Encore/Bullet Ventless Submittal Information

Encore Spec Sheet ........................................................................................................ 1.1
Bullet Spec Sheet .......................................................................................................... 1.3
UL Ventless Label .......................................................................................................... 2.1
Notice of Authorization to Apply to UL Mark ................................................................... 3.1
UL Listing .......................................................................................................................... 4.1
UL KNLZ Explained ......................................................................................................... 5.1
Emissions Test Results .................................................................................................... 6.1
Emissions by Product ....................................................................................................... 7.1
Fire and Smoke Statement .............................................................................................. 8.1
Energy Usage Estimate .................................................................................................... 9.1
Encore Surface Temperatures ......................................................................................... 10.1
Bullet Surface Temperatures .......................................................................................... 10.3
LA County Ventless Authorization .................................................................................... 11.1
TurboChef Installation Recommendations ....................................................................... 12.1
PERFORMANCE
The TurboChef Bullet oven uses radiant heat, high-speed air impingement, and side-launched microwave to cook food rapidly without compromising quality.

VENTILATION
- UL (KNLZ) listed for ventless operation.¹
- EPA 202 test (8 hr):
  - Product: Pepperoni Pizzas
  - Results: 0.13 mg/m³
  - Ventless Requirement: <5.00 mg/m³
- Internal catalytic filtration to limit smoke, grease, and odor emissions.

EXTERIOR CONSTRUCTION
- Stainless steel front, top, and sides
- Stainless steel removable grease collection pan
- Cool-to-touch exterior; all surfaces below 131°F (55°C)
- Ergonomic door handle
- 7-inch capacitive touch screen with tempered glass cover

INTERIOR CONSTRUCTION
- 201 stainless steel
- Fully welded and insulated cook chamber
- Removable rack and lower jetplate

FEATURES
- Simple and intuitive touch controls
- Easy to clean
- Integral recirculating catalytic converter for UL (KNLZ) listed ventless operation
- Variable-speed High h recirculating impingement airflow
- Independent bottom temperature offset
- Smart menu system capable of storing up to 256 recipes
- Light ring provides visual cues for cooking
- Built-in self-diagnostics for monitoring oven components and performance
- Stackable design (requires stacking kit)
- USB compatible
- Ethernet and Wi-Fi compatible
- Smart voltage sensor technology* (U.S. only)
- Includes plug and cord (6 ft. nominal)
- Warranty – 1 year parts and labor

STANDARD ACCESSORIES
- 1 Baking Stone (ENC-3012)
- 1 Oven Rack (ENC-1279)
- 1 Aluminum Paddle (NGC-1478)
- 1 Bottle Oven Cleaner (103180)
- 1 Bottle Oven Guard (103181)
- 2 Trigger Sprayers (103182)
- 2 Non-stick Baskets (NGC-1331)

This product conforms to the ventilation recommendations set forth by NFPA96 using EPA202 test method.

* Smart Voltage Sensor Technology does not compensate for lack of or over voltage situations. It is the responsibility of the owner to supply voltage to the unit according to the specifications on the back of this sheet.

¹ Ventless certification is for all food items except for foods classified as “fatty raw proteins.” Such foods include bone-in, skin-on chicken, raw hamburger meat, raw bacon, raw sausage, steaks, etc. If cooking these types of foods, consult local HVAC codes and authorities to ensure compliance with ventilation requirements.

Ultimate ventless allowance is dependent upon AHU approval, as some jurisdictions may not recognize the UL certification or application. If you have questions regarding ventless certifications or local codes please email ventless.help@turbochef.com

TurboChef reserves the right to make substitutions of components or change specifications without prior notice.
### ELECTRICAL SPECIFICATIONS - SINGLE PHASE

**Bullet US Model (ENC-9600-601) - North America**
- Voltage: 208/240 VAC
- Frequency: 60 Hz
- Current (Max Circuit Requirement): 30 amps (30 amps)
- Max Input (MW Input): 208: 5.99 kW (3.5 kW)  
  240: 6.77 kW (3.5 kW)
- Weight: 185 lb. 84 kg

**Bullet UK Model (ENC-9600-602-UK) - Europe/Asia**
- Voltage: 230 VAC
- Frequency: 50 Hz
- Current (Max Circuit Requirement): 30 amps (30 amps)
- Max Input (MW Input): 6.7 kW (3.5 kW)

**Bullet BK Model (ENC-9600-606-BK) - Brazil**
- Voltage: 220 VAC
- Frequency: 60 Hz
- Current (Max Circuit Requirement): 30 amps (30 amps)
- Max Input (MW Input): 6.7 kW (3.5 kW)

**Bullet LA Model (ENC-9600-607-LA) - Latin America**
- Voltage: 220 VAC
- Frequency: 60 Hz
- Current (Max Circuit Requirement): 30 amps (30 amps)
- Max Input (MW Input): 6.7 kW (3.5 kW)

**Bullet JK Model 50 Hz (ENC-9600-608-JK) - Japan**
- Voltage: 220 VAC
- Frequency: 50 or 60 Hz
- Current (Max Circuit Requirement): 30 amps (30 amps)
- Max Input (MW Input): 6.7 kW (3.5 kW)

**Bullet SK Model (ENC-9600-615-SK) - Middle East**
- Voltage: 230 VAC
- Frequency: 60 Hz
- Current (Max Circuit Requirement): 30 amps (30 amps)
- Max Input (MW Input): 6.7 kW (3.5 kW)

**Bullet SK Model 50 Hz (ENC-9600-610-JK) - Japan**
- Voltage: 220 VAC
- Frequency: 50 or 60 Hz
- Current (Max Circuit Requirement): 30 amps (30 amps)
- Max Input (MW Input): 6.7 kW (3.5 kW)

**Bullet AU Model (ENC-9600-605-AU) - Australia/New Zealand Wye**
- Voltage: 400 VAC
- Frequency: 50 or 60 Hz
- Current (Max Circuit Requirement): 16 amps (20 amps)
- Max Input (MW Input): 6.7 kW (3.5 kW)

### ELECTRICAL SPECIFICATIONS - MULTI PHASE

**Bullet ED Model (ENC-9600-603-ED) - Europe/Asia Delta**
- Voltage: 230 VAC
- Frequency: 50 Hz
- Current (Max Circuit Requirement): 30 amps (30 amps)
- Max Input (MW Input): 6.7 kW (3.5 kW)

**Bullet EW Model (ENC-9600-604-EW) - Europe/Asia Wye**
- Voltage: 400 VAC
- Frequency: 50 Hz
- Current (Max Circuit Requirement): 16 amps (20 amps)
- Max Input (MW Input): 6.7 kW (3.5 kW)

**Bullet JD Model 50 Hz (ENC-9600-609-JD) - Japan Delta**
- Voltage: 200 VAC
- Frequency: 50 or 60 Hz
- Current (Max Circuit Requirement): 30 amps (30 amps)
- Max Input (MW Input): 6.7 kW (3.5 kW)

### SHIPPI NG INFORMATION

U.S.: All ovens shipped within the U.S. are packaged in a double-wall corrugated box banded to a wooden skid. All international ovens shipped via Air or Less than Container Loads are packaged in wooden crates.

- **Box size:** 33.8" x 26.3" x 26.3" (859 mm x 668 mm x 668 mm)
- **Crate size:** 40" x 36" x 35" (1016 mm x 914 mm x 889 mm)
- **Item class:** 85 NMFC #26770
- **HS code:** 8419.81
- **Approximate boxed weight:** 226 lb. (103 kg)
- **Approximate crated weight:** 301 lb. (137 kg)
- **Minimum entry clearance required for box:** 26.3" (668 mm)
- **Minimum entry clearance required for crate:** 35.5" (902 mm)

⚠️ **TurboChef requires installing a type D circuit breaker for all installations.**
THE TurboChef Encore oven uses radiant heat, high-speed air impingement, and side-launched microwave to cook food rapidly without compromising quality.

**EXTERIOR CONSTRUCTION**
- Powder coated, corrosion-resistant steel outer wrap
- Powder coated, corrosion-resistant aluminum front panels and door
- Cool-to-touch exterior; all surfaces below 122°F (50°C)
- Ergonomic door handle

**INTERIOR CONSTRUCTION**
- 201 stainless steel
- Fully welded and insulated cook chamber
- Removable rack and lower jetplate

**FEATURES**
- Easy to clean
- Integral recirculating catalytic converter for UL (KNLZ) listed ventless operation
- Variable-speed High h recirculating impingement airflow
- Independent bottom temperature offset
- Smart menu system capable of storing up to 256 recipes
- Light ring provides visual cues for cooking
- Built-in self-diagnostics for monitoring oven components and performance
- Stackable design (requires stacking kit)
- USB and Smart card compatible
- Smart Voltage Sensor Technology* (U.S. only)
- Includes plug and cord (6 ft. nominal)
- Warranty – 1 year parts and labor

**STANDARD ACCESSORIES**
- 1 Baking Stone (ENC-3012)
- 1 Oven Rack (ENC-1279)
- 1 Aluminum Paddle (NGC-1478)
- 1 Bottle Oven Cleaner (103180)
- 1 Bottle Oven Guard (103181)
- 2 Trigger Sprayers (103182)
- 2 PTFE Baskets (NGC-1331)

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This product conforms to the ventilation recommendations set forth by NFPA96 using EPA202 test method.

* Smart Voltage Sensor Technology does not compensate for lack of or over voltage situations. It is the responsibility of the owner to supply voltage to the unit according to the specifications on the back of this sheet.

† Ventless certification is for all food items except for foods classified as “fatty raw proteins.” Such foods include bone-in, skin-on chicken, raw hamburger meat, raw bacon, raw sausage, steaks, etc. If cooking these types of foods, consult local HVAC codes and authorities to ensure compliance with ventilation requirements.

Ultimate ventless allowance is dependent upon AHJ approval, as some jurisdictions may not recognize the UL certification or application. If you have questions regarding ventless certifications or local codes please email ventlesshelp@turbochef.com

TurboChef reserves the right to make substitutions of components or change specifications without prior notice.
**DIMENSIONS**

<table>
<thead>
<tr>
<th>Single Units</th>
<th>Height</th>
<th>19”</th>
<th>483 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>with legs</td>
<td>23”</td>
<td>584 mm</td>
<td></td>
</tr>
<tr>
<td>Width</td>
<td>21.4”</td>
<td>544 mm</td>
<td></td>
</tr>
<tr>
<td>Depth (footprint)</td>
<td>28.6”</td>
<td>726 mm</td>
<td></td>
</tr>
<tr>
<td>with door closed</td>
<td>32.7”</td>
<td>831 mm</td>
<td></td>
</tr>
<tr>
<td>with door open</td>
<td>39.4”</td>
<td>1000 mm</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>185 lb</td>
<td>84 kg</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stacked Units (Stacking Kit Required)</th>
<th>Height</th>
<th>38.5”</th>
<th>978 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>with legs (bottom oven)</td>
<td>42.5”</td>
<td>1080 mm</td>
<td></td>
</tr>
<tr>
<td>Width</td>
<td>21.4”</td>
<td>544 mm</td>
<td></td>
</tr>
<tr>
<td>Depth (footprint)</td>
<td>28.6”</td>
<td>726 mm</td>
<td></td>
</tr>
<tr>
<td>with door closed</td>
<td>32.7”</td>
<td>831 mm</td>
<td></td>
</tr>
<tr>
<td>with door open</td>
<td>39.4”</td>
<td>1000 mm</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>370 lb</td>
<td>168 kg</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cook Chamber</th>
<th>Height</th>
<th>6”</th>
<th>152 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>15.5”</td>
<td>394 mm</td>
<td></td>
</tr>
<tr>
<td>Depth</td>
<td>14.5”</td>
<td>368 mm</td>
<td></td>
</tr>
<tr>
<td>Volume</td>
<td>0.78 cu.ft.</td>
<td>22.1 liters</td>
<td></td>
</tr>
</tbody>
</table>

**Wall Clearance** (Oven not intended for built-in installation)

- Top: 5” 127 mm
- Sides: 2” 51 mm

**ELECTRICAL SPECIFICATIONS - SINGLE PHASE**

- **Encore US Model (ENC-9500-1) - North America**
  - Voltage: 208/240 VAC
  - Frequency: 60 Hz
  - Current (Max Circuit Requirement): 30 amps (30 amps)
  - Max Input (MW Input): 208: 5.99 kW (3.5 kW), 240: 6.675 kW (3.5 kW)

- **Encore UK Model (ENC-9500-2-UK) - Europe/Asia**
  - Voltage: 230 VAC
  - Frequency: 50 Hz
  - Current (Max Circuit Requirement): 30 amps (30 amps)
  - Max Input (MW Input): 6.7 kW (3.5 kW)

- **Encore BK Model (ENC-9500-6-BK) - Brazil**
  - Voltage: 220 VAC
  - Frequency: 60 Hz
  - Current (Max Circuit Requirement): 30 amps (30 amps)
  - Max Input (MW Input): 6.7 kW (3.5 kW)

- **Encore LA Model (ENC-9500-7-LA) - Latin America**
  - Voltage: 220 VAC
  - Frequency: 60 Hz
  - Current (Max Circuit Requirement): 30 amps (30 amps)
  - Max Input (MW Input): 6.7 kW (3.5 kW)

**ELECTRICAL SPECIFICATIONS - MULTI PHASE**

- **Encore ED Model (ENC-9500-3-ED) - Europe/Asia Delta**
  - Voltage: 230 VAC
  - Frequency: 50 Hz
  - Current (Max Circuit Requirement): 16 amps (20 amps)
  - Max Input (MW Input): 6.7 kW (3.5 kW)

- **Encore EW Model (ENC-9500-4-EW) - Europe/Asia Wye**
  - Voltage: 400 VAC
  - Frequency: 50 Hz
  - Current (Max Circuit Requirement): 16 amps (20 amps)
  - Max Input (MW Input): 6.7 kW (3.5 kW)

- **Encore AU Model (ENC-9500-5-AU) - Australia/New Zealand Wye**
  - Voltage: 400 VAC
  - Frequency: 50 Hz
  - Current (Max Circuit Requirement): 16 amps (20 amps)
  - Max Input (MW Input): 6.7 kW (3.5 kW)

- **Encore JD Model (ENC-9500-9-JD) - Japan Delta**
  - Voltage: 200 VAC
  - Frequency: 50 Hz
  - Current (Max Circuit Requirement): 30 amps (30 amps)
  - Max Input (MW Input): 6.7 kW (3.5 kW)

- **Encore KW Model (ENC-9500-12-KW) - Korea/Middle East Wye**
  - Voltage: 400 VAC
  - Frequency: 60 Hz
  - Current (Max Circuit Requirement): 16 amps (20 amps)
  - Max Input (MW Input): 6.7 kW (3.5 kW)

- **Encore SD Model (ENC-9500-13-SD) - Korea/Middle East Delta**
  - Voltage: 230 VAC
  - Frequency: 60 Hz
  - Current (Max Circuit Requirement): 30 amps (30 amps)
  - Max Input (MW Input): 6.7 kW (3.5 kW)

**SHIPPING INFORMATION**

- **U.S.:** All ovens shipped within the U.S. are packaged in a double-wall corrugated box banded to a wooden skid.
- **International:** All International ovens shipped via Air or Less than Container Loads are packaged in wooden crates.

- **Box size:** 35.8” x 26.4” x 26.3” (909 mm x 671 mm x 668 mm)
- **Crane size:** 40’ x 36’ x 33’ (1219 mm x 1067 mm x 1104 mm)
- **Item class:** 85 NMFC #26770 HS code 8419.81

- **Approximate boxed weight:** 235 lb. (106.6 kg)
- **Approximate crated weight:** 310 lb. (140.6 kg)

- **Minimum entry clearance required for box:** 26.8” (681 mm)
- **Minimum entry clearance required for crate:** 35.5” (902 mm)

TurboChef requires installing a type D circuit breaker for all installations.

© 2011-2013 TurboChef Technologies, Inc.
Commercial Cooking Appliance with Integral Systems for Limiting the Emissions of Grease-Laden Air

This Product Conforms to the Ventilation Recommendations Set Forth by NFPA96 Using EPA202 Test Method
NOTICE OF AUTHORIZATION TO APPLY THE UL MARK

10/26/2011

Turbochef Technologies Inc
Mr. David Castillo
Suite 105
4240 International Pky
Carrollton Tx 75007, Us

Our Reference: File E151487, Vol. 1
Your Reference: david castillo 6/9/11
Project Scope: USL/CNL

Dear Mr. David Castillo:

UL’s investigation of your product(s) has been completed under the above Reference Number and the product was determined to comply with the applicable requirements.

This letter temporarily supplements the UL Follow-Up Services Procedure and serves as authorization to apply the UL Mark only at authorized factories under UL’s Follow-Up Service Program.

To provide the manufacturer with the intended authorization to use the UL Mark, the addressee must send a copy of this notice to each manufacturing location currently authorized in File E151487, Vol. 1.

This authorization is effective from the date of this Notice and only for products at the indicated manufacturing locations. Records in the Follow-Up Services Procedure covering the product are now being prepared and will be sent in the near future. Until then, this letter authorizes application of the UL Mark for 90 days from the date of this letter.

Products that bear the UL Mark shall be identical to those that were evaluated by UL and found to comply with UL’s requirements. If changes in construction are discovered, appropriate action will be taken for products not in conformance with UL’s requirements and continued use of the UL Mark may be withdrawn. UL may elect to withdraw use of the UL Mark if the Applicant or Manufacturer fails to comply with UL’s requirements including ongoing compliance of the product, under UL’s Follow-Up Service.
Any information and documentation provided to you involving UL Mark services are provided on behalf of Underwriters Laboratories Inc. (UL) or any authorized licensee of UL.

The contents of this Letter are intended solely for the use of UL and the Applicant. The opinions and findings of UL represent its judgment given with due consideration to the necessary limitations of practical operation in accordance with UL’s objectives and purposes. UL shall not otherwise be responsible for the use of or reliance upon the contents of this letter by anyone. UL shall not incur any obligation or liability for any loss, expense or damages, including incidental, consequential or punitive damages, arising out of or in connection with the use or reliance upon the contents of this letter to anyone other than the Applicant as provided in the agreement between UL and Applicant. Any use or reference to UL’s name or certification mark(s) by anyone other than the Applicant in accordance with the agreement is prohibited without the express written approval of UL.

Very truly yours,

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Thomas C. Burdick
847-664-2884
Staff Engineering Associate
Thomas.C.Burdick@us.ul.com

NBK987E-6CE0B6
Commercial Cooking Appliances with Integral Systems for Limiting the Emission of Grease-laden Air

See General Information for Commercial Cooking Appliances with Integral Systems for Limiting the Emission of Grease-laden Air

TURBOCHEF TECHNOLOGIES INC
2801 Trade Center Drive
Carrollton, TX 75007 USA

Commercial microwave/convection ovens, Model(s) C3/C*, Encore 2, Encore*, i3*, i5*, NGC*, NGO*, Eco

Commercial ovens, Model(s) HHB, HHB2, HHD

 Conveyor Ovens, Model(s) HCW2620, HHC1618, HHC2020

* - Indicated complementary listed models.

Trademark and/or Tradename: "BULLET"

Last Updated on 2018-06-07
KNLZ.GuideInfo - COMMERCIAL COOKING APPLIANCES WITH INTEGRAL SYSTEMS FOR LIMITING THE EMISSION OF GREASE-LADEN AIR

[Heaters and Heating Equipment] (Heaters, Cooking Appliances) Commercial Cooking Appliances with Integral Systems for Limiting the Emission of Grease-laden Air

See General Information for Heaters, Cooking Appliances

USE AND INSTALLATION

This category covers cooking equipment intended for commercial use, such as pressurized deep fat fryers and other appliances for use in commercial kitchens, restaurants or other business establishments where food is prepared. Each appliance covered under this category is manufactured with an integral system feature to limit the emission of grease-laden air from the cooking process to the room ambient.

These appliances have been investigated for the limit of 5 mg/m³ for the emission of grease-laden air to the room ambient in accordance with the recommendations of ANSI/NFPA 96, "Ventilation Control and Fire Protection of Commercial Cooking Operations," using the EPA-20Z test method prescribed for cooking appliances provided with integral recirculating air systems.

These products are not intended for connection to a ducted exhaust system.

Appliances in this category are not provided with an integral fire extinguishing system. Authorities having jurisdiction should be consulted as to the requirements for this equipment with respect to fire extinguishing systems, such as the need for field installed systems in accordance with ANSI/NFPA 96.

In cases where the nature or construction of equipment is such that special precautions beyond the requirements of ANSI/NFPA 70, "National Electrical Code," must be observed in installations or use, suitable warning or special instructions are marked on the equipment.

Appliances covered under this category are suitable for wiring with either copper or aluminum power-supply conductors unless marked "Use Copper Wire Only For Power Supply Connections."

Commercial cooking appliances of certain types are designed for permanent connections to water supply and sewer lines at the point of installation. Authorities having jurisdiction should be consulted as to the requirements for this equipment with respect to sanitation and connection to water supply and waste disposal lines.

FACTORS NOT INVESTIGATED

Neither the toxicity of coatings nor the physiological effects on persons consuming food products prepared by use of these appliances has been investigated.

PRODUCT IDENTITY

One of the following product identities appears on the product:

Commercial Cooking Appliance with Integral System for Limiting the Emission of Grease-laden Air

Cooking Appliance with Integral System for Limiting the Emission of Grease-laden Air

Other product identities may be used as shown in the individual certifications, followed by the words "with Integral System for Limiting the Emission of Grease-laden Air."

RELATED PRODUCTS
For products with integral recirculating systems including fire extinguishing systems, see Commercial, with Integral Recirculating Systems (KNKG).

For cooking oil filters that are not an integral part of another appliance, see Commercial Filters for Cooking Oil (KNRF).

**ADDITIONAL INFORMATION**

For additional information, see Electrical Equipment for Use in Ordinary Locations (AALZ) and Heating, Cooling, Ventilating and Cooking Equipment (AAHC).

**REQUIREMENTS**

The basic standard used to investigate products in this category is ANSI/UL 197, "Commercial Electric Cooking Appliances."

Appliances covered under this category with an integral cooking oil filter have been additionally investigated to ANSI/UL 1889, "Commercial Filters for Cooking Oil."

**UL MARK**

The Certification Mark of UL on the product is the only method provided by UL to identify products manufactured under its Certification and Follow-Up Service. The Certification Mark for these products includes the UL symbol, the words "CERTIFIED" and "SAFETY," the geographic identifier(s), and a file number.

**Alternate UL Mark**

The Listing Mark of UL on the product is the only method provided by UL to identify products manufactured under its Listing and Follow-Up Service. The Listing Mark for these products includes the UL symbol (as illustrated in the Introduction of this Directory) together with the word "LISTED," a control number, and the product name "Commercial Cooking Appliance" or "Cooking Appliance," or other appropriate product name as shown in the individual Listings, together with the words "with integral system for limiting the emission of grease-laden air."

UL, in performing its functions in accordance with its objectives, does not assume or undertake to discharge any responsibility of the manufacturer or any other party. UL shall not incur any obligation or liability for any loss, expense or damages, including incidental or consequential damages, arising out of or in connection with the use, interpretation of, or reliance upon this Guide Information.

Last Updated on 2013-05-16

The appearance of a company's name or product in this database does not in itself assure that products so identified have been manufactured under UL's Follow-Up Service. Only those products bearing the UL Mark should be considered to be Certified and covered under UL's Follow-Up Service. Always look for the Mark on the product.

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9/9/2011

Mr. David Castillo  
Turbochef Technologies Inc  
Suite 105 4240 International Pky  
Carrollton, TX 75007  
United States

Reference: File E151487  
Project 11NK09045  
Volume: 1

Subject: CLOSING LETTER FOR EPA 202 TESTING ON THE MODEL ENCORE MICROWAVE HIGH SPEED CONVECTION OVEN FILE E151487

Dear Mr. Castillo,

Per your request, project 11NK09045 was opened for the evaluation of grease-laden vapors produced by the Model ENCORE microwave oven. The scope of the project was to complementary List these Models in accordance with EPA Method 202 test guidelines to demonstrate compliance with UL710B, the Standard for Recirculating Systems, Sec. 17 and NFPA96, the Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations, paragraph 4.1.1.2. The tests were conducted at our facility in Northbrook, IL on August 24th. This letter will report the results of the EPA202 test.

For the record, the test was conducted on the Model ENCORE microwave oven, cooking 12 in. pepperoni pizzas (Tombstone, with 19 pepperonis per pizza) as specified in Appendix A. Please see the attached page (Appendix A) for the test method and results of the tests. The results are considered to comply with UL710B, Section 17 and NFPA96, paragraph 4.1.1.2 since the measured values were less than the 5-mg/m³ limit.

Due to the Safety evaluation (11NK09045) not being completed, this letter will serve to report that all tests on the subject product have been completed with acceptable results as they relate to UL710B. After the successful completion of the safety project 11NK09045, a Service Request will be opened to add the Complementary Listing to the Model ENCORE. All information generated will be retained for future use. This concludes all work associated with project 11NK09045 and we are therefore closing this project. Our Accounting Department has been instructed to bill you for all charges incurred.

Any information and documentation involving UL Mark services are provided on behalf of Underwriters Laboratories Inc. (UL) or any authorized licensee of UL.

Should you have any questions or comments concerning the above, please feel free to contact the undersigned.

Sincerely,  

Bill Morler  
Project Engineer  
Department: 3015GNBK  
Tel: 847-664-1852  
E-mail: William.Morler@us.ul.com

Reviewed by:  

Fred Zaplatosch  
Engineer Staff  
Department: 3015GNBK  
E-mail: fred.zaplatosch@ul.com
APPENDIX: A

TEST FOR EVOLUTION OF SMOKE OR GREASE-LADEN AIR:

The Turbochef Model ENCORE microwave oven was tested using the method derived from EPA Method 202. Employing the VOC reducing catalytic converter, constructed of corrugated stainless steel with a ceramic washcoat, manufactured by Engelhard Emission Control Products.

A 12 in. by 6 in. rectangular, 108 in. tall sheet metal stack was constructed on top of a sheet metal hood and mounted above the exhaust vent of the oven. A sampling port was located approximately 80 in. downstream from the hood exhaust, at which point it was determined there was laminar flow. The sampler was assembled and an out of stack filter was used. A pre-leak check was conducted and determined to be > 0.02 ft/min. Sampling was determined to be done at 8 traverse points.

The oven with integral system was operated normally by cooking the following foods:

12 in. pepperoni pizza (Tombstone, with 19 pepperonis per pizza), each cooked for 1 minute and 32 seconds with 0 seconds between loads for 8 hours (total of 272 pizzas). Oven was set at the following duty:

<table>
<thead>
<tr>
<th>Temp</th>
<th>Event #</th>
<th>% Time</th>
<th>% Top Fan</th>
<th>IR</th>
<th>% Microwave Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>600°F</td>
<td>1</td>
<td>20</td>
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During the cooking operation, it was noted whether or not visible effluents evolved from the air exhaust of the hood. Gauge, meter and temperature readings were taken and recorded every 10 min. After cooking, the condition of the duct was noted and a post-leak check was conducted and determined to be < 0.02 ft³/min.

After being allowed to cool, the sampling equipment was disassembled; the filter was removed, and placed into a sample container labeled No. 1. The liquid in impingers Nos. 1, 2, and 3 were volumetrically measured and transferred to sample container No. 3. The silica gel and impinger No. 4 was transferred to sample container No. 5. The nozzle, probe and impingers were rinsed three times with water and the rinse was added to container No. 3. These parts were also rinsed three times with acetone and transferred to container No. 4. All additional inter surfaces of the sampling terrain glassware were rinsed with methylene chloride three times; the rinse was transferred to container No. 6. A blank of acetone approximately equivalent to the amount used for rinses was aliquoted into container No. 2, the same was done for the distilled de-ionized water and methylene chloride except that these were aliquoted into their own individual containers labeled No. 7 and 8 respectively. All containers were properly labeled and sealed, then the liquid levels in all the containers were marked.

The analysis phase was done in accordance with EPA Method 202, using the out of stack filter.

RESULTS:

There was no visible smoke emitted from the exhaust of the hood during the normal cooking operation of the Models ENCORE. There was no noticeable amount of smoke accumulated in the test room after 8 hours of continuous cooking.

The total amount of grease-laden effluents collected by the sampling equipment for the Model ENCORE was found to be 0.13 mg/m³, which is less than 5 mg/m³.
UL® (KNLZ)
Emissions by Product
Ventless Requirement: <5.00 mg/m³

<table>
<thead>
<tr>
<th>Product</th>
<th>Product Cooked Per 8-hour Period</th>
<th>Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bullet/Encore</td>
<td>272</td>
<td>0.13</td>
</tr>
<tr>
<td>C3</td>
<td>180</td>
<td>1.35</td>
</tr>
<tr>
<td>Double Batch</td>
<td>214</td>
<td>1.04</td>
</tr>
<tr>
<td>Eco</td>
<td>162</td>
<td>0.89</td>
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<tr>
<td>Fire</td>
<td>222</td>
<td>0.48</td>
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<tr>
<td>HhB</td>
<td>190</td>
<td>0.4</td>
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<tr>
<td>HhC 1618</td>
<td>311</td>
<td>1.12</td>
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<tr>
<td>HhC 2020</td>
<td>480</td>
<td>1.91</td>
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<tr>
<td>HhC 2620</td>
<td>576</td>
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<td>i3</td>
<td>160</td>
<td>0.32</td>
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<td>i5</td>
<td>240</td>
<td>2.8</td>
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<tr>
<td>Single Batch</td>
<td>131</td>
<td>0.52</td>
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<tr>
<td>Sota</td>
<td>280</td>
<td>0.64</td>
</tr>
<tr>
<td>Tornado</td>
<td>160</td>
<td>0.21</td>
</tr>
</tbody>
</table>
October 18, 2004

Mr. Mike Denny
Building Services,
224 West Knight St.
City of Sioux Falls,
South Dakota, 57102
Ph: 605-367-8252

Re: Fire and smoke containment

Dear Mr. Denny:

The TurboChef ovens have been extensively tested and conform to UL 923 and UL KNLZ standards. The UL 923 standard is the electrical/product safety standard and the KNLZ is the low particulate matter emissions standard to which we conform. While both standards address different aspects of the oven, they both have inherent overlap as it relates to grease/smoke/fire handling.

As it relates specifically to fire safety, UL 923 specifies:

Section 57 Cavity Fire Containment Test:

The performance of an appliance subjected to this test shall be considered acceptable if all of the following conditions are met:

a) There is no emission of fire, flame, or molten metal outside the appliance nor glowing or ignition of the cheesecloth, tissue paper, or wood surface;

b) The fuse rated 3 A does not open;

c) Following the test, the appliance complies with the requirements of Leakage Current, Section 33, and Dielectric Voltage-Withstand Test, Section 39, as applicable to primary circuits; and

d) Following the test and following 10 c of operation (opening and closing the door), the appliance complies with the requirements in 57.12. The radiation emission shall not exceed 5mW/cm².

Test Method:

Section 57.2 requires that 4 potatoes each weighing between 150g and 200g be placed inside the oven under test and cooked using full microwave power and hot air (if applicable) until the potatoes catch fire. Note: The test must be repeated until it catches fire. During this test, pieces of tissue paper and cheesecloth are placed above, below and around the product to ensure that the fire and/or excessive heat generated is safely contained within the confines of the appliance.

As it relates to grease handling, UL KNLZ specifies:

UL KNLZ Guide Information Excerpt:

“These appliances have been evaluated for the limit of 5 mg/m³ for the emission of grease-laden air to the room ambient in accordance with the recommendations of the National Fire Protection Association Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations, NFPA 96, using the EPA-202 test method prescribed for cooking appliances provided with integral recirculating air systems.”
Test Method:

The UL KNLZ category requires that products must have less than 5.0 mg/m3 of particulate matter emissions during 8 continuous hours of cooking a "worst case" food product as measured by EPA 202. Note: Our products were tested using full-fat pepperoni pizzas.

As it pertains specifically to smoke: Smoke typically consists of visible grease particulate that escapes from a product during operation. Our ovens utilize a recirculating airpath that is catalytic scrubbed, thus the airborne grease is combusted as it crosses our catalyst. Given this, under typical/normal operating conditions, our product does not emit smoke.

If you have any issues or specific questions regarding the above, please contact me directly.

Best regards,

James K. Pool III

James K. Pool III
Vice President Engineering,
TurboChef Technologies, Inc.,
Ph: 214.379.6020
Email: james.pool@turbochef.com
# TurboChef Energy Calculator

## User Inputs

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Total Operation Time per Day (hours)</td>
<td>12</td>
<td>hours</td>
</tr>
<tr>
<td>Cook Cycle Time (seconds)</td>
<td>60</td>
<td>seconds</td>
</tr>
<tr>
<td>Number of Cooks per Day</td>
<td>100</td>
<td>total</td>
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<tr>
<td>Energy Cost/kWhr ($)</td>
<td>0.11</td>
<td>$/kWhr</td>
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</tbody>
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## Constants

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<table>
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<tr>
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<tbody>
<tr>
<td>Power Warm-up (watts)</td>
<td>2,700</td>
</tr>
<tr>
<td>Power Cooking (watts)</td>
<td>4,300</td>
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<tr>
<td>Power Idle (watts)</td>
<td>1,100</td>
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<tr>
<td>Time Warm-up (seconds)</td>
<td>900</td>
</tr>
</tbody>
</table>

Energy = (Power x time), where power is in watts and time is in seconds

E_{total} = E_{idle} + E_{cooking} + E_{warmup}

Ave Power = \frac{E_{total}}{total time per day}

## Calculated Times

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Time (cooking, sec)</td>
<td>6,000</td>
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<tr>
<td>Time (idle, sec)</td>
<td>36,300</td>
</tr>
<tr>
<td>Time Check</td>
<td>12</td>
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</tbody>
</table>

E_{idle} (kJ) 39,930

E_{warm-up} (kJ) 2,430

E_{cooking} (kJ) 25,800

E_{total} (kJ) 68,160

E_{total} (kWHR) 18.93

Avg Power/Day (kW) 1.58

Tons of Cooling 0.45

Cost/Day ($) 2.08

Cost/Month ($) 62.40

Cost/Year ($) 759.20
The illustrations in this document represent the surface testing data reported for the TurboChef oven model Encore during idle and during cooking after two and half hours of idle at 500°F (260°C), simulating the highest temperature condition.

**Fahrenheit Measurements (Idle/Cooking)**
Celsius Measurements (Idle/Cooking)
The illustrations in this document represent the surface testing data reported for the TurboChef oven model Bullet during idle and during cooking after two and a half hours idle at 520°F (271°C), simulating the highest temperature condition.

Fahrenheit Measurements (Idle/Cooking)
Celsius Measurements (Idle/Cooking)

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</table>
April 4, 2012

James K. Pool, III
President
Turbochef Technologies INC.
4240 International Parkway
Carrollton, TX  75007

Ventilation Exemption Plan Check No. ME-2012- 001
Application Type: Equipment specific 208 / 240 V; 3.5KW
Effective Date: 04/04/2012
Expiration Date: 04/05/2017
Telephone: (214) 402-4526
Email: James.pool@turbochef.com

RE: EXEMPTION FROM MECHANICAL EXHAUST VENTILATION FOR TURBOCHEF ELECTRIC CONVECTION OVEN MODEL: ENCORE.

Dear Mr. Pool:

The County of Los Angeles Department of Public Health, Environmental Health, Plan Check Program has completed a review of the Turbochef Model: Encore electric convection oven for exemption from the mechanical exhaust ventilation requirements of Section 114149.1(a) of the California Retail Food Code.

You have provided documentation that this oven has Underwriter’s Laboratory (UL) KNLZ approval for safety and Sanitation Certifications under NSF / ANSI 4 for commercial food equipment. Also, you provided the results of the eight-hour cooking emissions test conducted on the Turbochef Model: Encore electric convection oven. The test result indicates that the particulate matter concentration produced by Encore was found to be 0.13 mg/m$^3$ which are below the limit of 5 mg/ m$^3$ considered as a low grease emission appliance.
Installation Recommendations

TurboChef ventless ovens have internal systems for destroying grease laden vapor prior to the grease escaping the oven; therefore, the ovens are certified as non-grease emitting appliances. When following our recommendations, TurboChef ovens can be installed without the aid of a Type I or Type II hood per International Mechanical Code (2006, 2009, and 2012), NFPA 96, NFPA 101 (Life Safety Code), EPA 202, and Underwriter’s Laboratory (UL KNLZ).

The following guide is intended to give relevant information for the ventless installation, operation, and maintenance of TurboChef ovens. It is important that these guidelines are followed and that the oven and surrounding areas be maintained regularly for optimal performance.

Certifications
Safety – cULus, TUV (CE)
Sanitation – NSF*, UL EPH†
Ventless – UL (KNLZ)

Electrical Requirements
TurboChef ovens must be installed on a circuit equal to the ratings listed below, per NEC sec 210.23, permissible loads.

<table>
<thead>
<tr>
<th>Oven</th>
<th>Voltage</th>
<th>Current</th>
<th>Phase</th>
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<tbody>
<tr>
<td>Bullet</td>
<td>208/240 VAC</td>
<td>30 amp</td>
<td>1 Ph</td>
</tr>
<tr>
<td>C3</td>
<td>208/240 VAC</td>
<td>50 amp</td>
<td>1 Ph</td>
</tr>
<tr>
<td>Double Batch</td>
<td>208/240 VAC</td>
<td>50 amp</td>
<td>1 Ph</td>
</tr>
<tr>
<td></td>
<td>208/240 VAC</td>
<td>30 amp</td>
<td>3 Ph</td>
</tr>
<tr>
<td>Eco</td>
<td>208/240 VAC</td>
<td>30 amp</td>
<td>1 Ph</td>
</tr>
<tr>
<td>Encore/Encore 2</td>
<td>208/240 VAC</td>
<td>30 amp</td>
<td>1 Ph</td>
</tr>
<tr>
<td>Fire</td>
<td>208/240 VAC</td>
<td>30 amp</td>
<td>1 Ph</td>
</tr>
<tr>
<td>HhB 2</td>
<td>208/240 VAC</td>
<td>30 amp</td>
<td>1 Ph</td>
</tr>
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<td>HhC 1618</td>
<td>208/240 VAC</td>
<td>30 amp</td>
<td>3 Ph</td>
</tr>
<tr>
<td></td>
<td>208/240 VAC</td>
<td>50 amp</td>
<td>1 Ph</td>
</tr>
<tr>
<td>HhC 2020</td>
<td>208/240 VAC</td>
<td>50 amp</td>
<td>3 Ph</td>
</tr>
<tr>
<td>HhC 2620</td>
<td>208/240 VAC</td>
<td>50 amp</td>
<td>3 Ph</td>
</tr>
<tr>
<td>i1 (Panini, Sóta, Waterless Steamer)</td>
<td>208/240 VAC</td>
<td>30 amp</td>
<td>1 Ph</td>
</tr>
<tr>
<td>i1 Sóta Single Mag</td>
<td>208/240 VAC</td>
<td>20 amp</td>
<td>1 Ph</td>
</tr>
<tr>
<td>i3</td>
<td>208/240 VAC</td>
<td>40 amp</td>
<td>1 Ph</td>
</tr>
<tr>
<td></td>
<td>208/240 VAC</td>
<td>30 amp</td>
<td>3 Ph</td>
</tr>
<tr>
<td>i5</td>
<td>208/240 VAC</td>
<td>50 amp</td>
<td>1 Ph</td>
</tr>
<tr>
<td></td>
<td>208/240 VAC</td>
<td>30 amp</td>
<td>3 Ph</td>
</tr>
<tr>
<td>Single Batch</td>
<td>208/240 VAC</td>
<td>30 amp</td>
<td>1 Ph</td>
</tr>
<tr>
<td>Tornado</td>
<td>208/240 VAC</td>
<td>30 amp</td>
<td>1 Ph</td>
</tr>
</tbody>
</table>

* NSF certification applies to the Tornado, C3, and HhB 2 ovens only. UL EPH certification applies to all ovens except the C3.

Menu Requirements
TurboChef ovens have been approved by Underwriter’s Laboratory for ventless operation (UL KNLZ listing) for all food items EXCEPT for foods classified as “fatty raw proteins.” Such foods include bone-in, skin-on chicken, raw hamburger meat, raw bacon, raw sausage, steaks, etc.

The TurboChef certification includes precooked food items such as pizza toppings, sandwich meats, frozen appetizers, and cheeses. Additionally, raw, lean meats such as boneless, skinless chicken breasts and fish fall within the certification.

Cleaning Requirements
To ensure continued compliance with all health, building, and fire codes, users are required to:
- Use only TurboChef-approved cleaning chemicals.
- Follow monthly and quarterly cleaning instructions provided in the manual. Post cleaning instructions near the oven.
- Ventless installation requires that the areas around the oven (walls, ceilings, kitchen equipment, etc.) be cleaned as needed but no less than once every other month.

Installation Near Open Heat Source
When placing a TurboChef oven near an open heat source (see illustration below), strictly adhere to the following:
- If the oven is being placed near a grill or stove, a divider must exist between the oven and the open heat source, with a minimum of 6” (152 mm) between the oven and the divider.
- If the oven is being placed near a fryer, a divider must exist between the oven and fryer, with a minimum of 12” (305 mm) between the oven and the divider.
- The height of the divider must be greater than or equal to the height of the oven.

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DOC-1448 / Revision E / August 2018
Oven Clearances
Verify the oven location has the following clearances on the top and each side. TurboChef ovens have built-in back bumpers that allow for the necessary spacing from the oven to the back wall.

<table>
<thead>
<tr>
<th>Oven</th>
<th>Top</th>
<th>Sides</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bullet</td>
<td>5&quot; (127 mm)</td>
<td>2&quot; (51 mm)</td>
</tr>
<tr>
<td>C3</td>
<td>4&quot; (102 mm)</td>
<td>2&quot; (51 mm)</td>
</tr>
<tr>
<td>Double Batch</td>
<td>2&quot; (51 mm)</td>
<td>2&quot; (51 mm)</td>
</tr>
<tr>
<td>Eco</td>
<td>5&quot; (127 mm)</td>
<td>1&quot; (25 mm)</td>
</tr>
<tr>
<td>Encore/Encore 2</td>
<td>5&quot; (127 mm)</td>
<td>2&quot; (51 mm)</td>
</tr>
<tr>
<td>Fire</td>
<td>2&quot; (51 mm)</td>
<td>2&quot; (51 mm)</td>
</tr>
<tr>
<td>HhB 2</td>
<td>2&quot; (51 mm)</td>
<td>2&quot; (51 mm)</td>
</tr>
<tr>
<td>HhC 1618</td>
<td>10&quot; (254 mm)</td>
<td>0&quot; (0 mm)</td>
</tr>
<tr>
<td>HhC 2020</td>
<td>10&quot; (254 mm)</td>
<td>0&quot; (0 mm)</td>
</tr>
<tr>
<td>HhC 2620</td>
<td>10&quot; (254 mm)</td>
<td>0&quot; (0 mm)</td>
</tr>
<tr>
<td>i1 (Panini, Sôta / Sôta Single Mag, Waterless Steamer)</td>
<td>5&quot; (127 mm)</td>
<td>1&quot; (25 mm)</td>
</tr>
<tr>
<td>i3</td>
<td>19&quot; (483 mm)</td>
<td>2&quot; (51 mm)</td>
</tr>
<tr>
<td>i5</td>
<td>19&quot; (483 mm)</td>
<td>2&quot; (51 mm)</td>
</tr>
<tr>
<td>Single Batch</td>
<td>2&quot; (51 mm)</td>
<td>2&quot; (51 mm)</td>
</tr>
<tr>
<td>Tornado</td>
<td>4&quot; (102 mm)</td>
<td>2&quot; (51 mm)</td>
</tr>
</tbody>
</table>

Ventilation
TurboChef ovens must be installed in a well-ventilated space. The space should have an exhaust rate of .70 cfm per square foot of kitchen space and an additional 100 sq. ft. (9.3 m²) of virtual space per ventless cooking appliance (TurboChef or any other).

If the air inlet is for general exhaust, pursuant to requirements for 507.2.2, paragraph 2, locate the air inlet above the center point of each oven.

The heat load from TurboChef ovens is mostly sensible. The only latent heat present is due to evaporation during the cooking process. When installing a TurboChef oven, the space must have the following tons of AC per oven installed.

<table>
<thead>
<tr>
<th>Oven</th>
<th>Tons of AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bullet</td>
<td>0.5</td>
</tr>
<tr>
<td>C3</td>
<td>0.63</td>
</tr>
<tr>
<td>Double Batch</td>
<td>1.15</td>
</tr>
<tr>
<td>Eco</td>
<td>0.89</td>
</tr>
<tr>
<td>Encore/Encore 2</td>
<td>0.45</td>
</tr>
<tr>
<td>Fire</td>
<td>0.55</td>
</tr>
<tr>
<td>HhB 2</td>
<td>0.84</td>
</tr>
<tr>
<td>HhC 1618</td>
<td>1.00</td>
</tr>
<tr>
<td>HhC 2020</td>
<td>1.47</td>
</tr>
<tr>
<td>HhC 2620</td>
<td>1.82</td>
</tr>
<tr>
<td>i1 (Panini, Sôta / Sôta Single Mag, Waterless Steamer)</td>
<td>0.3</td>
</tr>
<tr>
<td>i3</td>
<td>0.9</td>
</tr>
<tr>
<td>i5</td>
<td>1.3</td>
</tr>
<tr>
<td>Single Batch</td>
<td>0.75</td>
</tr>
<tr>
<td>Tornado</td>
<td>0.58</td>
</tr>
</tbody>
</table>

How the Ovens are Tested
TurboChef ovens are evaluated according to UL. The evaluation entails placing the test oven in an environmental chamber built to capture all emissions escaping during idle, cooking, and door-open conditions. During the eight-hour test period, a typical worst-case food item is cooked continuously, and 100% of condensable and non-condensable emissions from the product are collected and analyzed according to the EPA 202 Test Method. At the conclusion of the test, the total concentration of particulate matter (emissions) must be less than 5.0 mg/m³ for the oven to be certified for ventless operation. Cooking devices that measure above the 5.0 mg/m³ threshold are considered to produce grease and must be installed under Type I ventilation, according to International Mechanical Code.

TurboChef ovens are well below the 5.0 mg/m³ threshold as shown below.

Contact Information
For questions regarding a ventless installation, email ventless.help@turbochef.com. For questions or concerns regarding an existing installation, contact Customer Service at 1.800.908.8726, Option 1.

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