**Work Paper PGECOFST117**

**Commercial Conveyor Oven-Gas**

**Revision # 5**

**Pacific Gas & Electric Company**

**Customer Energy Solutions**

**Commercial Conveyor Oven-Gas**

**Measure Codes F208**

# At-a-Glance Summary

|  |  |
| --- | --- |
| Applicable Measure Codes: | **F208** |
| **Measure Description:** | Commercial Gas Conveyor Oven |
| **Energy Impact Common Units:** | Conveyor Oven |
| **Base Case Description:** | Source: PG&E Calculations Existing Gas Conveyor Oven |
| **Base Case Energy Consumption:** | Source: PG&E Calculations 3,571 Therms/yr |
| **Measure Energy Consumption:** | Source: PG&E Calculations 2,687 Therms/yr |
| **Energy Savings (Base Case – Measure)** | Source: PG&E Calculations 884Therms/yr |
| **Costs Common Units:** | Source: PG&E Calculations  Conveyor Oven |
| **Base Case Equipment Cost ($/unit):** | Source: PG&E Calculations $10,177 |
| **Measure Equipment Cost ($/unit):** | Source: PG&E Calculations $12.407 |
| **Gross Measure Cost** | Source: PG&E Calculations |
| **Measure Incremental Cost ($/unit):** | Source: PG&E Calculations $2,230 |
| **Effective Useful Life (years):** | 12 years -- Source: [www.Deeresources.com](http://www.Deeresources.com) EUL |
| **Program Type:** | Replace on Burnout (ROB), and New Construction (NC). |
| **Net-to-Gross Ratios:** | Source: 2011 DEER Default  0.6 |
| **Important Comments:** |  |

# Work Paper Approvals

The following Manager(s) approved this workpaper through the PG&E Electronic Data Routing System under Routing Requisition # \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| --- |
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| **Grant Brohard**  Manager, Technical Product Support |
| **Carolyn Weiner**  Manager, Appliance Products |

# Document Revision History

Revision # Date Description Author (Company)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Revision 0 | 2/13/2008 | | Original work paper: Commercial Conveyor Oven – Gas PGECOFST117 R0.doc | | David Zabrowski (Fisher-Nickel, inc.) | | |
| Revision 1 | 6/1/09 | | Changes to EUL, NTG language and references, costs updated | | David Zabrowski, Lauren Mills (Fisher-Nickel, inc.), Steve Blanc PG&E | | |
| Revision 2 | | 2/10/2010 | | Update to DEER 2009-11 NTG file | | David Zabrowski (Fisher-Nickel, inc.), Steve Blanc PG&E |
| Revision 3 | 06/16/2010 | | Changes incorporating recommendations from Energy Division | | David Zabrowski (Fisher-Nickel), Charlene Spoor (PG&E) | | |
| Revision 4 | 06/08/2012  8/23/2012 | | Updated NTG and EUL, Remove measure F168 due to lack of available product  Updated BLD, CZ and VIN to ANY per READI requirements | | Kong Sham (Fisher-Nickel, Inc.), Charlene Spoor (PG&E)  Charlene Spoor (PG&E) | | |
| Revision 5 | 5/31/2014 | | Updated to new template format | | Charlene Spoor (PG&E) | | |

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# Section 1. General Measure & Baseline Data

## 1.1 Product Measure Description & Background

This work paper documents the rationale for the Energy Efficient Commercial Conveyor Oven,(Gas) measures as listed in the Commercial Food Service Catalog. The Commercial Food Service Catalog is part of Pacific Gas and Electric Company’s Customer Energy Efficiency Program. PG&E offers incentives to non-residential customers for installing qualifying lighting, refrigeration, air-conditioning, food service, and agricultural equipment.

***Catalog Description***

**F208:** The tested commercial conveyor oven must meet or exceed baking energy efficiency of ≥42% and have an idle energy rate of ≤ 57,000 Btu/h, utilizing ASTM Standard F1817[[1]](#endnote-1). Multiple-deck oven configurations are paid per qualifying oven deck.

***Program Restrictions and Guidelines***

***Terms and Conditions***

This measure includes new commercial gas conveyor ovens that meet the qualifications listed in Table 1. Used or rebuilt equipment is not eligible. Customers must provide proof that the appliance meets the requirements in Table 1.

**Table 1 Energy Efficiency Requirements for Commercial Gas Conveyor Ovens.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Measure Code** | **Conveyor Oven Type** | **Cooking-Energy Efficiency a** | **Idle Energy Rate b** |
| F208 | Gas Conveyor Oven | ≥ 42% | ≤ 57,000 Btu/h |

a Based on the heavy-load test in ASTM F1817.

b Based on the idle energy rate test in ASTM F1817.

***The rebate is downstream, provided to the customer at the time of installation upon receipt of application and invoice. This is not a Direct install program.***

***Market Applicability***

This measure is applicable to any commercial cooking application, including (but not limited to) casual dining and quick service restaurants, hotels, motels, schools, colleges and recreational facilities.

## 1.2 Product Technical Description

**Table 2 DEER Use and Technology Table**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | ***DEER USE and TECHNOLOGY TABLE*** | |  |  |
|  | **Use Category Description** | **Use Category** | **Use Sub Category Description** | **Use Sub Category** |  |
|  | Food Service | FoodServ | Cooking | Food-Cook |  |
|  |  |  |  |  |  |
|  | **Technology Groups Description** | **Technology Groups** | **Technology Types Descriptions** | **Technology Types** |  |
|  | Cooking Equipment | Cook\_equip | Oven-Gas Conveyor | OvenGasConveyor |  |
|  |  |  |  |  |  |

Commercial ovens are the most widely used appliances in the food service industry. Many food service operations rely heavily on the versatility of ovens. A conveyor oven can be described simply as a heated chamber with a moving belt that carries food product into and through the chamber. Conveyor ovens are generally used for producing a limited number of products with similar cooking requirements at high production rates.

Essentially, conveyor ovens are a rectangular housing unit containing a baking cavity or chamber, which is open on two opposing sides. A conveyor system carries the food product through the baking chamber or tunnel on a wire rack. Most conveyor ovens can be outfitted with multiple conveyor belts, each of which may have a different operating speed.

The ovens are available in many different sizes and configurations. They are available in sizes small enough to satisfy low-volume and niche operations, such as kiosks, that have limited production space, and large enough to meet the demands of high volume operations. Most conveyor ovens, both large and small, can be stacked up to three units high; significantly increasing production capacity without requiring increased floor space2.

Conveyor oven performance is determined by applying the ASTM Standard Test Method for the Performance of Conveyor Ovens (F1817). The ASTM standard test method is considered to be the industry standard for quantifying the efficiency and performance of conveyor ovens.

## 1.3 Measure Application Type

The DEER Measure Cost Data Users Guide found on [www.deeresources.com](http://www.deeresources.com) under *DEER2014 Database Format* hyperlink, DEER2014 spreadsheet *SPTdata\_format-V0.97.xls*, defines the terms as follows:

Table 3Measure Application Type[[2]](#endnote-2)

*Identifies the measure application type in the Measure Implemenation table in DEER2011.*

|  |  |  |
| --- | --- | --- |
| **Code** | **Description** | **Comment** |
| ER | Early retirement | *measure applied while existing equipment still viable, or retrofit of existing equipment* |
| ROB | Replace on Burnout | *measure applied when existing equipment fails or maintenance requires replacement* |
| NC | New Construction | *measure applied during construction design phase as an alternative to a code-compliant standard design* |

Since there are no EM&V studies on the useful life of conveyor ovens and it is standard practice in the commercial foodservice industry to purchase equipment only when it is needed (e.g., replacement or additional capacity), this measure is focused on ROB and NC applications only.

## 1.4 Product Base Case and Measure Case Data

This Work Paper uses ASTM Standard Test Method for thePerformance of Conveyor Ovens (F1817) for calculation of energy use and demand, based on testing in an approved and qualified laboratory. In the absence of mandatory regulations for testing commercial conveyor ovens, there is little incentive on the part of equipment manufacturers to have their baseline equipment tested. Therefore, the ASTM performance parameters for baseline equipment were drawn from a sample of economy grade equipment tested by the Food Service Technology Center and is summarized in Table 3.

**Table 4 Baseline ASTM test results for Conveyor Ovens.**

|  |  |  |
| --- | --- | --- |
|  | **Cooking-Energy Efficiency\*** | **Idle Energy Rate (Btu/hr)** |
| Gas Conveyor Oven | 20% | 70,000 |

\*Based on the heavy-load test in ASTM F2093.

The measure case data was drawn from the list of commercial conveyor ovens that have been tested by IOU testing laboratories as of April 20, 2012. The complete list is in Appendix A and the averages are summarized in Table 4.

**Table 5 Measure ASTM test results for Conveyor Ovens.**

|  |  |  |
| --- | --- | --- |
|  | **Cooking-Energy Efficiency\*** | **Idle Energy Rate (Btu/hr)** |
| Gas Conveyor Oven | 42% | ≤ 57,000 Btu/h |

\*Based on the heavy-load test in ASTM 2093.

## 1.4.1 DEER Base Case and Measure Case Information

The DEER database does not contain information on energy use or savings for an energy-efficient conveyor oven measure. The only reference in DEER for Commercial cooking equipment is for Estimated Useful Life.[[3]](#endnote-3)

## 1.4.2 Codes & Standards Requirements Base Case and Measure Information

These measures are not governed by either state or federal codes and standards.

ASTM Standard Test Method for thePerformance of Conveyor Ovens (F1817) is applicable for estimating energy use and cooking performance. It was used to estimate the energy consumption of the base case and measure equipment.

## 1.4.3 EM&V, Market Potential, and Other Studies – Base Case and Measure Case Information

There were no specific EM&V studies identified that addressed cooking measures in the commercial sector.

## 

## 1.4.4 Assumptions and Calculations from other sources—Base and Measure Cases

The Food Service Technology Center conducted an assessment of major commercial cooking appliance technologies in 2002, which included a chapter on ovens[[4]](#endnote-4).The study showed that standard-efficiency gas conveyor oven cooking-energy efficiencies vary from 10 to 20% and high-efficiency gas conveyor oven cooking-energy efficiencies vary from 40 to 50%. Since commercial gas conveyor ovens are currently not covered by state or national codes, the base case for existing models of gas conveyor ovens was determined from upper range of standard gas conveyor ovens as listed in Table 7.1 of the Food Service Technology Center assessment.

***Base Cases & Measure Effective Useful Lives***

The DEER Measure Cost Data Users Guide, version 2.01, defines the following terms:

* Replace on Burnout (ROB) – replacing a technology at the end of its useful life.
* New Construction (NC) – installing a technology in a new construction or major renovation project.

The 2014 DEER, database shows a EUL of 12 years for all cooking appliance measures, including gas conveyor ovens. Gasconveyor ovens are classed as suitable for ROB, and NC installations.

***Net-to-Gross Ratios for Different Program Strategies***

The 2014 DEER NTGR Values file does not specifically list commercial food service appliances. The default used for non-residential measures is 0.6.[[5]](#endnote-5) However, we are convinced that this default value underestimates the actual importance of the rebate programs in motivating FS operators to purchase EE equipment.

**Table 6 Net-to-Gross Ratios**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **DEER Spreadsheet** | |
| Program Approach | NTG | File name |  |
| Commercial Gas Conveyor Ovens | 0.6\* | DEER2011-NTG\_IncludingCarryoversFromDEER2008\_2012-05-16.xls |  |

***1.4.5 Time-of-Use Adjustment Factor***

We are required by CPUC decision 06-06-063 dated June 29, 2006 to apply time-of-use (TOU) adjustment factors on residential A/C and commercial A/C (packaged and split-system direct-expansion cooling) measures only. Since this is not an A/C measure, the TOU adjustment factor is 0.

***1.5 Summary of Inputs for Savings Calculations***

The following table provides references to sections that document the inputs for calculation:

**Table 7 Summary of Inputs**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Input Variable** | **Variations** | **Base Case 1 Average Value** | **Base Case 2 Average Value** | **Measure Case Average Value** | **Reference Section** |
| **Electric Savings** | None | N/A | *N/A* | *N/A* | *Section 1.4.1* |
| **Gas Savings** | None | N/A | N/A | 884 | Section 2.3 |
| **Hours of operation** | None | 4380 | N/A | 4380 | Section 2.3 |
| **Full Cost** | None | $10,177 | N/A | $12,407 | Appendix B |
| **Incremental Cost** | None |  | N/A | $2,230 | Appendix B |
| **EUL /RUL** | None | 12 | N/A | 12 | Section 1.4 |
| **NTG** | One | 0.6 | N/A | 0.6 | Section 1.4 |
| **ISR** | No | 1 | N/A | 1 | Section 1.4 |
| **TOU Factor** | *A/C projects only* | *N/A* | *N/A* | *N/A* | *Section 1.4.5* |

# Section 2. Calculation Methods

Table 8 Baseline by Measure Application Type

|  |  |  |  |
| --- | --- | --- | --- |
| ****Measure Application Type**** | ****Measure Life Basis**** | ****First Baseline Period: Energy Savings Baseline**** | ****Second Baseline Period: Energy Savings Baseline**** |
| ***ER* (early retirement)** | **EUL** | Customer Average Baseline | Code Baseline |
| ***ROB* (replace-on-burnout)** | **EUL** | Code Baseline | N/A |
| ***NC* (new construction)** | **RUL/EUL-RUL** | Code Baseline | N/A |

Notes:

* For ROB measures, First Baseline is the baseline for the full EUL. There is no second baseline.
* For ER measures, First Baseline Period is the period for the RUL(remaining useful life),defined by the CPUC as RUL=1/3 EUL. Second baseline period for ER is Code baseline for the period EUL-RUL.

## 2.1 Electric Energy Savings Estimation Methodologies

* There were no electric energy savings associated with this (these) measure(s).

## 2.2. Demand Reduction Estimation Methodologies

* There is no anticipated demand reduction associated with this measure

## 2.3. Gas Energy Savings Estimation Methodologies

The industry standard for energy use and cooking performance of conveyor ovens is ASTM Standard Test Method for thePerformance of Conveyor Ovens (F1817). Table 10 shows an example of the calculation results under ASTM F1817 for a gas conveyor oven.

**Table 9 Commercial Gas Conveyor Ovenl Cost Effectiveness Example.**

|  |  |  |
| --- | --- | --- |
| **Performance** | **Baseline Model** | **Energy Efficient Model** |
| Preheat Time (min) | 15 | 15 |
| Preheat Energy (Btu) | 35,000 | 18,000 |
| Idle Energy Rate (Btu/h) | 70,000 | 57,000 |
| Heavy Load Cooking Energy Efficiency (%) | 20% | 42% |
| Production Capacity (pizzas/hr) | 150 | 220 |
| Operating Hours/Day a | 12 | 12 |
| Operating Days/Year | 365 | 365 |
| Number of Preheats per Day | 1 | 1 |
| Pizzas Cooked per Day | 250 | 250 |
| Gas Cost ($/therm) | $1.00 | $1.00 |
| ASTM Energy to Food (Btu/pizza) | 190 | 190 |
| Daily Energy Consumption (Btu) | 978,333 | 736,073 |
| Annual Energy Consumption (therms) b | 3,571 | 2,687 |
| Estimated Energy Savings (therms/yr) | - | 884 |
| Annual Energy Cost ($) | $3,571 | $2,687 |
| Estimated Cost Savings ($/yr) | - | $884 |
| Incremental Measure Cost c | - | SEE APPENDIX B |
| Estimated Useful Life (EUL) d | 12 years | 12 years |

a Operating hours were based on the procedure for calculating daily energy consumption of a convection oven based on reported test results, Appendix X2 in ASTM F1496.

b 1 therm = 100,000 Btu.

c Incremental measure cost was determined through comparison of an average of published pricing listed in APPENDIX B.

d The estimated useful life is based on the 2011 DEER EUL estimates.

Daily Energy Consumption Calculation and Definitions

EDAY = (nPizzas x EFOOD) ÷ EFFICIENCY + [IDLERATE x (TON - nPizzas/PC – nP x TP/60)]   
+ nP x EP

Where:

|  |  |
| --- | --- |
| EDAY = | Daily Energy Consumption (Btu/day) |
| nPizzas = | Number of Pizzas Cooked per Day |
| EFOOD = | ASTM Energy to Food (Btu/pizza) = Btu of energy (per pizza) absorbed by food product during cooking |
| EFFICIENCY = | Heavy Load Cooking Energy Efficiency % |
| IDLE RATE = | Idle Energy Rate (Btu/h) |
| TON = | Operating Hours/Day |
| PC = | Production Capacity (pizzas/hr) |
| TP = | Preheat Time (min) |
| nP = | Number of preheats/Day |
| EP = | Preheat Energy (Btu) |

# *Section 3. Load Shapes*

## For Gas-only measures, the gas savings profile is used to determine the gas avoided cost to apply to the measure. The gas savings profile choices are summer only, winter only, or annual.3.1 Base Case Load Shapes

The base case would be expected to follow a typical non-residential foodservice gas usage profile.

Commercial conveyor oven load shapes differ among food service facilities (quick service, casual dining, hotels, college, schools, hospitals, etc.) depending on daily menu variations, hours of operation, serving periods, day-of-week, and facility location (city downtown, suburban mall, access to interstate highways, etc.). Consequently, applicable average TOU and hourly load shapes for conveyor ovens are unavailable. The ASTM Standard Test Method used to generate energy use data is based on hours of use and operating state (preheat, idle, idle, light- and heavy-load cooking). Generally, conveyor ovens are used to prepare food shortly before being served, so loads tend to be coincident with regular meal periods (e.g., lunch, dinner). Between meal periods conveyor ovens energy use tends to be either idle or light.

## 3.2 Measure Load Shapes

There are no measure case load shapes applicable to this measure. The base case shapes are to be used in the cost avoidance calculation. For purposes of the net benefits estimates in the E3 calculator, the gas usage profile for this measure is determined based on the applicable non-residential market sector and the foodservice end-use.

The gas load profile for the high efficiency gas conveyor oven is expected to be the same as the Base Case. The profile will vary as explained in Section 3.1. The Measure Load Shape for the high efficiency conveyor oven will use less energy.

# Section 4. Base Case & Measure Costs

**Table 10 DEER Base Case an Measure Case Cost Definitions**

|  |  |  |  |
| --- | --- | --- | --- |
| **Measure Application Type** | **Measure Life Basis** | **First Baseline Period Full Measure Cost (RUL)** | **Second Baseline Period Full Measure Cost (EUL – RUL)** |
| ***NC (new construction)*** | EUL | Calculated as Incremental Measure Cost | N/A |
| ***ROB(replace on burnout)*** | EUL | Calculated as Incremental Measure Cost | N/A |
| ***ER (early retirement)*** | RUL/  EUL-RUL | Calculated as Full Gross Measure Cost | Calculated as Negative Full Gross Base Case Cost |

High efficiency gas conveyor ovens typically list for more than standard-efficiency gas conveyor ovens. However, high-efficiency designs are often bundled with other features such as all-stainless steel construction and high-quality components and controls. In addition to lower operating costs, high-efficiency conveyor ovens frequently exhibit better uniformity and higher production capacities.

Equipment prices for these work papers were compiled from a number of sources including, Autoquotes, equipment sales reps and manufacturer sources. Since equipment pricing in food service is closely held information and prices vary widely according to buying volume and other factors, we cannot list the sources for prices specifically.

***4.1 Base Cases Costs***

The Base Case costs include only the equipment. Since this measure is applicable for ROB and NC installations, the installation and maintenance costs are expected to be the same for the customer. The estimated equipment cost is based on recent list cost data for electric and gas conveyor ovens and applying an industry-standard 50% discount to the manufacturer published list prices.[[6]](#endnote-6)

***4.2 Measure Costs***

The Measure costs include only the equipment, as explained in Section 4.1. The estimated equipment cost is based on recent list cost data and applying an industry-standard 50% discount to the manufacturer published list prices (see Appendix B).

## 4.3 Incremental & Full Measure Costs

**Table 11 DEER Incremental and Full Measure Cost Definitions**

|  |  |  |  |
| --- | --- | --- | --- |
| **Measure Application Type** | **Full Measure Cost**  **(RUL Period/First Baseline)** | **Full Measure Cost**  **(EUL-RUL Period/ Second Baseline)** | **Incremental Measure Cost** |
| ER | Measure Equipment Cost  +Measure Labor Cost | (-1)x(Base Equipment Cost  + Base Labor Cost) | Measure Equipment Cost  – Base Case Equipment Cost |
| ROB | Measure Equipment Cost  – Base Case Equipment Cost | N/A | Measure Equipment Cost  – Base Case Equipment Cost |
| NC | Measure Equipment Cost  – Base Case Equipment Cost | N/A | Measure Equipment Cost  – Base Case Equipment Cost |

# *4.3.1 Full Measure Cost*

Full Measure Cost is the cost to install an energy efficient measure per the CPUC calculators. This definition implies a different meaning depending on the Measure Application type.

This Measure Application Type is: **NC** or **ROB**, so the Full Measure Cost (FMC) is represented by the equation below (choose):

FMC = (Measure Equipment Cost + Measure Labor Cost) –

(Base Case Equipment Cost + Base Case Labor Cost)

\*Note: We assume that, unless stated otherwise, the measure case labor and base case labor are assumed to be the same value reducing the equation to the following:

FMC = Measure Equipment Cost – Base Case Equipment *Cost*

*FMC = $ $12,407 per oven- $ 10,177 per oven = $ $2,230 per unit*

# *4.3.2 Incremental Measure Costs*

Incremental Measure Cost is the premium cost to install an energy efficient measure over a standard efficiency measure or code baseline measure. While IMC has a straightforward definition depending on the Measure Application type, the equation does vary.

This Measure Application Types is: **ROB,** or **NC** so the Gross Measure Cost (GMC) is represented by the appropriate equation below:

IMC = (Measure Equipment Cost + Measure Labor Cost) –

(Base Case Equipment Cost + Base Case Labor Cost)

\*Note: Unless stated otherwise the measure case and base case labor costs are typically the same, reducing the equation to the following:

IMC = Measure Equipment Cost – Base Case Equipment Cost

*IMC = $ per (unit) -- $ per (unit) = $ per (unit)*

**Table 12 Summary Table for Section 4**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Measure ID** | **Measure Application Types** | **Base Case Total Cost** | **Measure Case Total Cost[[7]](#endnote-7)** | **Full Measure Case Cost** | **Incremental Measure Cost** |
| **F208** | ROB | **10,177** | **12,407** | **12,407** | **2,230** |
| **F208** | NC | **10,177** | **12,407** | **12,407** | **2,230** |

# 

**Appendix A**

**ASTM Qualifying Equipment Data for Gas Conveyor Ovens**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Company** | **Model Number** | **Conveyor Width**  **(in.)** | **Cooking-Energy Efficiency (%)** | **Idle Energy Rate (kW)** | **Production Capacity (lbs/h)** |
| **Lincoln** | **1600-\*\*\*-UK\*\*\*\*** | **32** | **46.4** | **36.393** | **262** |
| **Lincoln** | **1600-\*\*\*-UK\*\*\*\*-AQ** | **32** | **46.4** | **23,402** | **262** |
| **Lincoln** | **3270-\*\*-N-K\*\*\*\*** | **32** | **43.8** | **53,800** | **410** |
| **Middleby** | **PS570** | **32** | **47.4** | **40,600** | **329** |
| **Middleby** | **WOW-P670** | **32** | **47.8** | **37,465** | **363** |
| **Middleby** | **WOW-P770** | **32** | **47.8** | **37,465** | **363** |
| **Middleby** | **WOW-P870** | **32** | **47.8** | **37,465** | **363** |
| **XLT** | **XLT 3255-TS3** | **32** | **42.0** | **41,700** | **255** |
| **XLT** | **XLT 3270-TS3** | **32** | **46.9** | **46,017** | **381** |
| **XLT** | **XLT 3855-TS3** | **38** | **45.4** | **45,004** | **345** |
| **XLT** | **XLT 3870-TS3** | **38** | **43.9** | **56,500** | **380** |
| **Average Performance** | | | **45.8** | **42,468** | **344** |

**Appendix B**

Equipment prices for these work papers were compiled from a number of sources including, Autoquotes, equipment sales reps and manufacturer sources. Since equipment pricing in food service is closely held information and prices vary widely according to buying volume and other factors, we cannot list the sources for prices specifically.

**Equipment Cost Data for Gas Conveyor Ovens**

| **Group** | **Model** | **List Price ($)** | **Cost($)\*** |
| --- | --- | --- | --- |
| baseline | X1 | $26,219 | $13,110 |
| Baseline | X2 | $17,,738 | $8,869 |
| Baseline | X3 | $31,004 | $15,502 |
| Baseline | X4 | $6,842 | $3,421 |
| Baseline | X6 | $15,564 | $7,782 |
| Baseline | X8 | $14,282 | $7,141 |
| Baseline | X9 | $16,234 | $8,117 |
| Baseline | X10 | $18,086 | $9,043 |
| Baseline | X11 | $22,680 | $11,340 |
| Baseline | X12 | $34,896 | $17,448 |
| Energy Efficient | X13 | $32,773 | $16,387 |
| Energy Efficient | X14 | $34,917 | $17,459 |
| Energy Efficient | X17 | $50,000 | $25,000\* |
| Energy Efficient | X20 | $11,924 | $5,962 |
| Energy Efficient | X21 | $14,339 | $7,170 |
| Energy Efficient | X22 | $13,116 | $6,558 |
| Energy Efficient | X23 | $16,633 | $8,317 |

\*Taken from industry survey

**Equipment Incremental Cost Data for Energy Efficient Gas Conveyor Ovens\***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Category** | **Baseline Unit Price** | **Energy Efficient Unit Price** | **Incremental Price Difference** | **Baseline Unit Cost** | **Energy Efficient Unit Cost** | **Incremental Measure Cost (IMC)** |
| Gas Conveyor Oven | $ 20,354 | $24,815 | $ 4,460 | $ 10,177 | $ 12,407 | $ 2,230 |

\*Estimated purchase price and Incremental Measure Cost (IMC) were based on an industry-standard 50% discount off the manufacturer’s list price

# References

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7. SCE, Measure Cost Revision 5 revised for PG&E by S.L. Blanc 2012

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