Air economizers shall be capable of <u>and configured to</u> reducing reduce outdoor air intake to the design minimum outdoor air quantity where outdoor air intake will no longer reduce cooling energy usage <u>use</u>. High-limit shutoff control types and associated setpoints for specific climate zones shall be chosen from Table E 503.5.1.2. [ASHRAE 90.1:6.5.1.1.3]</p>
ASHRAE	<p>E 503.5.2 Water Fluid Economizers, Design Capacity. Water Fluid economizer systems shall be capable of cooling supply air by indirect evaporation and providing up to 100 percent of the expected system cooling load at outdoor air temperatures of not more than 50°F (10°C) dry bulb or 45°F (7°C) wet bulb.</p>
ASHRAE	<p>Exceptions:</p>
ASHRAE	<p>(1) Systems primarily serving computer rooms in which 100 percent of the expected system cooling load at the dry bulb and wet bulb <u>temperatures</u> in accordance with Table E 503.5.2 is <u>achieved met</u> with evaporative water-cooled fluid economizers.</p>
ASHRAE	<p>(2) Systems primarily serving computer rooms in which 100 percent of the expected system cooling load at the dry bulb temperatures in accordance with listed in Table E 503.5.2 is <u>achieved met</u> with dry-cooler water air-cooled fluid economizers.</p>
ASHRAE	<p>(3) Systems where dehumidification requirements are not capable of being met using outdoor air temperatures of 50°F (10°C) dry bulb or 45°F (7°C) wet bulb; and where 100 percent of the expected system cooling load at 45°F (7°C) dry bulb or 40°F (4°C) wet bulb is <u>achieved met</u> with evaporative water-cooled fluid economizers. [ASHRAE 90.1:6.5.1.2.1]</p>
ASHRAE	<p>E 503.5.2.1 Maximum Hydronic Pressure Drop. Precooling coils and waterfluid-to-water heat exchangers used as part of a <u>water fluid</u> economizer system shall either have a water-side pressure drop of less than 15 feet of water (45 kPa), or a secondary loop shall be created so that the coil or heat exchanger pressure drop is not seen by the circulating pumps where the system is in the normal cooling (non-economizer) mode. [ASHRAE 90.1:6.5.1.2.2]</p>
ASHRAE	<p>E 503.5.3 Integrated Economizer Control. Economizer systems shall be integrated with the mechanical cooling system and be capable of <u>and configured to providing</u> provide partial cooling even where additional mechanical cooling is required to be in accordance with the remainder of the cooling load. Controls shall not false load the mechanical cooling systems by limiting or disabling the economizer or by other means, such as hot gas bypass, except at the lowest stage of mechanical cooling.</p>
ASHRAE	<p>Units that include an air economizer shall comply with the following:</p>
ASHRAE	<p>(1) Unit controls shall have the mechanical cooling capacity control interlocked with the air economizer controls such that the outdoor air damper is at the 100 percent open position when mechanical cooling is on, and the outdoor air damper does not begin to close to prevent coil freezing due to minimum compressor run time until the leaving air temperature is less than 45°F (7°C).</p>
ASHRAE	<p>(2) DX units that control the capacity of the mechanical cooling directly based on occupied space temperature shall have a minimum of two stages of mechanical cooling capacity per the following effective dates:</p>
ASHRAE	<p>(a) Not less than 75 000 Btu/h (22kW) Rated Capacity—Effective 1/1/2014</p>
ASHRAE	<p>(b) Not less than 65 000 Btu/h (18kW) Rated Capacity—Effective 1/1/2016 [ASHRAE 90.1:6.5.1.3]</p>

ASHRAE (2) DX units with a rated capacity no less than 65 000 Btu/h (18 kW) that control the capacity of the mechanical cooling directly based on occupied space temperature shall have not less than two stages of mechanical cooling capacity.
ASHRAE (3) ~~E 503.5.3.1 Other DX Units.~~ Other DX units, including those that control space temperature by modulating the airflow to the space, shall comply with the requirements of Table E 503.5.3.1. [ASHRAE 90.1:6.5.1-46.5.1.3]

TABLE E 503.5.3.1
DX COOLING STAGE REQUIREMENTS FOR MODULATING AIRFLOW UNITS
[ASHRAE 90.1: TABLE 6.5.1-46.5.1.3]

RATING CAPACITY, (Btu/h)	MINIMUM NUMBER OF MECHANICAL COOLING STAGES	MINIMUM COMPRESSOR DISPLACEMENT*
≥65 000 and <240 000	3	≤35% of full load
≥240 000	4	≤25% full load

ASHRAE For SI units: 1000 British thermal units per hour = 0.293 kW
ASHRAE * For mechanical cooling stage control that does not use variable compressor displacement the percent displacement shall be equivalent to the mechanical cooling capacity reduction evaluated at the full load rating conditions for the compressor.
ASHRAE

TABLE E 503.5.1.2
HIGH-LIMIT SHUTOFF CONTROL SETTINGS FOR AIR ECONOMIZERS2
[ASHRAE 90.1: TABLE 6.5.1.1.3]

CONTROL TYPE	ALLOWED ONLY IN CLIMATE ZONE AT LISTED SETPOINT	REQUIRED HIGH LIMIT (ECONOMIZER OFF WHERE):	
		EQUATION	DESCRIPTION
Fixed dry bulb temperature	0b, 1b, 2b, 3b, 3c, 4b, 4c, 5b, 5c, 6b, 7, 8	$T_{oa} > 75^{\circ}\text{F}$	Outdoor air temperature exceeds 75°F
	5a, 6a	$T_{oa} > 70^{\circ}\text{F}$	Outdoor air temperature exceeds 70°F
	0a, 1a, 2a, 3a, 4a	$T_{oa} > 65^{\circ}\text{F}$	Outdoor air temperature exceeds 65°F
Differential dry bulb temperature	0b, 1b, 2b, 3b, 3c, 4b, 4c, 5a, 5b, 5c, 6a, 6b, 7, 8	$T_{oa} > T_{ra}$	Outdoor air temperature exceeds return air temperature

(portions of table not shown remain unchanged)

TABLE E 503.5.2
WATER FLUID ECONOMIZER SIZING DRY-BULB AND WET-BULB REQUIREMENTS FOR COMPUTER ROOMS*
[ASHRAE 90.1: TABLE 6.5.1.2.1]

CLIMATE ZONE	EVAPORATIVE WATER-ECONOMIZER WATER COOLED		DRY-COOLER-WATER-
	DRY BULB, °F	WET BULB, °F	DRY BULB, °F
0	A	NR	NR
0	B	NR	NR

(portions of table not shown remain unchanged)

ASHRAE **E 503.5.4.1 Economizer Humidification System Impact.** Systems with hydronic cooling and humidification systems designed to maintain inside humidity at a dew-point temperature more than 35°F (2°C) shall use a water fluid economizer where an economizer is required in accordance with Section E 503.5 through Section E 503.5.4.1. [ASHRAE 90.1:6.5.1-6 6.5.1.5]

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ASHRAE **E 503.5.6.1 Fan System Power and Efficiency.** ~~Each HVAC systems at fan system design conditions shall not exceed the allowable~~ having a total fan system motor nameplate horsepower (kW) exceeding 5 hp (3.7 kW) at fan system design conditions shall not exceed the allowable fan system motor nameplate horsepower (kW) (Option 1) or fan system brake horsepower (kW) (Option 2) as shown in Table E 503.5.6.1(1). This shall include supply fans, return or relief fans, exhaust fans, and fan-powered terminal units associated with systems providing heating or cooling capability that operate at fan system design conditions. Single-zone ~~variable air volume VAV~~ systems shall comply with the constant-volume fan power limitation.

- Exceptions:**
- (1) Hospital, vivarium, and laboratory systems that utilize flow control devices on exhaust, return, or both to maintain space pressure relationships necessary for occupant health and safety, or environmental control shall be permitted to use variable-volume fan power limitation.
 - (2) Individual exhaust fans with motor nameplate horsepower of 1 hp (0.7 kW) or less. [ASHRAE 90.1:6.5.3.1.1]

TABLE E 503.5.6.1(2)
FAN POWER LIMITATION PRESSURE DROP ADJUSTMENT
[ASHRAE 90.1: TABLE 6.5.3.1-2]

DEVICE	ADJUSTMENT
CREDITS	
Fully ducted return, exhaust, or both air systems <u>Return or exhaust systems required by code or accreditation standards to be fully ducted, or systems required to maintain air pressure differentials between adjacent rooms</u>	0.5 in. w.c. (2.15 in w.c. for laboratory and vivarium systems)
Energy recovery device, other than coil runaround loop	For each airstream [(2.2 x energy recovery effectiveness enthalpy recovery ratio) - 0.5] in w.c. for each airstream

(portions of table not shown remain unchanged)

ASHRAE **E 503.5.6.1.1 Motor Nameplate Horsepower.** For a each fan, the selected fan motor shall be not larger than the first available motor size more than the brake horsepower (bhp) (kW). The fan brake horsepower shall be indicated on the design documents to allow for compliance verification by the Authority Having Jurisdiction.

- Exceptions:**
- (1) For fans less than 6 bhp (4.5 kW), where the first available motor larger than the bhp (kW) has a nameplate rating within 50 percent of the bhp (kW), the next larger nameplate motor size shall be selected.
 - (2) For fans 6 bhp (4.5 kW) and larger, where the first available motor larger than the bhp (kW) has a nameplate rating within 30 percent of the bhp (kW), the next larger nameplate motor size shall be selected.
 - (3) Systems that are in accordance with Section E 503.5.6.1, Option 1.
 - (4) Fans with motor nameplate horsepower of less than 1 hp (0.7 kW). [ASHRAE 90.1:6.5.3.1.2]

ASHRAE **E 503.5.6.1.2 Fan Efficiency.** Fans shall have a fan efficiency grade (FEG) of 67 or more, based on manufacturers' certified data in accordance with AMCA 205. The total efficiency of the fan at the design point of operation shall be within 15 percentage points of the maximum total efficiency of the fan.

- Exceptions:**
- (1) Single Individual fans with a motor nameplate horsepower of 5 hp (3.7 kW) or less that are not part of a group operated as the functional equivalent of a single fan.
 - (2) through (7) remain unchanged
[ASHRAE 90.1:6.5.3.1.3]

TABLE E 503.5.7.1
PUMP FLOW CONTROL REQUIREMENTS
[ASHRAE 90.1: Table 6.5.4.2]

<u>CHILLED WATER PUMPS IN THESE CLIMATE ZONES</u>	<u>HEATING WATER PUMPS IN THESE CLIMATE ZONES</u>	<u>MOTOR NAMEPLATE HORSEPOWER</u>
<u>0A, 0B, 1A, 1B, 2B</u>	<u>NR</u>	<u>≥2 hp</u>
<u>2A, 3B</u>	<u>NR</u>	<u>≥3 hp</u>
<u>3A, 3C, 4A, 4B</u>	<u>7, 8</u>	<u>≥5 hp</u>
<u>4C, 5A, 5B, 5C, 6A, 6B</u>	<u>3C, 5A, 5C, 6A, 6B</u>	<u>≥7.5 hp</u>
<u>-</u>	<u>4A, 4C, 5B</u>	<u>≥10 hp</u>
<u>7, 8</u>	<u>4B</u>	<u>≥15 hp</u>
<u>-</u>	<u>2A, 2B, 3A, 3B</u>	<u>≥25 hp</u>
<u>-</u>	<u>1B</u>	<u>≥100 hp</u>
<u>-</u>	<u>0A, 0B, 1A</u>	<u>≥200 hp</u>

For SI units: 1 horsepower = 0.746 kW

TABLE E 503.7.2
MINIMUM DUCT INSULATION R-VALUE¹
[ASHRAE 90.1: TABLE 6.8.2]

CLIMATE ZONE	DUCT LOCATION		
	EXTERIOR ²	UNCONDITIONED SPACE AND BURIED DUCTS	INDIRECTLY CONDITIONED SPACE ^{3,4}
SUPPLY AND RETURN DUCTS FOR HEATING AND COOLING			
0 to 4	R-8	R-6	R-1.9
5 to 8	R-12	R-6	R-1.9
SUPPLY AND RETURN DUCTS FOR HEATING ONLY			
0 to 1	none	none	none
2 to 4	R-6	R-6	R-1.9
5 to 8	R-12	R-6	R-1.9
SUPPLY AND RETURN DUCTS FOR COOLING ONLY			
0 to 6	R-6 8	R-6	R-1.9
7 to 8	R-1.9	R-1.9	R-1.9

Notes:

1. Insulation R-values, measured in [°F•h•ft²/(Btu•in)] [(m•K)/W], are for the insulation as installed and do not include film resistance. The required minimum thicknesses do not consider water vapor transmission and possible surface condensation. Where exterior walls portions of the building envelope are used as a plenum walls enclosure, wall building envelope insulation shall be in accordance with as required by the most restrictive condition of Section E 503.4.7–E 503.4.7.1 or ASHRAE 90.1, depending on whether the plenum is located in the roof, wall, or floor. Insulation resistance measured on a horizontal plane in accordance with ASTM C518 at a mean temperature of 75°F (24°C) at the installed thickness.
2. Includes attics above insulated ceilings, parking garages and crawl spaces.
3. Includes return air plenums, with or without exposed roofs above.
4. Return ducts in this duct location do not require insulation.

E 503.5.10 Exhaust Air Energy Recovery. A Each fan system shall have an energy recovery system where the design supply fan airflow rate exceeds the value listed in Table E 503.5.10(1) and Table E 503.5.10(2), based on the climate zone and percentage of outdoor airflow rate air at design airflow conditions. Table E 503.5.10(1) shall be used for all ventilation systems that operate less than 8000 hours per year and Table E 503.5.10(2) shall be used for all ventilation systems that operate 8000 or more hours per year.

ASHRAE Energy recovery systems required by this section shall have 50 percent or more energy recovery effectiveness result in an enthalpy recovery ratio of not less than 50 percent. A fifty percent energy enthalpy recovery effectiveness ratio shall be the mean a change in the enthalpy of the outdoor air supply equal to 50 percent of the difference between the outdoor air and return entering exhaust air enthalpies at design conditions. Provision shall be provided to bypass or control the energy recovery system to permit air economizer operation in accordance with Section E 503.5.1.

Exceptions:

(1) Laboratory systems that are in accordance with Section E 503.5.11.3.
(2) Systems serving spaces that are not cooled and that are heated to less than 60°F (16°C).
(3) Where more than 60 percent of the outdoor air heating energy is provided from site-recovered energy or site-solar energy.
(4) Heating energy recovery in Climate Zones 0, 1, and 2.
(3 5) Cooling energy recovery in climate zones 3eC, 4eC, 5bB, 5eC, 6bB, 7, and 8.
(4 6) Where the sum of the airflow rates exhausted and relieved within 20 feet (6096 mm) of each other is less than 75 percent of the design outdoor airflow rate, excluding exhaust air that is
(a) used for another energy recovery system,
(b) not allowed by ASHRAE 170 for use in energy recovery systems with leakage potential, or
(c) of Class 4 as defined in ASHRAE 62.1.
(5 7) Systems requiring dehumidification that employ energy recovery in series with the cooling coil.
(6 8) Systems expected to operate less than 20 hours per week at the outdoor air percentage in accordance with Table E 503.5.10(1). [ASHRAE 90.1:6.5.6.1]

TABLE E 503.5.10(1)
EXHAUST AIR ENERGY RECOVERY REQUIREMENTS FOR VENTILATION SYSTEMS
OPERATING LESS THAN 8000 HOURS PER YEAR*
[ASHRAE 90.1: TABLE 6.5.6.1-1]

CLIMATE ZONE	PERCENT OUTDOOR AIR AT FULL DESIGN AIRFLOW RATE							
	≥10% and <20%	≥20% and <30%	≥30% and <40%	≥40% and <50%	≥50% and <60%	≥60% and <70%	≥70% and <80%	≥80%
DESIGN SUPPLY FAN AIRFLOW RATE (cubic feet per minute)								
0A, 1A, 2A, 3A, 4A, 5A, 6A	≥26 000	≥16 000	≥5500	≥4500	≥3500	≥2000	≥1000	≥0 ≥120
7, 8	≥4500	≥4000	≥2500	≥1000	≥0 ≥140	≥0 ≥120	≥0 ≥100	≥0 ≥80

(portion of table not shown remains unchanged)

TABLE E 503.5.10(2)
EXHAUST AIR ENERGY RECOVERY REQUIREMENTS FOR VENTILATION SYSTEMS OPERATING NOT LESS
THAN 8000 HOURS PER YEAR*
[ASHRAE 90.1: TABLE 6.5.6.1-2]

CLIMATE ZONE	PERCENT OUTDOOR AIR AT FULL DESIGN AIRFLOW RATE							
	≥10% and <20%	≥20% and <30%	≥30% and <40%	≥40% and <50%	≥50% and <60%	≥60% and <70%	≥70% and <80%	≥80%
DESIGN SUPPLY FAN AIRFLOW RATE (cubic feet per minute)								
0B, 1B, 2B, 3B, 4C, 5C	NR	≥19 500	≥9000	≥5000	≥4000	≥3000	≥1500	≥0 ≥ 120
0A, 1A, 2A, 3A, 4B, 5B	≥2500	≥2000	≥1000	≥500	≥0 ≥ 140	≥0 ≥ 120	≥0 ≥ 100	≥0 ≥ 80
4A, 5A, 6A, 6B, 7, 8	≥0 ≥ 200	≥0 ≥ 130	≥0 ≥ 100	≥0 ≥ 80	≥0 ≥ 70	≥0 ≥ 60	≥0 ≥ 50	≥0 ≥ 40

1 cubic foot per minute = 0.00047 m³/s

* NR—Not required

E 503.5.11.2.1 Kitchen or Dining Facility. Where a kitchen or dining facility has a total kitchen hood exhaust airflow rate more than 5000 ft³/min (2.3597 m³/s), then one of the following shall be provided:

- (1) Fifty percent or more of all replacement air is transfer air that would otherwise be exhausted.

Upon a full review and consideration of all of the information available to it, the Council concludes that a clear and substantial basis exists to amend sections E 503.1.3 and E503.4.6 through E 503.5.11.3 of the 2018 edition of the *Uniform Mechanical Code* – as noted above – to read consistently with *ASHRAE 90.1 – 2016*, the source of the extracted text. Of equal importance, the TIA resolves conflicting language between the *Uniform Mechanical Code* and *ASHRAE 90.1*.

Thus, the Council hereby issues the proposed TIA.

Sincerely,



Gabriella Davis
Secretary, Standards Council

CC: Monte Bogatz, Executive VP & General Counsel
Hugo Aguilar, VP, Codes & Standards Development
IAPMO Standards Council
Members of the Mechanical TC

****NOTE:** Participants in IAPMO's codes and standards making process are advised that limited review of this decision may be sought from the IAPMO Board of Directors. For the rules describing the available review and the method for petitioning the Board of Directors for review, please consult Section 1-7 of the *IAPMO Regulations Governing Committee Projects* and the *IAPMO Regulations Governing Petitions to the Board of Directors from Decisions of the Standards Council*. **Notice of the intent to file such a petition must be submitted to the Petitions Clerk of the Board of Directors within 15 calendar days of the Date of Decision noted in the subject line of this letter.** As this document is an American National Standard (ANS), any persons who have directly and materially affected interests by this decision have the right to appeal to ANSI in accordance with ANSI procedures.

IAPMO Regulations Governing Committee Projects

Section 1-7

1-7 Petitions to the Board of Directors.

1-7.1 General. The Standards Council has been delegated the responsibility for the administration of the codes and standards development process and the issuance of Documents. However, where extraordinary circumstances requiring the intervention of the Board of Directors exist, the Board of Directors may take any action necessary to fulfill its obligations to preserve the integrity of the standards development process. Anyone seeking such intervention of the Board of Directors may petition the Board of Directors concerning Standards Council action on any matters. Such petitions shall be filed and processed in accordance with the Regulations Governing Petitions to the Board of Directors from Decisions of the Standards Council.

1-7.2 Notice of Intent to File the Petition. Anyone wishing to petition the Board of Directors concerning an Standards Council action related to the issuance of a document, shall file a Notice of Intent to File a Petition within 15 days following the Standards Council action. A Standards Council action related to the issuance of a document includes any action of the Council that issues or returns a Document or that affects the text of a Document. Petitions concerning other Standards Council actions shall be filed within a reasonable period of time.

1-7.3 Effect of Filing. The filing of a Petition will not serve to stay the effective date of a Document or a Tentative Interim Amendment unless the Chief Executive Officer of the Association or the Board of Directors acts, pursuant to 4-7.2 or 5-6, to delay the effective date. Any Petition pending at the time a Document or Tentative Interim Amendment becomes effective will be treated as a Petition to withdraw the Document or Tentative Interim Amendment.

1-8 Use of Visual Aids and Demonstrations Before the Standards Council or Board of Directors. The policy for the use of visual aids and physical demonstrations to the Standards Council and Board of Directors shall be the same as that required for TCCs, TCs, and Task Groups, in accordance with 3-3.3.3(e) and 3-3.3.3(f).

IAPMO Regulations Governing Petitions to the Board of Directors from Decisions of the Standards Council

ADOPTED BY THE IAPMO BOARD OF DIRECTORS SEPTEMBER 4, 2000. Amended in January 2007.

Section 1 Scope of and Authority for these Regulations.

(a) These regulations have been issued by the Board of Directors pursuant to its authority under Article 5, 6 and 8 of the IAPMO Bylaws.

(b) These regulations set forth the procedures to be used for the filing and processing of all petitions to the Board of Directors filed pursuant to 1-7 of the Regulations Governing Committee Projects.

(c) The Board of Directors can amend these regulations from time to time and waive or supplement, in whole or in part, at any time or times at its discretion.

(d) For the purposes of these regulations, the Standards Council Secretary, or such other person as the Chair of the Board of Directors may appoint, shall act as a petitions clerk.

Section 2 Subcommittees of the Board of Directors. Unless the Board of Directors otherwise orders, the authority to consider and make recommendations on the disposition of a petition by the Board of Directors shall be delegated to a subcommittee of the Board of Directors, which shall be appointed, in accordance with 2.1 of these regulations. Subcommittees shall be appointed by the Chair of the Board of Directors.

2-1 Composition of Subcommittees. Subcommittees shall consist of three or more members of the Board of Directors. The criteria for selection and appointment of subcommittee members shall be as follows:

(a) A subcommittee member shall be a person who can decide the petition on the merits in an impartial manner.

(b) A subcommittee member shall not have any conflict of interest. (A conflict of interest is defined as any situation in which a decision on a petition could substantially and materially affect the member's financial or business interest.)

(c) Each subcommittee member shall, to the extent practicable, represent diverse interests within the association.

In making a decision of whether or not to serve on a subcommittee, the member may consult with the IAPMO general counsel.

Section 3 The Scope of Review. The petitioner shall generally confine the argument in the petition to matters that were presented below and shall not raise any new matters that could have but were not presented within the standards development process. A petition to the Board of Directors shall not be regarded as simply another opportunity to reargue a position that was rejected by the Standards Council. In considering a petition, the subcommittee shall give due deference to the judgment of the Standards Council and shall not intervene unless it can be demonstrated that extraordinary circumstances exist requiring the Board of Director's intervention to protect the integrity of the standards development process.

Section 4 The Record. In its consideration of the petition, the subcommittee shall have before it the entire record that was before the Standards Council, as well as all proceedings and decisions of the Standards Council on the issue. In addition, the subcommittee may consult any other records of the association that it deems pertinent to the issue, and the subcommittee may seek technical assistance from staff, the technical committee, or any other source or persons that it deems appropriate.

Section 5 Notice of Intent to File the Petition. Anyone wishing to petition the Board of Directors concerning a Standards Council action related to the issuance of a document, shall file a Notice of Intent to File a Petition within 15 days following the Standards Council action. A Standards Council action related to the issuance of a document includes any action of the

Council that issues or returns a document or that affects the text of a document. Petitions concerning other Standards Council actions shall be filed within a reasonable period of time.

Section 6 Filing and Contents of the Petition.

(a) Within 15 days following the receipt of the notice of intent to file, or within such other time as the petitions clerk may allow, the petitioner shall file the petition together with 20 copies. The petition shall be no more than 10 pages in length and shall contain, in separately denominated sections, the following:

- (1) Name, affiliation, and address of the petitioner;
- (2) Statement identifying the particular Standards Council action to which the petition relates;
- (3) Argument setting forth the grounds for the petition and, in particular, addressing why there exist extraordinary circumstances requiring the intervention of the Board of Directors (see the preceding Section 3 and 1-7 of the Regulations Governing Committee Projects); and
- (4) Statement of the precise relief requested.

(b) Any part of the record related to the standards development process that is referenced or discussed in the petition should be clearly cited in the petition using available markings such as the title, author, date, and page of the record. Since the full record will be available to the subcommittee during its review, attachments and appendices shall not accompany the petition, unless express permission has been obtained from the petitions clerk.

Section 7 Consideration of the Petition.

7-1 Initial Review. The petitions clerk may, at his or her discretion, arrange for initial review of the petition by meeting, correspondence, or telephone conference. If upon such initial review of the petition and any relevant portions of the record, the subcommittee determines that the petition has no merit, it may dismiss the petition.

7-2 Full Review. If initial review is not conducted, or, if upon such review, the subcommittee determines that further review is warranted, it shall afford the opportunity for responses to be filed by interested parties. Responses, together with 20 copies, shall be filed within 15 days or within such other time as the petitions clerk may allow.

(a) Responses shall be no more than 10 pages in length and shall contain, in separately denominated sections, the following:

- (1) Name, affiliation, and address of the respondent;
- (2) Statement identifying the petition to which the response relates and stating whether the respondent supports or opposes the petition; and
- (3) Argument setting forth the grounds for opposing or supporting the petition and, in particular, addressing why there does or does not exist extraordinary circumstances requiring the intervention of the Board of Directors (see the preceding Section 3 and 1-7 of the Regulations Governing Committee Projects).

(b) Any part of the record related to the standards development process that is referenced or discussed in a response should be clearly cited in the response using available markings such as the title, author, date, and page of the record. Since the full record will be available to the subcommittee during its review, attachments and appendices shall not accompany the response, unless express permission has been obtained from the petitions clerk.

(c) So as to avoid unnecessary repetition and duplication of effort, parties are encouraged to file joint responses where possible and appropriate.

(d) Unless a hearing has been requested and granted by the subcommittee (see Section 8), the subcommittee shall, either by meeting or telephone conference, review and render a decision on the petition based on the written submissions of the parties and the record before it.

Section 8 Requests for Hearings. If the petitioner requests a hearing on the petition and that hearing is granted, the petitioner shall be assessed a filing fee of \$2,500 to be posted following the granting of the request. This fee may be reduced or waived by the Chief Executive Officer upon application of the petitioner if good cause for reducing or waiving the fee is presented. If a hearing is granted, the Procedures for Hearings shall be followed.

Section 9 Waiver of Regulations. Any of the deadlines or requirements set forth in these regulations may be waived by the subcommittee upon application of the petitioner or any other party for good cause shown, or in the discretion of the subcommittee.

Section 10 Subcommittee Report to the Board of Directors. The subcommittee shall file with the Board of Directors a written report concerning each petition that it has determined.