

Amendment 7 to Council Bill No. 24 - 2025

BY: Liz Walsh

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Amendment No. 7

*(This Amendment provides additional energy efficiency requirements for new residential construction in the Howard County Building Code.)*

On page 56, in line, 26 insert the following:

“(11) DELETE THE PARAGRAPH MARKED SECTION R408.2 AND REPLACE WITH THE FOLLOWING.

**R408.2 ADDITIONAL ENERGY EFFICIENCY CREDIT REQUIREMENTS. RESIDENTIAL BUILDINGS**

SHALL EARN NOT LESS THAN 35 CREDITS FROM NOT LESS THAN TWO MEASURES FROM TABLE

**R408.2 AND TABLE R408.2.12. FIVE ADDITIONAL CREDITS SHALL BE EARNED FOR**

DWELLING UNITS WITH MORE THAN 5,000 SQUARE FEET (465 M2) OF LIVING SPACE LOCATED

ABOVE GRADE PLANE. TO EARN CREDIT AS SPECIFIED IN TABLE R408.2 OR TABLE R408.2.12,

EACH MEASURE SELECTED FOR COMPLIANCE SHALL COMPLY WITH THE APPLICABLE

SUBSECTIONS OF SECTION R408 OR SECTION R408.2.12. EACH DWELLING UNIT OR SLEEPING

UNIT SHALL COMPLY WITH THE SELECTED MEASURE TO EARN CREDIT. INTERPOLATION OF

CREDITS BETWEEN MEASURES SHALL NOT BE PERMITTED.

AFTER SECTION R408.2.11, ADD SECTION R408.2.12 AS FOLLOWS.

**TABLE R408.2.12 CREDITS FOR ADDITIONAL ENERGY EFFICIENCY-EFFICIENT EQUIPMENT TYPES.**

<u>MEASURE</u> <u>NUMBER</u>	<u>MEASURE</u> <u>DESCRIPTION</u>	<u>UNIT TYPE</u>	<u>FOUNDATION</u> <u>TYPE</u>	<u>CREDITS</u>
<u>R408.2.12.1</u>		<u>MULTIFAMILY</u>	<u>SLAB-ON-GRADE</u>	<u>2</u>

	<u>ELECTRIC HEAT PUMP</u>		<u>HEATED BASEMENT</u>	<u>6</u>
			<u>UNHEATED BASEMENT</u>	<u>1</u>
			<u>CRAWLSPACE</u>	<u>3</u>
		<u>ONE- OR TWO- FAMILY OR TOWNHOUSE</u>	<u>SLAB-ON-GRADE</u>	<u>9</u>
			<u>HEATED BASEMENT</u>	<u>13</u>
			<u>UNHEATED BASEMENT</u>	<u>8</u>
			<u>CRAWLSPACE</u>	<u>12</u>
<u>R408.2.12.2</u>	<u>ELECTRIC TANK WATER HEATER</u>	<u>MULTIFAMILY</u>	<u>SLAB-ON-GRADE</u>	<u>19</u>
			<u>HEATED BASEMENT</u>	<u>16</u>
			<u>UNHEATED BASEMENT</u>	<u>19</u>
			<u>CRAWLSPACE</u>	<u>19</u>
		<u>ONE- OR TWO- FAMILY OR TOWNHOUSE</u>	<u>SLAB-ON-GRADE</u>	<u>13</u>
			<u>HEATED BASEMENT</u>	<u>11</u>
			<u>UNHEATED BASEMENT</u>	<u>16</u>
			<u>CRAWLSPACE</u>	<u>12</u>

**R408.2.12 EFFICIENT EQUIPMENT TYPES. DWELLING UNITS SHALL COMPLY WITH SECTION R408.2.12.1, SECTION R408.2.12.2, OR BOTH TO EARN THE APPLICABLE AMOUNT OF CREDITS FOR THE DWELLING UNIT'S UNIT TYPE AND FOUNDATION TYPE. A DWELLING UNIT IS PERMITTED TO EARN CREDITS FROM THESE MEASURES IN ADDITION TO CREDITS FROM MEASURES IN SECTION R408.2.2 AND SECTION R408.2.3.**

**R408.2.12.1 EFFICIENT SPACE HEATING EQUIPMENT TYPE.** INSTALLED SPACE HEATING SYSTEMS SHALL BE ONE OR MORE ELECTRIC HEAT PUMPS AND SHALL COMPLY WITH ALL OF THE FOLLOWING. WHERE MULTIPLE HEATING SYSTEMS ARE INSTALLED SERVING DIFFERENT ZONES OR PARTIAL HEATING LOADS, CREDITS SHALL BE EARNED ACCORDING TO EQUATION RM-1.

1. HEAT PUMPS SHALL BE AS OR MORE EFFICIENT THAN REQUIRED BY APPLICABLE FEDERAL MINIMUM ENERGY EFFICIENCY STANDARDS.
2. HEAT PUMPS SHALL BE SIZED IN ACCORDANCE WITH SECTION R403.7.
3. HEAT PUMPS SHALL BE CONFIGURED TO PROVIDE BOTH SPACE HEATING AND SPACE COOLING.
4. HEAT PUMPS SHALL BE CONFIGURED AS THE PRIMARY SPACE HEATING EQUIPMENT AND MAY BE INSTALLED WITH SUPPLEMENTARY ELECTRIC RESISTANCE HEAT IN ACCORDANCE WITH SECTION R403.1.2.

**EQUATION RM-1**  $C = \sum N(ZPSF * ZPHL) * MC$

WHERE:

$C$  = THE CREDITS EARNED BY THE *DWELLING UNIT* FOR MEASURE R408.2.12.1

$\sum N$  = THE SUM OF THE FOLLOWING EXPRESSION FOR ALL *ZONES* IN *CONDITIONED SPACE*

$ZPSF$  = THE PERCENT OF *DWELLING UNIT* SQUARE FOOTAGE LOCATED IN *ZONE N*

$ZPHL$  = THE PERCENT OF *ZONE N* DESIGN HEATING LOAD SERVED BY AN ELECTRIC HEAT PUMP

$MC$  = THE CREDITS LISTED IN TABLE R408.2.12 FOR MEASURE R408.2.12.1

**R408.2.12.2 EFFICIENT WATER HEATING EQUIPMENT TYPE.** THE INSTALLED HOT WATER SYSTEM SHALL BE AN ELECTRIC TANK WATER HEATER THAT IS AS OR MORE EFFICIENT THAN REQUIRED BY APPLICABLE FEDERAL MINIMUM ENERGY EFFICIENCY STANDARDS.

1 DELETE THE PARAGRAPH MARKED SECTION R405.2, INCLUDING EXCEPTIONS, AND REPLACE  
2 WITH THE FOLLOWING.

3 **SECTION R405.2 SIMULATED BUILDING PERFORMANCE COMPLIANCE.** COMPLIANCE BASED  
4 ON SIMULATED BUILDING PERFORMANCE REQUIRES THAT A BUILDING COMPLY WITH THE  
5 FOLLOWING:

- 6 1. THE REQUIREMENTS OF THE SECTIONS INDICATED WITHIN **R405.2.**
- 7 2. THE PROPOSED TOTAL BUILDING THERMAL ENVELOPE THERMAL CONDUCTANCE (TC)  
8 SHALL BE LESS THAN OR EQUAL TO THE REQUIRED TOTAL BUILDING THERMAL ENVELOPE  
9 TC USING THE PRESCRIPTIVE *U*-FACTORS AND *F*-FACTORS FROM **TABLE R402.1.2**  
10 MULTIPLIED BY 1.05 IN ACCORDANCE WITH **EQUATION 4-2** AND **SECTION R402.1.5.**

11 **EQUATION 4-2**  $TC_{PROPOSED\ DESIGN} \leq 1.05 \times TC_{PRESCRIPTIVE\ REFERENCE\ DESIGN}$

- 12 3. THE ANNUAL SITE ENERGY USE OF EACH DWELLING UNIT SHALL BE LESS THAN OR EQUAL  
13 TO 55 PERCENT OF THE ANNUAL SITE ENERGY USE OF THE STANDARD REFERENCE DESIGN.  
14 FOR EACH DWELLING UNIT WITH GREATER THAN 5,000 SQUARE FEET (465 M<sup>2</sup>) OF LIVING  
15 SPACE LOCATED ABOVE GRADE PLANE, THE ANNUAL SITE ENERGY USE OF THE DWELLING  
16 UNIT SHALL BE REDUCED BY AN ADDITIONAL 5 PERCENT OF ANNUAL SITE ENERGY USE OF  
17 THE STANDARD REFERENCE DESIGN.

18 DELETE TABLE R405.4.2(1) AND REPLACE WITH THE FOLLOWING.

19 **TABLE R405.4.2(1)**

20 **SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS**

<b><u>BUILDING COMPO- NENT</u></b>	<b><u>STANDARD REFERENCE DESIGN</u></b>	<b><u>PROPOSED DESIGN</u></b>
<u>ABOVE- GRADE WALLS</u>	<u>TYPE: MASS WHERE THE PROPOSED WALL IS A MASS WALL; OTHERWISE WOOD FRAME.</u>	<u>AS PROPOSED.</u>
	<u>GROSS AREA: SAME AS PROPOSED.</u>	<u>AS PROPOSED</u>
	<u>U-FACTOR: AS SPECIFIED IN TABLE R402.1.2.</u>	<u>AS PROPOSED.</u>

	<u>SOLAR REFLECTANCE = 0.25.</u>	<u>AS PROPOSED.</u>
	<u>EMITTANCE = 0.90.</u>	<u>AS PROPOSED.</u>
<u>BASEMENT</u>	<u>TYPE: SAME AS PROPOSED.</u>	<u>AS PROPOSED.</u>
<u>AND CRAWL</u>	<u>GROSS AREA: SAME AS PROPOSED.</u>	<u>AS PROPOSED.</u>
<u>SPACE</u>	<u>U-FACTOR: AS SPECIFIED IN TABLE R402.1.2 , WITH THE</u>	<u>AS PROPOSED.</u>
<u>WALLS</u>	<u>INSULATION LAYER ON THE INTERIOR SIDE OF THE</u> <u>WALLS.</u>	
<u>ABOVE-</u>	<u>TYPE: WOOD FRAME.</u>	<u>AS PROPOSED.</u>
<u>GRADE</u>	<u>GROSS AREA: SAME AS PROPOSED.</u>	<u>AS PROPOSED.</u>
<u>FLOORS</u>	<u>U-FACTOR: AS SPECIFIED IN TABLE R402.1.2.</u>	<u>AS PROPOSED.</u>
<u>CEILINGS</u>	<u>TYPE: WOOD FRAME.</u>	<u>AS PROPOSED.</u>
	<u>GROSS AREA: SAME AS PROPOSED.</u>	<u>AS PROPOSED.</u>
	<u>U-FACTOR: AS SPECIFIED IN TABLE R402.1.2.</u>	<u>AS PROPOSED.</u>
<u>ROOFS</u>	<u>TYPE: COMPOSITION SHINGLE ON WOOD SHEATHING.</u>	<u>AS PROPOSED.</u>
	<u>GROSS AREA: SAME AS PROPOSED.</u>	<u>AS PROPOSED.</u>
	<u>SOLAR REFLECTANCE = 0.25.</u>	<u>AS PROPOSED.</u>
	<u>EMITTANCE = 0.90.</u>	<u>AS PROPOSED.</u>
<u>ATTICS</u>	<u>TYPE: VENTED WITH AN APERTURE OF 1 FT<sup>2</sup> PER 300 FT<sup>2</sup></u> <u>OF CEILING AREA.</u>	<u>AS PROPOSED.</u>
<u>FOUNDATIO</u>	<u>TYPE: SAME AS PROPOSED.</u>	<u>AS PROPOSED.</u>
<u>NS</u>	<u>FOUNDATION WALL EXTENSION ABOVE AND BELOW</u> <u>GRADE: SAME AS PROPOSED. FOUNDATION WALL OR</u> <u>SLAB PERIMETER LENGTH: SAME AS PROPOSED.</u> <u>SOIL CHARACTERISTICS: SAME AS PROPOSED.</u>	<u>AS PROPOSED.</u>
	<u>FOUNDATION WALL U-FACTOR AND SLAB F-FACTOR: AS</u> <u>SPECIFIED IN TABLE R402.1.2.</u>	
<u>OPAQUE</u>	<u>AREA: 40 FT<sup>2</sup>.</u>	<u>AS PROPOSED.</u>
<u>DOORS</u>	<u>ORIENTATION: NORTH.</u>	<u>AS PROPOSED.</u>
	<u>U-FACTOR: SAME AS FENESTRATION AS SPECIFIED IN</u> <u>TABLE R402.1.2 .</u>	<u>AS PROPOSED.</u>

<u>VERTICAL FENESTRATION ON OTHER THAN OPAQUE DOORS</u>	<u>TOTAL AREA =</u>  <u>(A) THE PROPOSED GLAZING AREA, WHERE THE PROPOSED GLAZING AREA IS LESS THAN 15 PERCENT OF THE CONDITIONED FLOOR AREA.</u>  <u>(B) 15 PERCENT OF THE CONDITIONED FLOOR AREA, WHERE THE PROPOSED GLAZING AREA IS 15 PERCENT OR MORE OF THE CONDITIONED FLOOR AREA.</u>	<u>AS PROPOSED.</u>
	<u>ORIENTATION: EQUALLY DISTRIBUTED TO FOUR CARDINAL COMPASS ORIENTATIONS (N, E, S &amp; W).</u>	<u>AS PROPOSED.</u>
	<u>U-FACTOR: AS SPECIFIED IN TABLE R402.1.2.</u>	<u>AS PROPOSED.</u>
	<u>SHGC: AS SPECIFIED IN TABLE R402.1.2 EXCEPT FOR CLIMATE ZONES WITHOUT AN SHGC REQUIREMENT, THE SHGC SHALL BE EQUAL TO 0.40.</u>	<u>AS PROPOSED.</u>
	<u>INTERIOR SHADE FRACTION: <math>0.92 - (0.21 \times \text{SHGC FOR THE STANDARD REFERENCE DESIGN})</math>.</u>	<u>INTERIOR SHADE FRACTION: <math>0.92 - (0.21 \times \text{SHGC AS PROPOSED})</math>.</u>
	<u>EXTERNAL SHADING: NONE</u>	<u>AS PROPOSED.</u>
<u>SKYLIGHTS</u>	<u>NONE</u>	<u>AS PROPOSED.</u>
<u>THERMALLY ISOLATED SUNROOMS</u>	<u>NONE</u>	<u>AS PROPOSED.</u>
<u>AIR LEAKAGE RATE</u>	<u>FOR DETACHED ONE-FAMILY DWELLINGS, THE AIR LEAKAGE RATE AT A PRESSURE OF 0.2 INCH WATER GAUGE (50 PA) SHALL BE AS FOLLOWS:</u>  <u>CLIMATE ZONES 0 THROUGH 2: 4.0 AIR CHANGES PER HOUR.</u>  <u>CLIMATE ZONES 3, 4 AND 5: 3.0 AIR CHANGES PER HOUR.</u>  <u>CLIMATE ZONES 6 THROUGH 8: 2.5 AIR CHANGES PER</u>	<u>THE MEASURED AIR LEAKAGE RATE.A</u>

	<p><u>HOUR.</u></p> <p><u>FOR DETACHED ONE-FAMILY DWELLINGS THAT ARE 1,500 FT<sup>2</sup> OR SMALLER AND ATTACHED DWELLING UNITS OR SLEEPING UNITS, THE AIR LEAKAGE RATE AT A PRESSURE OF 0.2 INCH WATER GAUGE (50 PA) SHALL BE 0.27 CFM/FT<sup>2</sup> OF THE TESTING UNIT ENCLOSURE AREA.</u></p>	
<p><u>MECHANICAL VENTILATION RATE</u></p>	<p><u>THE MECHANICAL VENTILATION RATE SHALL BE IN ADDITION TO THE AIR LEAKAGE RATE AND SHALL BE THE SAME AS IN THE PROPOSED DESIGN, BUT NOT GREATER THAN <math>B \times M</math></u></p> <p><u>WHERE:</u></p> <p><u><math>B = 0.01 \times CFA + 7.5 \times (NBR + 1)</math>, CFM.</u></p> <p><u><math>M = 1.0</math> WHERE THE MEASURED AIR LEAKAGE RATE IS <math>\geq 3.0</math> AIR CHANGES PER HOUR AT 50 PASCALS, AND OTHERWISE, <math>M = \text{MINIMUM}(1.7, Q/B)</math>.</u></p> <p><u><math>Q</math> = THE PROPOSED MECHANICAL VENTILATION RATE, CFM.</u></p> <p><u><math>CFA</math> = CONDITIONED FLOOR AREA, FT<sup>2</sup>.</u></p> <p><u><math>NBR</math> = NUMBER OF BEDROOMS.</u></p>	<p><u>THE MEASURED MECHANICAL VENTILATION RATE <math>B(Q)</math> SHALL BE IN ADDITION TO THE MEASURED AIR LEAKAGE RATE.</u></p>
<p><u>MECHANICAL VENTILATION FAN ENERGY</u></p>	<p><u>THE MECHANICAL VENTILATION SYSTEM TYPE SHALL BE THE SAME AS IN THE PROPOSED DESIGN. HEAT RECOVERY OR ENERGY RECOVERY SHALL BE MODELED FOR MECHANICAL VENTILATION WHERE REQUIRED BY SECTION R403.6.1. HEAT RECOVERY OR ENERGY RECOVERY SHALL NOT BE MODELED FOR MECHANICAL VENTILATION WHERE NOT REQUIRED BY SECTION R403.6.1.</u></p> <p><u>WHERE MECHANICAL VENTILATION IS NOT SPECIFIED IN THE PROPOSED DESIGN: NONE</u></p> <p><u>WHERE MECHANICAL VENTILATION IS SPECIFIED IN THE PROPOSED DESIGN, THE ANNUAL VENT FAN ENERGY USE,</u></p>	<p><u>AS PROPOSED.</u></p>

	<p>IN UNITS OF KWH/YR, SHALL EQUAL <math>(8.76 \times B \times M)/EF</math></p> <p>WHERE: <math>B</math> AND <math>M</math> ARE DETERMINED IN ACCORDANCE WITH THE AIR EXCHANGE MECHANICAL VENTILATION RATE ROW OF THIS TABLE. <math>EF</math> = THE MINIMUM FAN EFFICACY, AS SPECIFIED IN TABLE R403.6.2, CORRESPONDING TO THE SYSTEM TYPE AT A FLOW RATE OF <math>B \times M</math>.</p>	
<u>INTERNAL GAINS</u>	<p><u>IGAIN, IN UNITS OF BTU/DAY PER DWELLING UNIT, SHALL EQUAL <math>17,900 + 23.8 \times CFA + 4,104 \times NBR</math></u></p> <p>WHERE:</p> <p><u><math>CFA</math> = CONDITIONED FLOOR AREA, FT<sup>2</sup>.</u></p> <p><u><math>NBR</math> = NUMBER OF BEDROOMS.</u></p>	<u>SAME AS STANDARD REFERENCE DESIGN.</u>
<u>INTERNAL MASS</u>	<p><u>INTERNAL MASS FOR FURNITURE AND CONTENTS: 8 POUNDS PER SQUARE FOOT OF FLOOR AREA.</u></p>	<p><u>SAME AS STANDARD REFERENCE DESIGN,</u></p> <p><u>PLUS ANY</u></p> <p><u>ADDITIONAL MASS</u></p> <p><u>SPECIFICALLY</u></p> <p><u>DESIGNED AS A</u></p> <p><u>THERMAL STORAGE</u></p> <p><u>ELEMENTC BUT NOT</u></p> <p><u>INTEGRAL TO THE</u></p> <p><u>BUILDING THERMAL</u></p> <p><u>ENVELOPE OR</u></p> <p><u>STRUCTURE.</u></p>
<u>STRUCTURAL MASS</u>	<p><u>FOR MASONRY FLOOR SLABS: 80 PERCENT OF FLOOR AREA COVERED BY R-2 CARPET AND PAD, AND 20 PERCENT OF FLOOR DIRECTLY EXPOSED TO ROOM AIR.</u></p>	<u>AS PROPOSED.</u>
	<p><u>FOR MASONRY BASEMENT WALLS: AS PROPOSED, BUT WITH INSULATION AS SPECIFIED IN TABLE R402.1.3, LOCATED ON THE INTERIOR SIDE OF THE WALLS.</u></p>	<u>AS PROPOSED.</u>



	<u>FOR OTHER WALLS, CEILINGS, FLOORS, AND INTERIOR WALLS: WOOD-FRAMED CONSTRUCTION.</u>	<u>AS PROPOSED.</u>
<u>HEATING</u> <u>SYSTEMS</u> <u>D,E</u>	<u>FUEL TYPE/CAPACITY: NATURAL GAS, WITH CAPACITY THE SAME AS PROPOSED DESIGN</u>	<u>AS PROPOSED.</u>
	<u>PRODUCT CLASS: IF THE PROPOSED DESIGN USES ONLY NATURAL GAS HEATING SYSTEMS, SAME AS PROPOSED DESIGN. FOR ANY PROPOSED HEATING SYSTEMS THAT DO NOT USE NATURAL GAS, THE <i>STANDARD REFERENCE DESIGN</i> SHALL INCLUDE A HEATING SYSTEM OF A PRODUCT CLASS THAT USES NATURAL GAS. FOR <i>PROPOSED DESIGNS</i> WITH FORCED AIR OR ELECTRIC RESISTANCE RADIATIVE HEATING DISTRIBUTION SYSTEMS, SUBSTITUTE A FURNACE. FOR <i>PROPOSED DESIGNS</i> WITH HYDRONIC HEATING DISTRIBUTION SYSTEMS, SUBSTITUTE A BOILER.</u>	<u>AS PROPOSED.</u>
	<u>EFFICIENCIES:</u>	
	<u>FUEL GAS AND LIQUID FUEL FURNACES: COMPLYING WITH AND HAVING EFFICIENCY RATINGS EQUAL TO THE MINIMUM REQUIREMENTS OF 10 CFR §430.32.</u>	<u>FORCED AIR AND ELECTRIC RESISTANCE HEATING SYSTEMS AS PROPOSED.</u>
	<u>FUEL GAS AND LIQUID FUEL BOILERS: COMPLYING WITH AND HAVING EFFICIENCY RATINGS EQUAL TO THE MINIMUM REQUIREMENTS OF 10 CFR §430.32.</u>	<u>HYDRONIC HEATING SYSTEMS AS PROPOSED.</u>
<u>COOLING</u> <u>SYSTEMS</u> <u>D, F</u>	<u>FUEL TYPE: ELECTRIC</u> <u>CAPACITY: SAME AS PROPOSED DESIGN.</u>	<u>AS PROPOSED.</u>
	<u>EFFICIENCIES: COMPLYING WITH 10 CFR §430.32.</u>	<u>AS PROPOSED.</u>
<u>SERVICE</u> <u>WATER</u> <u>HEATING</u> <u>D, G</u>	<u>USE, IN UNITS OF GAL/DAY = <math>25.5 + (8.5 \times NBR)</math></u> <u>WHERE: <math>NBR</math> = NUMBER OF BEDROOMS.</u>	<u>USE, IN UNITS OF GAL/DAY = <math>25.5 + (8.5 \times NBR) \times (1 - HWDS)</math></u>

		<p><u>WHERE:</u></p> <p><u>NBR</u> = NUMBER OF BEDROOMS.</p> <p><u>HWDS</u> = FACTOR FOR THE COMPACTNESS OF THE HOT WATER DISTRIBUTION SYSTEM.</p>		
		<p><b><u>COMPACTNESS RATIO</u></b></p> <p><b><u>FACTOR</u></b></p>		<p><b><u>HWDS</u></b></p>
		<p><u>1</u> <u>STORY</u></p>	<p><u>2 OR</u> <u>MORE</u> <u>STORIES</u></p>	
		<p><u>≥</u> <u>60%</u></p>	<p><u>≥</u> <u>30%</u></p>	<p><u>0</u></p>
		<p><u>≥</u> <u>30%</u> <u>TO ≤</u> <u>60%</u></p>	<p><u>≥</u> <u>15%</u> <u>TO ≤</u> <u>30%</u></p>	<p><u>0.05</u></p>
		<p><u>≥</u> <u>15%</u> <u>TO ≤</u> <u>30%</u></p>	<p><u>≥</u> <u>7.5%</u> <u>TO ≤</u> <u>15%</u></p>	<p><u>0.10</u></p>
		<p><u>≤</u> <u>15%</u></p>	<p><u>≤</u> <u>7.5%</u></p>	<p><u>0.15</u></p>
	<p><u>FUEL TYPE AND PRODUCT CLASS: NATURAL GAS TANK</u> <u>WATER HEATER.</u></p>	<p><u>AS PROPOSED.</u></p>		
	<p><u>RATED STORAGE VOLUME: SAME AS PROPOSED DESIGN.</u></p>	<p><u>AS PROPOSED.</u></p>		
	<p><u>DRAW PATTERN: SAME AS PROPOSED DESIGN.</u></p>	<p><u>AS PROPOSED.</u></p>		

	<u>EFFICIENCIES: UNIFORM ENERGY FACTOR COMPLYING WITH AND HAVING EFFICIENCY RATINGS EQUAL TO THE MINIMUM REQUIREMENTS OF 10 CFR §430.32.</u>				<u>AS PROPOSED.</u>
	<u>TANK TEMPERATURE: 120°F (48.9°C).</u>				<u>SAME AS STANDARD REFERENCE DESIGN.</u>
<u>THERMAL DISTRIBUTION SYSTEMS</u>	<u>DUCT INSULATION: IN ACCORDANCE WITH SECTION R403.3.3.</u>				<u>DUCT INSULATION: AS PROPOSED.K</u>
	<u>DUCT LOCATION:</u>				<u>DUCT LOCATION: AS PROPOSED.J</u>
	<u>FOUNDATION TYPE</u>	<u>SLAB ON GRADE</u>	<u>UNCONDITIONED CRAWL SPACE</u>	<u>BASEMENT OR CONDITIONED CRAWL SPACE</u>	<u>---</u>
	<u>DUCT LOCATION (SUPPLY AND RETURN)</u>	<u>ONE-STORY BUILDING: 100% IN UNCONDITIONED ATTIC. ALL OTHER: 75% IN UNCONDITIONED ATTIC AND 25% INSIDE CONDITIONED SPACE.</u>	<u>ONE-STORY BUILDING: 100% IN UNCONDITIONED CRAWL SPACE. ALL OTHER: 75% IN UNCONDITIONED CRAWL SPACE AND 25% INSIDE CONDITIONED SPACE.</u>	<u>75% INSIDE CONDITIONED SPACE 25% UNCONDITIONED ATTIC.</u>	<u>DUCT SYSTEM LEAKAGE TO OUTSIDE: THE MEASURED TOTAL DUCT SYSTEM LEAKAGE RATE SHALL BE ENTERED INTO THE SOFTWARE AS THE DUCT SYSTEM LEAKAGE TO OUTSIDE RATE.</u>
	<u>DUCT SYSTEM LEAKAGE TO OUTSIDE: FOR DUCT SYSTEMS SERVING &gt; 1,000 FT2 OF CONDITIONED FLOOR</u>				<u>EXCEPTIONS:</u> <u>1 WHERE DUCT : SYSTEM LEAKAGE</u>

	<p><u>AREA, THE DUCT LEAKAGE TO OUTSIDE RATE SHALL BE 4</u>  <u>CFM PER 100 FT<sup>2</sup> OF CONDITIONED FLOOR AREA.</u>  <u>FOR DUCT SYSTEMS SERVING ≤ 1,000 FT<sup>2</sup> OF</u>  <u>CONDITIONED FLOOR AREA, THE DUCT LEAKAGE TO</u>  <u>OUTSIDE RATE SHALL BE 40 CFM.</u></p>	<p><u>TO OUTSIDE IS</u>  <u>TESTED IN</u>  <u>ACCORDANCE</u>  <u>ANSI/RESNET/I</u>  <u>CC 380 OR ASTM</u>  <u>E1554, THE</u>  <u>MEASURED VALUE</u>  <u>SHALL BE</u>  <u>PERMITTED TO BE</u>  <u>ENTERED.</u>  <u>WHERE TOTAL</u>  <u>DUCT SYSTEM</u>  <u>LEAKAGE IS</u>  <u>MEASURED</u>  <u>WITHOUT SPACE</u>  <u>CONDITIONING</u>  <u>2</u>  <u>EQUIPMENT</u>  <u>2</u>  <u>INSTALLED, THE</u>  <u>SIMULATION</u>  <u>VALUE SHALL BE 4</u>  <u>CFM PER 100 FT<sup>2</sup></u>  <u>OF CONDITIONED</u>  <u>FLOOR AREA.</u></p>
	<p><u>DISTRIBUTION SYSTEM EFFICIENCY (DSE): FOR</u>  <u>HYDRONIC SYSTEMS AND DUCTLESS SYSTEMS, A</u>  <u>THERMAL DSE OF 0.88 SHALL BE APPLIED TO BOTH THE</u>  <u>HEATING AND COOLING SYSTEM EFFICIENCIES.</u></p>	<p><u>DISTRIBUTION</u>  <u>SYSTEM EFFICIENCY</u>  <u>(DSE): FOR</u>  <u>HYDRONIC SYSTEMS</u>  <u>AND DUCTLESS</u>  <u>SYSTEMS, DSE SHALL</u></p>

		<u>BE AS SPECIFIED IN TABLE R405.4.2(2).</u>
<u>THERMOSTAT</u>	<u>TYPE: MANUAL, COOLING TEMPERATURE SETPOINT = 75°F; HEATING TEMPERATURE SETPOINT = 72°F.</u>	<u>SAME AS STANDARD REFERENCE DESIGN.</u>
<u>DEHUMIDISTAT</u>	<u>WHERE A MECHANICAL VENTILATION SYSTEM WITH LATENT HEAT RECOVERY IS NOT SPECIFIED IN THE PROPOSED DESIGN: NONE. WHERE THE PROPOSED DESIGN UTILIZES A MECHANICAL VENTILATION SYSTEM WITH LATENT HEAT RECOVERY:  DEHUMIDISTAT TYPE: MANUAL, SETPOINT = 60% RELATIVE HUMIDITY.  DEHUMIDIFIER: WHOLE-DWELLING WITH INTEGRATED ENERGY FACTOR = 1.77 LITERS/kWh.</u>	<u>SAME AS STANDARD REFERENCE DESIGN.</u>

1

2 DELETE FOOTNOTE D. TO TABLE R405.4.2(1) AND REPLACE WITH THE FOLLOWING.

3 D. FOR A PROPOSED DESIGN WITH MULTIPLE HEATING, COOLING OR WATER HEATING SYSTEMS

4 USING DIFFERENT PRODUCT CLASSES, THE APPLICABLE STANDARD REFERENCE DESIGN SYSTEM

5 CAPACITIES AND PRODUCT CLASSES SHALL BE WEIGHTED IN ACCORDANCE WITH THEIR RESPECTIVE

6 LOADS AS CALCULATED BY ACCEPTED ENGINEERING PRACTICE FOR EACH PRODUCT CLASS

7 PRESENT.

8 Delete footnote g. to Table R405.4.2(1) and replace with the following.

9 G. FOR A PROPOSED DESIGN WITHOUT A PROPOSED WATER HEATER, THE FOLLOWING ASSUMPTIONS

10 SHALL BE MADE FOR THE PROPOSED DESIGN AND THE STANDARD REFERENCE DESIGN.

11 FUEL TYPE: FOR THE STANDARD REFERENCE DESIGN, NATURAL GAS. FOR THE PROPOSED DESIGN,

12 THE SAME AS THE PREDOMINANT HEATING FUEL TYPE IN THE PROPOSED DESIGN.

13 RATED STORAGE VOLUME: 40 GALLONS

14 DRAW PATTERN: MEDIUM

EFFICIENCY: UNIFORM ENERGY FACTOR COMPLYING WITH AND NOT EXCEEDING THE MINIMUM  
EFFICIENCY REQUIREMENTS OF **10 CFR § 430.32**

**DELETE FOOTNOTES J. AND K. TO TABLE R405.4.2(1) WITHOUT SUBSTITUTION.**

DELETE FOOTNOTES L. AND M. TO TABLE R405.4.2(1) AND REPLACE WITH THE FOLLOWING.

J. ONLY SECTIONS OF DUCTWORK THAT ARE INSTALLED IN ACCORDANCE WITH SECTION R403.3.4,  
ITEMS 1 AND 2 ARE ASSUMED TO BE LOCATED COMPLETELY INSIDE CONDITIONED SPACE. ALL  
OTHER SECTIONS OF DUCTWORK ARE NOT ASSUMED TO BE LOCATED COMPLETELY INSIDE  
CONDITIONED SPACE.

K. SECTIONS OF DUCTWORK INSTALLED IN ACCORDANCE WITH SECTION R403.3.5.1 ARE ASSUMED  
TO HAVE AN EFFECTIVE DUCT INSULATION R-VALUE OF R-25.

DELETE THE PARAGRAPH MARKED SECTION R406.3 AND REPLACE WITH THE FOLLOWING.

SECTION R406.3 BUILDING THERMAL ENVELOPE. THE PROPOSED TOTAL BUILDING THERMAL  
ENVELOPE THERMAL CONDUCTANCE (TC) SHALL BE LESS THAN OR EQUAL TO THE REQUIRED TOTAL  
BUILDING THERMAL ENVELOPE TC USING THE PRESCRIPTIVE U-FACTORS AND F-FACTORS FROM  
TABLE R402.1.2 MULTIPLIED BY 1.05 IN ACCORDANCE WITH EQUATION 4-2 AND SECTION  
R402.1.5.

DELETE THE PARAGRAPH MARKED SECTION R406.5 AND REPLACE WITH THE FOLLOWING.

**SECTION R406.5 ERI-BASED COMPLIANCE.** COMPLIANCE BASED ON AN *ENERGY RATING INDEX*  
(*ERI*) ANALYSIS REQUIRES THAT THE *RATED DESIGN* AND EACH CONFIRMED AS-BUILT *DWELLING*  
*UNIT* BE SHOWN TO HAVE AN *ERI* LESS THAN OR EQUAL TO THE APPLICABLE VALUE INDICATED IN  
**TABLE R406.5** WHERE COMPARED TO THE *ERI REFERENCE DESIGN* AS FOLLOWS:

1. WHERE THE BUILDING USES *PURCHASED ENERGY* THAT IS NOT ELECTRICITY FOR *SPACE*  
*CONDITIONING* OR *SERVICE WATER HEATING* AND ON-SITE RENEWABLES ARE NOT INSTALLED, THE  
VALUES UNDER ENERGY RATING INDEX NOT INCLUDING OPP, MIXED-FUEL  
BUILDING APPLY.

2. WHERE THE BUILDING DOES NOT USE *PURCHASED ENERGY* THAT IS NOT ELECTRICITY FOR *SPACE*  
*CONDITIONING* OR *SERVICE WATER HEATING* AND ON-SITE RENEWABLES ARE NOT INSTALLED, THE

VALUES under ENERGY RATING INDEX NOT INCLUDING OPP, ELECTRIC HEAT BUILDING APPLY.

3. WHERE THE BUILDING USES *PURCHASED* ENERGY THAT IS NOT ELECTRICITY FOR *SPACE* *CONDITIONING* OR *SERVICE WATER HEATING* AND ON-SITE RENEWABLES ARE INSTALLED, THE VALUES UNDER ENERGY RATING INDEX WITH OPP, MIXED-FUEL BUILDING APPLY.

4. WHERE THE BUILDING DOES NOT USE *PURCHASED ENERGY* THAT IS NOT ELECTRICITY FOR *SPACE* *CONDITIONING* OR *SERVICE WATER HEATING* AND ON-SITE RENEWABLES ARE INSTALLED, THE VALUES UNDER ENERGY RATING INDEX WITH OPP, ELECTRIC HEAT BUILDING APPLY.

DELETE TABLE R406.5 AND REPLACE WITH THE FOLLOWING.

**TABLE R406.5**

**MAXIMUM ENERGY RATING INDEX**

<b><u>"CLIMATE ZONE</u></b>	<b><u>ENERGY RATING INDEX NOT INCLUDING OPP</u></b>		<b><u>ENERGY RATING INDEX WITH OPP</u></b>	
	<b><u>MIXED-FUEL BUILDING</u></b>	<b><u>ELECTRIC HEAT BUILDING</u></b>	<b><u>MIXED-FUEL BUILDING</u></b>	<b><u>ELECTRIC HEAT BUILDING</u></b>
<u>4</u>	<u>33</u>	<u>48</u>	<u>17</u>	<u>32."</u>

On page 58 in line 28, Insert the following:

**"SECTION 3.108 SEVERABILITY.**

IF ANY PROVISION OF THIS SUBTITLE OR THE APPLICATION THEREOF TO ANY PERSON OR CIRCUMSTANCES IS HELD INVALID FOR ANY REASON IN A COURT OF COMPETENT JURISDICTION, THE INVALIDITY DOES NOT AFFECT OTHER PROVISIONS OR ANY OTHER APPLICATION OF THIS SUBTITLE WHICH CAN BE GIVEN EFFECT WITHOUT THE INVALID PROVISION OR APPLICATION, AND FOR THIS PURPOSE THE PROVISIONS OF THIS ACT ARE SEVERABLE."