MEMORANDUM

TO: **IOWA TRM TECHNICAL ADVISORY COMMITTEE**

FROM: CHERYL JENKINS, PROJECT MANAGER and SAM DENT, TECHNICAL LEAD - VEIC

SUBJECT: V4.0 ERRATA MEASURE - EFFECTIVE 01/01/2020

DATE: 07/22/2020

Cc: Chaz Allen, IUA

The following errors in the Iowa Technical Reference Manual (TRM) have been identified. These should be applied as erratum to correct TRM Version 4.0, and be made effective 01/01/2020.

Each erratum is summarized in the table below, followed by a redline version of the measure.

Summary of Errata Measures

Section	Measure Name	New Measure Code	Brief Summary of Change
2.6.3	Rim/Band Joist Insulation	RS-SHL-RINS-V04-200101	Fixing error in v4 that had heating efficiency assumptions switched for sealed and unsealed ducts.
3.1.5	Automatic Milker Take Off	NR-AGE-AMTO-V03-200101	A formatting issue resulted in the "kWh/cow/milking" value being presented as 5031, when the "31" was a reference to the footnote – i.e., the value should be have been 50[31]. This has been made an errata to ensure that this is not incorrectly applied in 2020.
3.6.8	Conveyor Oven	NR-FSE-CVOV-V03-200101	Fixing error in calculation. Preheat assumptions are per preheat, not a rate (Btu/hr).

2.6.3 Rim/Band Joist Insulation

DESCRIPTION

This measure describes savings from adding insulation (either rigid or spray foam) to rim/band joist cavities. This measure requires a member of the implementation staff evaluating the pre- and post-project R-values and to measure surface areas. The efficiency of the heating and cooling equipment in the home should also be evaluated if possible.

Note unconditioned means a space that is not intentionally heated via furnace vents or boiler radiators. The presence of and/or leakage from a heating system in a space doesn't in itself imply the space is conditioned. If sealing of ducts is unknown, the sealed efficiency should be used.

This measure was developed to be applicable to the following program types: RF.

If applied to other program types, the measure savings should be verified.

DEFINITION OF EFFICIENT EQUIPMENT

The requirements for participation in the program will be defined by the utilities.

DEFINITION OF BASELINE EQUIPMENT

The existing condition will be evaluated by implementation staff or a participating contractor and is likely to be an uninsulated rim/band joist.

DEEMED LIFETIME OF EFFICIENT EQUIPMENT

The expected measure life is assumed to be 25 years.[1]

DEEMED MEASURE COST

The actual installed cost for this measure should be used in screening.

LOADSHAPE

Loadshape RE07 – Residential Single Family Cooling

Loadshape RE06 – Residential Single Family Central Heat

Loadshape RE08 – Residential Single Family Heat Pump

Loadshape RG01 – Residential Boiler

Loadshape RG04 – Residential Other Heating

Algorithm

CALCULATION OF SAVINGS

ELECTRIC ENERGY SAVINGS

$$\Delta kWh = (\Delta kWh\_cooling + \Delta kWh\_heating)$$

Where

[1] Measure Life Report, Residential and Commercial/Industrial Lighting and HVAC Measures, GDS Associates, 2007

ΔkWh_cooling = If central cooling, reduction in annual cooling requirement due to insulation

$$= \frac{\left(\frac{1}{R_{Old}} - \frac{1}{R_{Rim}}\right) * A_{Rim} * (1 - FramingFactor_{Rim}) * CDD * 24 * DUA}{(1000 * \eta Cool)}$$

R_{Rim} = R-value of new rim/band joist assembly including all layers between inside air and outside air ($ft^2.°F.h/Btu$)

= Actual[2]

R_{old} = R-value value of existing assembly and any existing insulation ($ft^2.°F.h/Btu$).

(Minimum of R-5 for uninsulated assemblies[3])

A_{Rim} = Net area of insulated rim/band joist (ft^2)

$FramingFactor_{Rim}$ = Adjustment to account for area of framing

= 25%[4]

CDD = Cooling Degree Days

= Dependent on location and whether in conditioned or unconditioned space:

Climate Zone (City based upon)	Conditioned Space	Unconditioned Space
	CDD 65 [5]	CDD 75 [6]
Zone 5 (Burlington)	1,209	411
Zone 6 (Mason City)	616	264
Average/ unknown (Des Moines)	1,068	474

24 = Converts days to hours

DUA = Discretionary Use Adjustment (reflects the fact that people do not always operate their AC when conditions may call for it)

[2] If open cavity, add new insulation value to the default or evaluated existing assembly R-value (R_{old}). If closed cavity, since you are displacing one or two air layers, reduce the default or evaluated existing assembly R-value by one and add to new insulation. Note, if existing insulation is added to/not removed – always re-evaluate R-value of existing insulation as it may have been degraded significantly due to compression etc.

[3] An estimate based on review of Madison Gas and Electric, Exterior Wall Insulation, R-value for no insulation in walls, and NREL's Building Energy Simulation Test for Existing Homes (BESTEST-EX).

[4] Consistent with Wall framing factor assumption; ASHRAE, 2001, "Characterization of Framing Factors for New Low-Rise Residential Building Envelopes (904-RP)," Table 7.1.

[5] National Climatic Data Center, calculated from 1981-2010 climate normals with a base temp of 65°F.

[6] The base temperature should be the outdoor temperature at which the desired indoor temperature stays constant, in balance with heat loss or gain to the outside and internal gains. Since unconditioned basements are allowed to swing in temperature, are ground coupled, and are usually cool, they have a bigger delta between the two (heating and cooling) base temperatures. 75F for cooling and 50F for heating are used based on professional judgment. Five year average cooling degree days with 75F base temp are provided from DegreeDays.net because the 30 year climate normals from NCDC are not available at base temps above 72F.

= 0.75 [7]

1000 = Converts Btu to kBtu

ηCool = Seasonal Energy Efficiency Ratio of cooling system (kBtu/kWh)

= Actual (where it is possible to measure or reasonably estimate) – If unknown, assume the following:[8]

Age of Equipment	ηCool Sealed Duct Estimate	ηCool Unsealed Duct Estimate (nCool Sealed * 0.85)
Before 2006	10	8.5
2006 – 2014	13	11
Central AC after 1/1/2015	13	11
Heat Pump after 1/1/2015	14	12

kWh_heating = If electric heat (resistance or heat pump), reduction in annual electric heating due to insulation

$$= \frac{\left(\frac{1}{R_{old}} - \frac{1}{R_{Rim}}\right) * A_{Rim} * (1 - FramingFactor_{Rim}) * HDD * 24 * ADJRim}{(\eta Heat * 3412)}$$

HDD = Heating Degree Days

= Dependent on location and whether in conditioned or unconditioned space:

Climate Zone (City based upon)	Conditioned Space HDD 60 [9]	Unconditioned Space HDD 50 [10]
Zone 5 (Burlington)	4,496	2,678
Zone 6 (Mason City)	6,391	4,222
Average/ unknown (Des Moines)	5,052	3,126

ηHeat = Efficiency of heating system

[7] This factor's source: Energy Center of Wisconsin, May 2008 metering study; "Central Air Conditioning in Wisconsin, A Compilation of Recent Field Research", p31.

[8] These default system efficiencies are based on the applicable minimum Federal Standards. In 2006 the Federal Standard for Central AC was adjusted. While one would expect the average system efficiency to be higher than this minimum, the likely degradation of efficiencies over time mean that using the minimum standard is appropriate.

[9] National Climatic Data Center, calculated from 1981-2010 climate normals with a base temp of 60°F, consistent with the findings of Belzer and Cort, Pacific Northwest National Laboratory in "Statistical Analysis of Historical State-Level Residential Energy Consumption Trends," 2004.

[10] The base temperature should be the outdoor temperature at which the desired indoor temperature stays constant, in balance with heat loss or gain to the outside and internal gains. Since unconditioned basements are allowed to swing in temperature, are ground coupled, and are usually cool, they have a bigger delta between the two (heating and cooling) base temperatures. 75F for cooling and 50F for heating are used based on professional judgment. National Climatic Data Center, calculated from 1981-2010 climate normals.

= Actual – If not available, refer to default table below:[11]

System Type	Age of Equipment	HSPF Estimate	ηHeat (Effective COP Estimate) with unsealed ducts (HSPF/3.412)*0.85	nHeat (Effective COP Estimate) with Sealed Ducts (HSPF/3.412)
Heat Pump	Before 2006	6.8	1.69	1.99
	2006 – 2014	7.7	1.92	2.26
	2015 on	8.2	2.04	2.40
Resistance	N/A	N/A	1.00	1.00

3412 = Converts Btu to kWh

ADJ_{Rim} = Adjustment for rim/band joist insulation to account for prescriptive engineering algorithms consistently overclaiming savings.

=63%[12]

For example, for a single family home in Mason City with 100 ft^2 of uninsulated (assume R-5) rim/band joist cavities in an unconditioned basement that is insulated to R-13. The home has 10.5 SEER Central AC and 2.26 (1.92 including distribution losses) COP Heat Pump:

ΔkWh = (ΔkWh_cooling + ΔkWh_heating)

= (((1/5 - 1/13) * 100 * (1-0.25) * 264 * 24 * 0.75) / (1000 * 10.5)) + (((1/5 - 1/13) * 100 * (1-0.25) * 4222 * 24 * 0.63) / (1.92 * 3412))

= 4.2 + 89.9

= 94.1 kWh

ΔkWh_heating = If gas *furnace* heat, kWh savings for reduction in fan run time

= ΔTherms * F_e * 29.3

Where:

F_e = Furnace Fan energy consumption as a percentage of annual fuel consumption

= 3.14%[13]

[11] These default system efficiencies are based on the applicable minimum Federal Standards. In 2006 the Federal Standard for Heat Pumps was adjusted. While one would expect the average system efficiency to be higher than this minimum, the likely degradation of efficiencies over time means that using the minimum standard is appropriate. An 85% distribution efficiency is then applied to account for duct losses for heat pumps.

[12] Consistent with ADJWall; Based upon comparing algorithm derived savings estimate and evaluated bill analysis estimate in the following 2012 Massachusetts report: "Home Energy Services Impact Evaluation", August 2012. See "Insulation ADJ calculations.xls" for details or calculation.

[13] F_e is not one of the AHRI certified ratings provided for residential furnaces, but can be reasonably estimated from a calculation based on the certified values for fuel energy (Ef in MMBtu/yr) and Eae (kWh/yr). An average of a 300 record sample (non-random) out of 1495 was 3.14%. This is, appropriately, ~50% greater than the Energy Star version 3 criteria for 2% F_e. See "Furnace Fan Analysis.xlsx" for reference.

29.3 = kWh per therm

For example, for a single family home in Mason City with 100 ft[2] of uninsulated (assume R-5) rim/band joist cavities in an unconditioned basement that is insulated to R-13. The home has a gas furnace with system efficiency of 74% (for therm calculation see Natural Gas Savings section) with unsealed ducts:

ΔkWh = 8.0 * 0.0314 * 29.3

= 7.4 kWh

SUMMER COINCIDENT PEAK DEMAND SAVINGS

$$\Delta kW = \frac{\Delta kWh\_cooling}{FLH\_cooling} * CF$$

Where:

FLH_cooling = Full load hours of air conditioning

= Dependent on location[14]:

Climate Zone (City based upon)	Single Family	Multifamily	Manufactured
Zone 5 (Burlington)	918	736	865
Zone 6 (Mason City)	468	375	441
Average/ unknown (Des Moines)	811	650	764

CF = Summer System Peak Coincidence Factor for Cooling

= 68% if central AC, 72% if ducted ASHP or ductless HP used for whole home conditioning[15], 43.1%[16] for ductless HP used as supplemental or limited zone

For example, for a single family home in Mason City with 100 ft[2] of uninsulated (assume R-5) rim/band joist cavities in an unconditioned basement that is insulated to R-13. The home has 10.5 SEER Central AC and 2.26 (1.92 including distribution losses) COP Heat Pump:

ΔkW = 4.2 / 468 * 0.68

= 0.0061 kW

NATURAL GAS SAVINGS

ΔTherms (if Natural Gas heating)

$$= \frac{\left(\frac{1}{R_{old}} - \frac{1}{R_{Rim}}\right) * A_{Rim} * (1 - FramingFactor_{Rim}) * HDD * 24 * ADJRim}{(\eta Heat * 100{,}000)}$$

[14] Full load hours for Des Moines are provided based on Cadmus modeling for the 2011 Joint Assessment. The other locations were calculated based on relative Cooling Degree Day ratios (from NCDC).

[15] Based on analysis of metering results from homes in Ameren Illinois service territory in PY5; 'Impact and Process Evaluation of Ameren Illinois Company's Residential HVAC Program (PY5)'.

[16] Based on analysis of metering results from Ameren Illinois; Cadmus, "All-Electric Homes: PY6 Metering Results: Multifamily HVAC Systems", October 6, 2015.

Where:

HDD = Heating Degree Days

= Dependent on location and whether in conditioned or unconditioned space:

Climate Zone (City based upon)	Conditioned Space	Unconditioned Space
	HDD 60 [17]	HDD 50 [18]
Zone 5 (Burlington)	4,496	2,678
Zone 6 (Mason City)	6,391	4,222
Average/ unknown (Des Moines)	5,052	3,126

ηHeat = Efficiency of heating system

= Equipment efficiency * distribution efficiency

= Actual.[19] If unknown assume 74%[20] for unsealed ducts or 87% for sealed ducts

100,000 = Converts Btu to Therms

Other factors as defined above

For example, for a single family home in Mason City with 100 ft^2 of uninsulated (assume R-5) rim/band joist cavities in an unconditioned basement that is insulated to R-13. The home has a gas furnace with system efficiency of 87% with sealed ducts:

ΔTherms = ((1/5 - 1/13) * 100 * (1-0.25) * 4222 * 24 * 0.63) / (0.87 * 100,000)

= 6.8therms

PEAK GAS SAVINGS

$$\Delta PeakTherms = \Delta Therms * GCF$$

[17] National Climatic Data Center, calculated from 1981-2010 climate normals with a base temp of 60°F, consistent with the findings of Belzer and Cort, Pacific Northwest National Laboratory in "Statistical Analysis of Historical State-Level Residential Energy Consumption Trends," 2004.

[18] The base temperature should be the outdoor temperature at which the desired indoor temperature stays constant, in balance with heat loss or gain to the outside and internal gains. Since unconditioned basements are allowed to swing in temperature, are ground coupled, and are usually cool, they have a bigger delta between the two (heating and cooling) base temperatures. 75F for cooling and 50F for heating are used based on professional judgment. National Climatic Data Center, calculated from 1981-2010 climate normals.

[19] Ideally, the System Efficiency should be obtained either by recording the AFUE of the unit, or performing a steady state efficiency test. The Distribution Efficiency can be estimated via a visual inspection and by referring to a look up table such as that provided by the Building Performance Institute: (http://www.bpi.org/files/pdf/DistributionEfficiencyTable-BlueSheet.pdf) or by performing duct blaster testing.

[20] This has been estimated assuming that natural gas central furnace heating is typical for Iowa residences (the predominant heating is gas furnace with 49% of Iowa homes (based on Energy Information Administration, 2009 Residential Energy Consumption Survey). In 2000, 60% of furnaces purchased in Iowa were condensing (based on data from GAMA, provided to Department of Energy during the federal standard setting process for residential heating equipment (see Furnace Penetration.xls). Furnaces tend to last up to 20 years and so units purchased 15 years ago provide a reasonable proxy for the current mix of furnaces in the State. Assuming typical efficiencies for condensing and non-condensing furnaces and duct losses, the average heating system efficiency is estimated as follows: ((0.60*0.92) + (0.40*0.8)) * (1-0.15) = 0.74.

Where:

ΔTherms = Therm impact calculated above

GCF = Gas Coincidence Factor for Heating[22]

= 0.014378 for Residential Boiler

= 0.016525 for Residential Space Heating (other)

For example, for a single family home in Mason City with 100 ft^2 of uninsulated (assume R-5) rim/band joist cavities in an unconditioned basement that is insulated to R-13. The home has a gas furnace with system efficiency of 87% with sealed ducts:

ΔPeakTherms = 6.8* 0.016525

= 0.11therms

WATER IMPACT DESCRIPTIONS AND CALCULATION
N/A

DEEMED O&M COST ADJUSTMENT CALCULATION
N/A

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[22] Calculated using Cadmus provided Gas Loadshapes as the maximum daily load for the end use.

3.1.5 Automatic Milker Take Off

DESCRIPTION

This measure characterizes the energy savings for the installation of automatic milker takeoffs on dairy milking vacuum pump systems. Automatic Milker Takeoff measure reduces energy use by shutting off the milking vacuum pump suction once a minimum flowrate has been achieved.

Because automatic milker takeoffs have been standard equipment in new milk parlors since 1995[23],this measure is limited to existing dairy parlors for which no size upgrade or other vacuum system improvement has happened.

DEFINITION OF BASELINE EQUIPMENT

The baseline is an existing dairy parlor with no previously existing automatic milker takeoff and no plans to increase size and or make any other vacuum improvements.

DEEMED LIFETIME OF EFFICIENT EQUIPMENT

The expected measure life of a milker takeoff is 15[24] years.

DEEMED MEASURE COST

Retrofit measure, actual costs will be used.

LOADSHAPE

Loadshape NRE11 – Nonresidential Agriculture

Algorithm

CALCULATION OF SAVINGS

Electric Energy Savings**:**

$$Annual\ kWh = kWh/cow/milking\ *\ Nmilkings\ *\ Ncows$$

Where:

kWh/cow/milking = 50 [25]

Nmilkings = Number of milkings per day

= Actual, if unknown use 2 [26]

Ncows = Number of milking cows per farm

[23] Reinemann, D. "Milking Facilities for the Expanding Dairy" presented at the 1995 conference of the WVMA. University of Wisconsin-Madison, Department of Agricultural Engineering Milking Research and Instruction Lab.

[24] Value based on engineering judgment.

[25] Alliant's Global Energy Partners impact calculations in DSM Tracking, 2006, and in agreement with IPL Energy Efficiency Programs 2009 Evaluation, KEMA. Appendix F Program Evaluations Group 1, Vol 2.

[26] Regional Technical Forum (RTF) as part of the Northwest Power & Conservation Council, Deemed Measures List; Agricultural: Variable Frequency Drives-Dairy, FY2012, v1.2. Pre- and post-power meter data for five sites were used to establish RTF energy savings and the raw data used to generate load profiles showed, on average, two milkings per day. For further detail on the corroboration of this source, please see the 2016 Pennsylvania TRM.

= Actual; if unknown use 113[27]

SUMMER COINCIDENT PEAK DEMAND SAVINGS:

$$\Delta kW = \frac{\Delta kWh}{FLH} \, x \, CF$$

Where:

FLH = Full Load Hours

= 2,703[28]

CF = Coincidence Factor

= 0.793[29]

NATURAL GAS ENERGY SAVINGS

N/A

PEAK GAS SAVINGS

N/A

WATER IMPACT DESCRIPTIONS AND CALCULATION

N/A

DEEMED O&M COST ADJUSTMENT CALCULATION

N/A

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[27] 2012 U.S. Census of Agriculture, Iowa State Summary Highlights, Full Report, Volume 1, Chapter 2, U.S. State Level, 247. Average number of cows per farm = 204,757 cows / 1,810 farms = 113

[28] The full load hours are based on an average number of milkings per day of 2, and assumptions on the average hours per milking of 3.7 hours, with milking occurring 365.25 days a year. Source Milking System Air Consumption When Using a Variable Speed Vacuum Pump. Paper Number: 033014 An ASAE Meeting Presentation. July 2003

[29] Cadmus Loadshape analysis IA_Loadshapes_ WORKING DRAFT.xls

3.6.8 Conveyor Oven

DESCRIPTION

This measure applies to a natural gas fired high efficiency conveyor oven installed in a commercial kitchen.

Conveyor ovens are available using four different heating processes: infrared, natural convection with a ceramic baking hearth, forced convection or air impingement, or a combination of infrared and forced convection. Conveyor ovens are typically used for producing a limited number of products with similar cooking requirements at high production rates.

Some manufacturers offer an air-curtain feature at either end of the cooking chamber that helps to keep the heated air inside the conveyor oven. The air curtain operates as a virtual oven wall and helps reduce both the idle energy of the oven and the resultant heat gain to the kitchen.

This measure was developed to be applicable to the following program types: TOS.

DEFINITION OF EFFICIENT EQUIPMENT

To qualify for this measure, the installed equipment must be a natural gas conveyor oven with cooking efficiency and idle energy rates that meet the minimum standards according to utility program requirements.

DEFINITION OF BASELINE EQUIPMENT

The baseline equipment is a new, standard, natural gas conveyor oven.

DEEMED LIFETIME OF EFFICIENT EQUIPMENT

The expected measure life is assumed to be 12 years.[30]

DEEMED MEASURE COST

The incremental capital cost for this measure is $1800.[31]

LOADSHAPE

Loadshape NRGC01 - Nonresidential Gas Cooking – Restaurant

Algorithm

CALCULATION OF SAVINGS

ELECTRIC ENERGY SAVINGS

N/A

SUMMER COINCIDENT PEAK DEMAND SAVINGS

N/A

NATURAL GAS ENERGY SAVINGS

Custom calculation below, otherwise use deemed value of 594.1 therms/yr.[32]

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[30] Measure life from Food Service Technology Center Gas Conveyor Oven Life-Cycle Cost Calculator https://caenergywise.com/calculators/natural-gas-conveyor-ovens/#calc

[31] Nicor Gas Energy Efficiency Plan 2011-2014. Revised Plan Filed Pursuant to Order Docket 10-0562, May 27, 2011

[32] Assumptions derived from Food Service Technology Center Gas Conveyor Oven Life-Cycle Cost Calculator and from FSTC Oven Technology Assessment, http://www.fishnick.com/equipment/techassessment/7_ovens.pdf.

$$\Delta Therms = (\Delta PreheatEnergy + \Delta IdleEnergy + \Delta CookingEnergy) * Days/100{,}000$$

Where:

ΔPreheatEnergy = ($PreheatEnergy_{Base}$ * Preheats) - ($PreheatEnergy_{EE}$ * Preheats)

ΔIdleEnergy = $IdleRate_{Base}$* (Hours – (FoodCooked/$Production_{Base}$) – (Preheats * PreheatTime / 60)) - $IdleRate_{EE}$ * (Hours – (FoodCooked/$Production_{EE}$) – (Preheats * PreheatTime / 60))

ΔCookingEnergy = (FoodCooked * EFOOD/ Eff_{Base}) - (FoodCooked * EFOOD/ Eff_{EE})

Where:

Days = Annual days of operation

= Custom or if unknown, use 312 days per year

100,000 = Btu to therms conversion factor

$PreheatEnergy_{Base}$ = Preheat energy of baseline oven

= 35,000 Btu

$PreheatEnergy_{EE}$ = Preheat energy of efficient oven

= Custom or if unknown, use 18,000 Btu

Preheats = Number of preheats per day

= Custom or if unknown, use 1 preheat per day

PreheatTime = Length of one preheat

= Custom or if unknown, use 15 minutes per preheat[33]

60 = Minutes to hours conversion factor

$IdleRate_{Base}$ = Idle energy rate of baseline oven

= 70,000 Btu/hr

$IdleRate_{EE}$ = Idle energy rate of efficient oven

= Custom or if unknown, use 57,000 Btu/hr

Hours = Average daily hours of operation

= Custom or if unknown, use 10 hours per day

FoodCooked = Number of pizzas cooked per day

[33] Engineering assumption

= Custom or if unknown, use 250 pizzas per day

$Production_{Base}$ = Production capacity of baseline oven

= 150 pizzas per hour

$Production_{EE}$ = Production capacity of efficient oven

= Custom or if unknown, use 220 pizzas per hour

EFOOD = ASTM energy to food

= 170 Btu/pizza

Eff_{Base} = Cooking efficiency of baseline oven

= 20%

Eff_{EE} = Cooking efficiency of efficient oven

= Custom or if unknown, use 42%

For example, an efficient conveyor oven with default values from the algorithm above would save:

ΔTherms = (ΔPreheatEnergy + ΔIdleEnergy + ΔCookingEnergy) * Days /100,000

Where:

ΔPreheatEnergy = (35,000 * 1) - (18,000 * 1)

= 17,000 Btu/day

ΔIdleEnergy = 70,000* (10 - (250 / 150) - (1 * 15 / 60)) - 57,000 * (10 - (250 / 220) - (1 * 15 / 60))

= 74,856 Btu/day

ΔCookingEnergy = (250 * 170/ 0.20) - (250 * 170/ 0.42)

= 111,310 Btu/day

ΔTherms = (17,000 + 74,856 +111,310) * 312 / 100,000

= 633.9 therms/yr

PEAK GAS SAVINGS

$$\Delta PeakTherms = \ \Delta Therms \ / \ Days$$

Where:

ΔTherms = Natural gas energy savings, calculated above

Days = Annual days of operation

= Custom or if unknown, use 312 days per year

For example, an efficient conveyor oven with default values from the algorithm above would save:

ΔPeakTherms = 633.9 / 312

= 2.032 therms/day

WATER IMPACT DESCRIPTIONS AND CALCULATION

N/A

DEEMED O&M COST ADJUSTMENT CALCULATION

N/A

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