

**VARIANCE FEES**

MGO \$50.00  
 COMM \$490.00  
 Priority - Double above

**PETITION FOR VARIANCE APPLICATION**

**City of Madison**  
**Building Inspection Division**  
 215 Martin Luther King Jr. Blvd. Ste. 17  
 PO Box 2984  
 Madison, WI 53701-2984  
 (608) 266-4568

Amount Paid \$490 HA 12-2-19

Name of Owner Bill Eberhardt	Project Description New construction of 2-story elementary school	Agent, architect, or engineering firm MEP Associates, LLC (engineering firm)
Company (if applies) Middleton-Cross Plains Area School District		No. & Street 1111 Deming Way, Suite 202
No. & Street 2130 Pinehurst Drive	Tenant name (if any)	City, State, Zip Code Madison, WI 53717
City, State, Zip Code Middleton, WI 53562	Building Address  <u>816 SCHEWERA</u>	Phone 608.848.9556
Phone 608.829.2353		Name of Contact Person Josh Hinson
e-mail beberhardt@mcpasd.k12.wi.us		e-mail joshh@mepassociates.com

- The rule being petitioned reads as follows: (Cite the specific rule number and language. Also, indicate the nonconforming conditions for your project.)  
 SPS 363.0403 (8) Piping Insulation. (a) The requirements in IECC section C403.2.10 are not included as part of chs. SPS 361 to 366. Substitute 2009 IECC Table 503.2.8 for IECC Table C403.2.10.  
 The above code section requires pipe insulation thicknesses to comply with the 2009 IECC Table 503.2.8 as opposed to the 2015 IECC requirements. We propose to follow the requirements of the 2015 IECC per Table C403.2.10. Refer to Exhibit A for the 2009 and 2015 tables.
- The rule being petitioned cannot be entirely satisfied because:  
 The additional pipe insulation thickness required by the 2009 IECC Table 503.2.8 has been determined to provide no additional benefit to the project. Fluid operating temperatures are as follows: Low-temp Chilled Water 42-57°F; High-temp Chilled Water 56-61°F; and Heating Hot Water 115-130°F. The mechanical system, as designed, is estimated to consume 61% less energy when compared to a baseline system complying with minimum code requirements. Refer to Exhibit B for Focus On Energy results.
- The following alternatives and supporting information are proposed as a means of providing an equivalent degree of health, safety, and welfare as addressed by the rule:  
 Pipe insulation with thicknesses in accordance with the 2015 IECC Table C403.2.10 for fluid temperatures of 40-60°F and 105-140°F.

**Note: Please attach any pictures, plans, or required position statements.**

**VERIFICATION BY OWNER – PETITION IS VALID ONLY IF NOTARIZED AND ACCOMPANIED BY A REVIEW FEE AND ANY REQUIRED POSITION STATEMENTS.**

Note: Petitioner must be the owner of the building. Tenants, agents, contractors, attorneys, etc. may not sign the petition unless a Power of Attorney is submitted with the Petition for Variance Application.

Lori Ames, being duly sworn, I state as petitioner that I have read the foregoing petition, that I believe it to be true, and I have significant ownership rights in the subject building or project.

Signature of owner <u>Lori Ames</u>	Subscribed and sworn to before me this date: <u>11-26-19</u>
Notary public <u>Cheryl Jansse</u>	My commission expires: <u>7.25.21</u>

**NOTE: ONLY VARIANCES FOR COMMERCIAL CODES ARE REQUIRED TO BE NOTARIZED.**

# EXHIBIT A

## 2009 IECC

**TABLE 503.2.8  
MINIMUM PIPE INSULATION  
(thickness in inches)**

FLUID	NOMINAL PIPE DIAMETER	
	< 1.5"	> 1.5"
Steam	1 1/2	3
Hot water	1 1/2	2
Chilled water, brine or refrigerant	1 1/2	1 1/2

For SI: 1 inch = 25.4 mm.

- a. Based on insulation having a conductivity (*k*) not exceeding 0.27 Btu · inch/h · ft<sup>2</sup> · °F.
- b. For insulation with a thermal conductivity not equal to 0.27 Btu · inch/h · ft<sup>2</sup> · °F at a mean temperature of 75°F, the minimum required pipe thickness is adjusted using the following equation:

$$T = r[(1 + t/r)^{0.8} - 1]$$

where:

- T* = Adjusted insulation thickness (in).
- r* = Actual pipe radius (in).
- t* = Insulation thickness from applicable cell in table (in).
- K* = New thermal conductivity at 75°F (Btu · in/hr · ft<sup>2</sup> · °F).
- k* = 0.27 Btu · in/hr · ft<sup>2</sup> · °F.

## 2015 IECC

### C403.2.10 Piping insulation.

Piping serving as part of a heating or cooling system shall be thermally insulated in accordance with Table C403.2.10.

#### Exceptions:

1. Factory-installed piping within HVAC equipment tested and rated in accordance with a test procedure referenced by this code.
2. Factory-installed piping within room fan-coils and unit ventilators tested and rated according to AHRI 440 (except that the sampling and variation provisions of Section 6.5 shall not apply) and AHRI 840, respectively.
3. Piping that conveys fluids that have a design operating temperature range between 60°F (15°C) and 105°F (41°C).
4. Piping that conveys fluids that have not been heated or cooled through the use of fossil fuels or electric power.
5. Strainers, control valves, and balancing valves associated with piping 1 inch (25 mm) or less in diameter.
6. Direct buried piping that conveys fluids at or below 60°F (15°C).

**TABLE C403.2.10  
MINIMUM PIPE INSULATION THICKNESS (in inches)<sup>a, c</sup>**

FLUID OPERATING TEMPERATURE RANGE AND USAGE (°F)	INSULATION CONDUCTIVITY		NOMINAL PIPE OR TUBE SIZE (inches)				
	Conductivity Btu · in./h · ft <sup>2</sup> · °F <sup>b</sup>	Mean Rating Temperature, °F	< 1	1 to < 1 1/2	1 1/2 to < 4	4 to < 8	≥ 8
> 350	0.32 – 0.34	250	4.5	5.0	5.0	5.0	5.0
251 – 350	0.29 – 0.32	200	3.0	4.0	4.5	4.5	4.5
201 – 250	0.27 – 0.30	150	2.5	2.5	2.5	3.0	3.0
141 – 200	0.25 – 0.29	125	1.5	1.5	2.0	2.0	2.0
105 – 140	0.21 – 0.28	100	1.0	1.0	1.5	1.5	1.5
40 – 60	0.21 – 0.27	75	0.5	0.5	1.0	1.0	1.0
< 40	0.20 – 0.26	50	0.5	1.0	1.0	1.0	1.5

For SI: 1 inch = 25.4 mm; °C = [(°F) - 32]/1.8.

a. For piping smaller than 1 1/2 inches and located in partitions within conditioned spaces, reduction of these thicknesses by 1 inch shall be permitted (before thickness adjustment required in footnote b) but not to a thickness less than 1 inch.

b. For insulation outside the stated conductivity range, the minimum thickness (T) shall be determined as follows:

## EXHIBIT B

Energy Parameter	Baseline*	Bundle 2, As Modeled - including Ground Loop (Renewable) Savings*	Bundle 2, As Modeled - without Ground Loop Saving*
Energy Cost	\$162,644	\$62,456	\$74,506
Energy Cost Savings		\$100,188	\$88,138
Percent Energy Cost Savings		62%	54%
Electricity Demand	262 kW	120 kW	122 kW
Electricity Demand Savings		142 kW	140 kW
Percent Electricity Demand Savings		54%	53%
Electricity Consumption	1,473,101 kWh	559,734 kWh	670,081 kWh
Electricity Consumption Savings		913,367 kWh	803,020 kWh
Percent Electricity Consumption Savings		62%	55%
Natural Gas Consumption	2,120 therms	1,587 therms	1,587 therms
Natural Gas Consumption Savings		533 therms	533 therms
Percent Natural Gas Consumption Savings		25%	25%
Incremental First Cost		\$1,258,708	\$1,258,708
Incremental First Cost after incentives		\$1,153,916	\$1,153,916
<b>Estimated Focus on Energy Electric Incentive</b>			\$104,392.60
<b>Estimated Focus on Energy Gas Incentive</b>			\$399.75
<b>Estimated Focus on Energy Incentive**</b>			\$104,792.35
<b>Simple Payback with Incentive (in years)</b>			<b>11.5***</b>

\* The figures in the 'Baseline' and 'Bundle 2, As Modeled' are reprinted from the June 19, 2019, Design Assistance Results Meeting Minutes for this project, which were the basis for the original energy savings projections. Results are presented with and without the ground loop incorporated into the model. Incentives are calculated from the savings without the ground loop, as incentives cannot be provided for energy savings associated with the ground loop.

\*\*The Focus on Energy Design Assistance incentive cannot reduce the simple payback below 1.5 years, and is capped at \$500,000.

\*\*\* The simple payback is calculated using the total incremental cost of (\$1,153,916) after incentives, and the total energy savings of (\$100,188) for the actual mechanical system, which includes the ground-coupled heat pumps.

Energy Parameter	Baseline	Bundle 2, As Modeled
<b>Building Results</b>		
Energy Use Intensity (EUI)	46.4 kBtu/sf	18.3 kBtu/sf
EUI Savings		28.1 kBtu/sf
Percent EUI Savings		61%

## **APPLICATION INSTRUCTIONS**

1. Fill in the owner's information section. It is important to have a complete address and phone number for communication between the applicant and the department.
2. Fill in the project description box. Explain what the building project is. (Basement alteration, second floor alteration, two-story addition, etc.)
3. If there is an agent working for the owner and the agent is a better contact for information regarding the variance, fill in the agent information area.
4. Answer the three questions.
  1. State the code and section number with a summary of what the code says. Also, indicate what the nonconforming conditions for the project are. (example: SPS 321.04 minimum stair width is 36 inches. We will have 34 inches of stair width.)
  2. State why the rule cannot be satisfied. (example: not structurally feasible)
  3. State what will be done to provide an equivalency to the code. These items should be things that relate to the item the variance is being sought for and exceed code requirements.
5. Print the Owner's name on the line indicating to do so.
6. The owner of the property is required to sign where indicated. If the project is for a one or two family home the form is not required to be notarized. If the project is for a commercial building the form is required to be notarized.

## **Variance Procedure**

1. Fill out the variance form.
2. If the variance is for a commercial building and is not for an accessibility code contact the fire department so they can fill out a fire department position statement.
3. Submit the application and fee to the building inspection department. Also, where applicable, submit the fire department position statement.
4. A field inspector may visit the site to verify existing conditions and the completeness of the application.
5. If there have previously been at least 5 variances for the same item approved, the variance may be approved on precedence. In this case the applicant will not have to attend a meeting of the building board and will be notified by letter that the variance is approved. The letter will be sent within 7 days after the scheduled meeting.
6. In all other cases the variance will be presented to the building board at a monthly meeting. 7 days before the meeting the supervisor will review the variance for approval to be put on the agenda. 5 days before the meeting the secretary will mail out the agenda to the Appeals Board members and to the applicants.
7. When a variance is heard by the board the applicant or agent must attend the meeting to answer questions.
8. The meeting minutes will be mailed within 7 days after the meeting.