

## Tornado and Tornado 2 (NGC) Ventless Submittal Information

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# THE TORNADO®

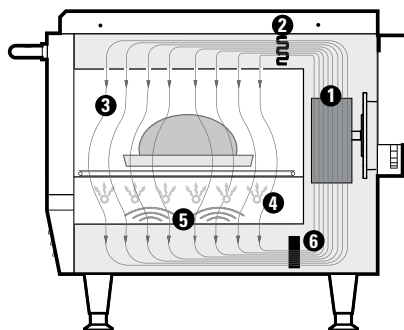


## PERFORMANCE

- The Tornado® evenly and consistently toasts, browns and crisps food up to 12X faster than traditional cooking methods, resulting in a high level of throughput without compromising quality

## VENTILATION

- UL 710B (KNLZ) listed for ventless operation.<sup>†</sup>
- EPA 202 test (8 hr):
  - Product: Pepperoni Pizzas
  - Results: 0.21 mg/m<sup>3</sup>
  - Ventless Requirement: <5.00 mg/m<sup>3</sup>
- Internal catalytic filtration to limit smoke, grease, and odor emissions.



1. Blower Motor
2. Impingement Heater
3. Impinged Air
4. Bottom Browning Element
5. Microwave Bursts
6. Catalytic Converter

Project \_\_\_\_\_

Item No. \_\_\_\_\_

Quantity \_\_\_\_\_

## EXTERIOR CONSTRUCTION

- 430 stainless steel front, top, sides and back
- 4" (102 mm) adjustable legs
- Cool to the touch pull down door with microwave seal

## INTERIOR CONSTRUCTION

- 304 stainless steel interior
- Fully insulated cook chamber
- Removable / variable cooking surfaces
- Exposed bottom browning element

## STANDARD FEATURES

- Integral recirculating catalytic converter for UL 710B (KNLZ) listed ventless operation
- Variable-speed High h recirculating impingement airflow system
- Variable cooking surfaces (racks, stones and platters)
- Independently-controlled bottom browning element
- Smart Voltage Sensor Technology\* (U.S. only)
- Smart menu system capable of storing up to 128 recipes
- Built-in self-diagnostics for monitoring oven components and performance
- Stackable design (requires stacking kit)
- Manual snooze mode
- Includes plug and cord (6 ft. nominal)
- Smart card compatible
- Warranty – 1 year parts and labor

## COMES WITH STANDARD ACCESSORIES

- 1 Aluminum Paddle (NGC-1478)
- 1 Bottle Oven Cleaner (103180)
- 1 Bottle Oven Guard (103181)
- 2 Trigger Sprayers (103182)
- 2 Non-stick Baskets (100011)



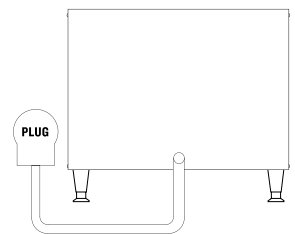
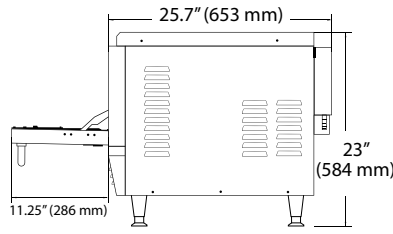
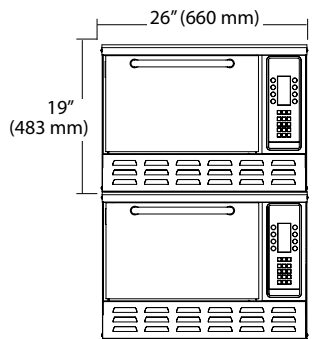
This product conforms to the ventilation recommendations set forth by NFPA96 using EPA202 test method.

\* 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.

<sup>†</sup> 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 [ventless.help@turbochef.com](mailto:ventless.help@turbochef.com)

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



**DIMENSIONS**

Single Units		
Height	19"	483 mm
on legs	23"	584 mm
Width	26"	660 mm
Depth	25.7"	653 mm
with handle	28.2"	716 mm
Weight	190 lbs.	86 kg
Stacked Units (Stacking Kit Required)		
Height	38"	965 mm
Width	26"	660 mm
Depth	25.7"	653 mm
with handle	28.2"	716 mm
Weight	380 lbs.	172 kg
Cook Chamber		
Height	8"	203 mm
Width	15.5"	394 mm
Depth	14.7"	373 mm
Volume	1.05 cu.ft.	29.9 liters
Wall Clearance (Oven not intended for built-in installation)		
Top	4"	102 mm
Sides	2"	51 mm

**ELECTRICAL SPECIFICATIONS**

NORTH AMERICA		
NGC (NGC-1180-1)		
Phase	1 Phase	
Voltage	208/240 VAC	
Frequency	60 Hz	
Current	30 amp	
Max Circuit Requirement	30 amp	
Plug/Cord	NEMA 6-30P; 1.5m, H07RN-F	
Max Input	5990/6675 watts	
Microwave Input Power	3500 watts	
NGCBK (NGC-1180-1K-2020)		
Phase	1 Phase	
Voltage	220 VAC	
Frequency	60 Hz	
Current	30 amp	
Max Circuit Requirement	30 amp	
Plug	IEC 309, 3-pin, 32 amp	
Max Input	6700 watts	
Microwave Input Power	3500 watts	
EUROPE/ASIA-PACIFIC		
NGCEW (NGC-1180-1W for standard) NGCEW (NGC-1180-1W-2024 for Australia/New Zealand)* NGCKW (NGC-1180-1W-2004 for South Korea)**		
Phase	3 Phase	
Voltage	400 VAC	
Frequency	50 Hz or 60 Hz**	
Current	16 amp	

Max Circuit Requirement	20 amp	
Plug	IEC 309, 5-pin, 32 amp	
Max Input	10500 watts	
Microwave Input Power	3500 watts	
NGCED (NGC-1180-1D)		
Phase	3 Phase	
Voltage	230 VAC	
Frequency	50 Hz	
Current	30 amp	
Max Circuit Requirement	32 amp	
Plug	IEC 309, 4-pin, 32 amp	
Max Input	10500 watts	
Microwave Input Power	3500 watts	
NGCUK (NGC-1180-1K)		
Phase	1 Phase	
Voltage	230 VAC	
Frequency	50 Hz	
Current	30 amp	
Max Circuit Requirement	32 amp	
Plug	IEC 309, 3-pin, 32 amp	
Max Input	6700 watts	
Microwave Input Power	3500 watts	
JAPAN		
NGCJD - 50Hz/ 3 Phase (NGC-1180-1D-2005-1) NGCJD - 60Hz/ 3 Phase (NGC-1180-1D-2005-2) NGCJK - 50Hz/ 1 Phase (NGC-1180-1K-2005-3) NGCJK - 60Hz/ 1 Phase (NGC-1180-1K-2005-4)		
Phase	1 or 3 Phase	
Voltage	200 VAC	
Frequency	50 or 60 Hz	
Current	30 amp	
Max Circuit Requirement	30 amp	
Plug	PSE-marked, 3 or 4-blade, 30 amp	
Max Input	10500 or 6700 watts	
Microwave Input Power	3500 watts	

**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: 34" x 30" x 30" (864 mm x 762 mm x 762 mm)  
 Crate size: 37" x 33" x 34" (940 mm x 838 mm x 864 mm)  
 Item class: 85 NMFC #26770 HS code 8419.81  
 Approximate boxed weight: 260 lb. (118 kg)  
 Approximate crated weight: 320 lb. (145 kg)  
 Minimum entry clearance required for box: 30.5" (775 mm)  
 Minimum entry clearance required for crate: 33.5" (851 mm)

\*All AU-New Zealand ovens with clips allow for 5 pin plug.  
 TurboChef recommends installing a type D circuit breaker for all installations.

**TurboChef Global Operations**  
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# TORNADO 2™

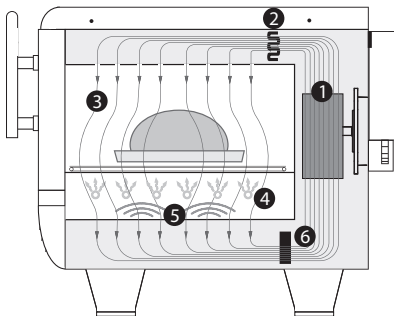


## PERFORMANCE

The Tornado 2™ oven evenly and consistently toasts, browns, and crisps food up to twelve times faster than traditional cooking methods, resulting in a high level of throughput without compromising quality.

## VENTILATION

- UL 710B (KNLZ) listed for ventless operation.†
- EPA 202 test (8 hr):
  - Product: Pepperoni Pizzas
  - Results: 0.21 mg/m<sup>3</sup>
  - Ventless Requirement: <5.00 mg/m<sup>3</sup>
- Internal catalytic filtration to limit smoke, grease, and odor emissions.



1. Blower Motor
2. Impingement Heater
3. Impinged Air
4. Bottom Browning Element
5. Microwave Bursts
6. Catalytic Converter

Project \_\_\_\_\_

Item No. \_\_\_\_\_

Quantity \_\_\_\_\_

## EXTERIOR CONSTRUCTION

- Stainless steel exterior with powder-coated side panels
- 4" (102 mm) legs
- Cool to the touch pull down door with microwave seal

## INTERIOR CONSTRUCTION

- 304 stainless steel interior
- Fully insulated cook chamber
- Removable / variable cooking surfaces
- Exposed bottom browning element

## STANDARD FEATURES

- Integral recirculating catalytic converter for UL 710B (KNLZ) listed ventless operation
- Variable-speed High h recirculating impingement airflow system
- Variable cooking surfaces (racks, stones, and platters)
- Independently-controlled bottom browning element
- Smart Voltage Sensor Technology\* (U.S. only)
- Smart menu system capable of storing up to 128 recipes
- Built-in self-diagnostics for monitoring oven components and performance
- Stackable design (requires stacking kit)
- Manual snooze mode
- Includes plug and cord (6 ft. nominal)
- Smart card compatible
- Warranty – 1 year parts and labor

## COMES WITH STANDARD ACCESSORIES

- 1 Aluminum Paddle (NGC-1478)
- 1 Bottle Oven Cleaner (103180)
- 1 Bottle Oven Guard (103181)
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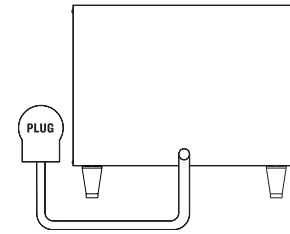
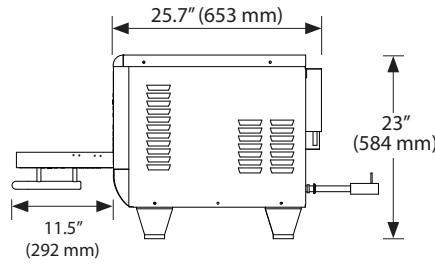
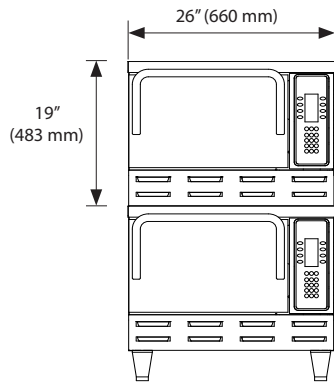
This product conforms to the ventilation recommendations set forth by NFPA96 using EPA202 test method.

\* 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.

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



DIMENSIONS		
Single Units		
Height	19"	483 mm
on legs	23"	584 mm
Width	26"	660 mm
Depth	25.7"	653 mm
with handle	28.45"	723 mm
Weight	190 lb.	86 kg
Stacked Units (Stacking Kit Required)		
Height	38"	965 mm
Width	26"	660 mm
Depth	25.7"	653 mm
with handle	28.45"	723 mm
Cook Chamber		
Height	8"	203 mm
Width	15.5"	394 mm
Depth	14.7"	373 mm
Volume	1.05 cu.ft.	29.9 liters
Wall Clearance (Oven not intended for built-in installation)		
Top	4"	102 mm
Sides	2"	51 mm
ELECTRICAL SPECIFICATIONS		
NORTH AMERICA (NGC-1280-1)		
Phase	1 Phase	
Voltage	208/240 VAC	
Frequency	60 Hz	
Current	30 amps	
Max Circuit Requirement	30 amps	
Plug/Cord	NEMA 6-30P; 1.5m, H07RN-F	
Max Input	5,990 watts (208) / 6,675 watts (240)	
Microwave Input Power	3,500 watts	
NGCBK (NGC-1280-1K-2020)		
Phase	1 Phase	
Voltage	220 VAC	
Frequency	60 Hz	
Current	30 amps	
Max Circuit Requirement	30 amps	
Plug	IEC 309, 3-pin, 32 amp	
Max Input	6,700 watts	
Microwave Input Power	3,500 watts	
EUROPE/ASIA-PACIFIC		
NGCEW (NGC-1280-1W for standard) NGCEW (NGC-1280-1W-2024 for Australia/New Zealand)* NGCKW (NGC-1280-1W-2004 for South Korea)**		
Phase	3 Phase	
Voltage	400 VAC	
Frequency	50 Hz or 60 Hz**	
Current	16 amps	
Max Circuit Requirement	20 amps	

Plug	IEC 309, 5-pin, 32 amp	
Max Input	10,500 watts	
Microwave Input Power	3,500 watts	
NGCED (NGC-1280-1D)		
Phase	3 Phase	
Voltage	230 VAC	
Frequency	50 Hz	
Current	30 amps	
Max Circuit Requirement	30 amps	
Plug	IEC 309, 4-pin, 32 amp	
Max Input	10,500 watts	
Microwave Input Power	3,500 watts	
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Voltage	230 VAC	
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Current	30 amps	
Max Circuit Requirement	32 amps	
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Max Input	6,700 watts	
Microwave Input Power	3,500 watts	
JAPAN		
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Phase	1 or 3 Phase	
Voltage	200 VAC	
Frequency	50 or 60 Hz	
Current	30 amps	
Max Circuit Requirement	30 amps	
Plug	PSE-marked, 3 or 4-blade, 30 amp	
Max Input	6,700 or 10,500 watts	
Microwave Input Power	3,500 watts	
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: 34" x 30" x 30" (864 mm x 762 mm x 762 mm) Crate size: 37" x 33" x 34" (940 mm x 838 mm x 864 mm) Item class: 85 NMFC #26770 HS code 8419.81		
Approximate boxed weight: 260 lb. (118 kg) Approximate crated weight: 320 lb. (145 kg)		
Minimum entry clearance required for box: 30.5" (775 mm) Minimum entry clearance required for crate: 33.5" (851 mm)		

\*All AU-New Zealand ovens with clips allow for 5 pin plug.

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

**TurboChef Global Operations**

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 Fax: +1 214.379.6073 / turbochef.com



Commercial Microwave/Convection Oven  
with Integral Systems for Limiting  
the Emissions of Grease Laden Air

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This Product Conforms to the Ventilation Recommendations  
Set Forth by NFPA96 Using EPA202 Test Method



## KNLZ.E151487 Commercial Cooking Appliances with Integral Systems for Limiting the Emission of Grease-laden Air

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### 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**

E151487

2801 Trade Center Drive  
Carrollton, TX 75007 USA

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

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

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

\* - Indicated complementary listed models.

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## KNLZ.GuideInfo

### Commercial Cooking Appliances with Integral Systems for Limiting the Emission of Grease-laden Air

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## [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](#)

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 in 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 evaluated for the limit of 5 mg/m<sup>3</sup> 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.

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 NFPA 96.

For products with integral recirculating systems including fire extinguishing systems, refer to Commercial, with Integral Recirculating Systems ([KNKG](#)).

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

Appliances Listed in 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.

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

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

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

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

Appliances Listed in this category with an integral cooking oil filter have been additionally investigated to the requirements in the standard "Commercial Filters for Cooking Oil", [ANSI/UL 1889](#).

The Listing Mark of Underwriters Laboratories Inc. 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 name and/or symbol of Underwriters Laboratories Inc. (as illustrated in the Introduction of this Directory) together with the word "LISTED," a control number and one of the following product names as appropriate: "Commercial Cooking Appliance," "Cooking Appliance," or other appropriate product identity specified in the individual Listing, along with the words "with integral system for limiting the emission of grease-laden air. "



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Mailing Address P.O. Box 1247, San Ramon, California 94583



September 8, 2003

TurboChef Technologies, Inc.  
10500 Metric Drive, Suite 128  
Dallas, Texas 75243

Dear Mr. Pool:

The eight-hour cooking emissions test on the NGC electric oven was completed as scheduled on August 27, 2003. The test samples have been analyzed and the total particulate matter (PM) concentration ( $\text{mg}/\text{m}^3$ ) has been determined to be  $0.523 \text{ mg}/\text{m}^3$  at an applied ventilation rate of 200 cfm.

The result of this test definitively supports the use of the NGC oven without the benefit of a Type I dedicated exhaust hood. Set against the pass/fail criteria of UL 197, the total PM concentration produced by the oven falls well below the standard's limit of  $5.0 \text{ mg}/\text{m}^3$  for allowable grease emissions. Further, the measured total PM concentration of  $0.523 \text{ mg}/\text{m}^3$  is below the  $1.5 \text{ mg}/\text{m}^3$  limit adopted by some regulatory agencies.

The attached table summarizes the food product specifications, cooking parameters, constant test conditions and test results of the eight-hour cooking emissions test.

Please feel free to contact me should you have any questions or would like to further discuss the results of this test.

Sincerely,

Todd Bell  
Emissions Researcher  
Food Service Technology Center

Enclosure: 1

Emissions Testing Summary

Food Product Specification

---

Test Food Product ..... Pepperoni Pizza  
Average Total Weight of each Pizza (lb)..... 0.42

Cooking Parameters

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Cook Time (minutes) ..... 2.0  
Loading Time (minutes)..... 0.25  
Removal Time (minutes)..... 0.25  
Total Cooking Cycle (minutes)..... 2.50  
Pre-Cooking State (°F)..... 30 ± 2.0  
Number of Pizzas ..... 384  
Number of Pizzas per Load..... 2

Test Conditions

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Sampling Time (hours) ..... 8  
Exhaust Ventilation Rate (cfm)..... 200  
Number of Probe Sampling Points..... 3  
Time Interval at each Sampling Point (minutes)..... 30

Test Results

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Total PM Concentration (mg/m<sup>3</sup>)..... 0.523

air from the exhaust outlet discharges away from such locations.

**506.4 Ducts serving Type II hoods.** Single or combined Type II exhaust systems for food-processing operations shall be independent of all other exhaust systems. Commercial kitchen exhaust systems serving Type II hoods shall comply with Sections 506.4.1 and 506.4.2.

**506.4.1 Type II exhaust outlets.** Exhaust outlets for ducts serving Type II hoods shall comply with Sections 401.4 and 401.4.2. Such outlets shall be protected against local weather conditions and shall meet the provisions for exterior wall opening protectives in accordance with the *International Building Code*.

**506.4.2 Ducts.** Ducts and plenums serving Type II hoods shall be constructed of rigid metallic materials. Duct construction, installation, bracing and supports shall comply with Chapter 6. Ducts subject to positive pressure and ducts conveying moisture-laden or waste-heat-laden air shall be constructed, joined and sealed in an approved manner.

**506.5 Exhaust equipment.** Exhaust equipment, including fans and grease reservoirs, shall comply with Sections 506.5.1 through 506.5.5 and shall be of an approved design or shall be listed for the application.

**506.5.1 Exhaust fans.** Exhaust fan housings serving a Type I hood shall be constructed as required for grease ducts in accordance with Section 506.3.1.1.

**Exception:** Fans listed and labeled in accordance with UL 762.

**506.5.1.1 Fan motor.** Exhaust fan motors shall be located outside of the exhaust airstream.

**506.5.2 Exhaust fan discharge.** Exhaust fans shall be positioned so that the discharge will not impinge on the roof, other equipment or appliances or parts of the structure. A vertical discharge fan shall be manufactured with an approved drain outlet at the lowest point of the housing to permit drainage of grease to an approved grease reservoir.

**506.5.3 Exhaust fan mounting.** An upblast fan shall be hinged and supplied with a flexible weatherproof electrical cable to permit inspection and cleaning. The ductwork shall extend a minimum of 18 inches (457 mm) above the roof surface.

**506.5.4 Clearances.** Exhaust equipment serving a Type I hood shall have a clearance to combustible construction of not less than 18 inches (457 mm).

**Exception:** Factory-built exhaust equipment installed in accordance with Section 304.1 and listed for a lesser clearance.

**506.5.5 Termination location.** The outlet of exhaust equipment serving Type I hoods shall be in accordance with Section 506.3.12.

**Exception:** The minimum horizontal distance between vertical discharge fans and parapet-type building structures shall be 2 feet (610 mm) provided that such struc-

tures are not higher than the top of the fan discharge opening.

## SECTION 507 COMMERCIAL KITCHEN HOODS

**507.1 General.** Commercial kitchen exhaust hoods shall comply with the requirements of this section. Hoods shall be Type I or Type II and shall be designed to capture and confine cooking vapors and residues. Commercial kitchen exhaust hood systems shall operate during the cooking operation.

### Exceptions:

1. Factory-built commercial exhaust hoods which are tested in accordance with UL 710, listed, labeled and installed in accordance with Section 304.1 shall not be required to comply with Sections 507.4, 507.7, 507.11, 507.12, 507.13, 507.14 and 507.15.
2. Factory-built commercial cooking recirculating systems which are tested in accordance with UL 710B, listed, labeled and installed in accordance with Section 304.1 shall not be required to comply with Sections 507.4, 507.5, 507.7, 507.12, 507.13, 507.14 and 507.15.
3. Net exhaust volumes for hoods shall be permitted to be reduced during no-load cooking conditions, where engineered or listed multispeed or variable-speed controls automatically operate the exhaust system to maintain capture and removal of cooking effluents as required by this section.

**507.2 Where required.** A Type I or Type II hood shall be installed at or above all commercial cooking appliances in accordance with Sections 507.2.1 and 507.2.2. Where any cooking appliance under a single hood requires a Type I hood, a Type I hood shall be installed. Where a Type II hood is required, a Type I or Type II hood shall be installed.

**507.2.1 Type I hoods.** Type I hoods shall be installed where cooking appliances produce grease or smoke, such as occurs with griddles, fryers, broilers, ovens, ranges and wok ranges.

**507.2.1.1 Operation.** Type I hood systems shall be designed and installed to automatically activate the exhaust fan whenever cooking operations occur. The activation of the exhaust fan shall occur through an interlock with the cooking appliances, by means of heat sensors or by means of other approved methods.

**507.2.2. Type II hoods.** Type II hoods shall be installed where cooking or dishwashing appliances produce heat, steam, or products of combustion and do not produce grease or smoke, such as steamers, kettles, pasta cookers and dishwashing machines.

### Exceptions:

1. Under-counter-type commercial dishwashing machines.
2. A Type II hood is not required for dishwashers and potwashers that are provided with heat and water

vapor exhaust systems that are supplied by the appliance manufacturer and are installed in accordance with the manufacturer's instructions.

**3. A single light-duty electric convection, bread, retherm or microwave oven. The additional heat and moisture loads generated by such appliances shall be accounted for in the design of the HVAC system.**

4. A Type II hood is not required for the following electrically heated appliances: toasters, steam tables, popcorn poppers, hot dog cookers, coffee makers, rice cookers, egg cookers, holding/warming ovens. The additional heat and moisture loads generated by such appliances shall be accounted for in the design of the HVAC system.



**507.2.3 Domestic cooking appliances used for commercial purposes.** Domestic cooking appliances utilized for commercial purposes shall be provided with Type I or Type II hoods as required for the type of appliances and processes in accordance with Sections 507.2, 507.2.1 and 507.2.2.

**507.2.4 Extra-heavy-duty.** Type I hoods for use over extra-heavy-duty cooking appliances shall not cover other appliances that require fire extinguishing equipment and such hoods shall discharge to an exhaust system that is independent of other exhaust systems.

**507.3 Fuel-burning appliances.** Where vented fuel-burning appliances are located in the same room or space as the hood, provisions shall be made to prevent the hood system from interfering with normal operation of the appliance vents.

**507.4 Type I materials.** Type I hoods shall be constructed of steel not less than 0.043 inch (1.09 mm) (No. 18 MSG) in thickness, or stainless steel not less than 0.037 inch (0.94 mm) (No. 20 MSG) in thickness.

**507.5 Type II hood materials.** Type II hoods shall be constructed of steel not less than 0.030 inch (0.76 mm) (No. 22 Gage) in thickness, stainless steel not less than 0.024 inch (0.61 mm) (No. 24 Gage) in thickness, copper sheets weighing not less than 24 ounces per square foot (7.3 kg/m<sup>2</sup>), or of other approved material and gage.

**507.6 Supports.** Type I hoods shall be secured in place by non-combustible supports. All Type I and Type II hood supports shall be adequate for the applied load of the hood, the unsupported ductwork, the effluent loading, and the possible weight of personnel working in or on the hood.

**507.7 Hood joints, seams and penetrations.** Hood joints, seams and penetrations shall comply with Sections 507.7.1 and 507.7.2.

**507.7.1 Type I hoods.** External hood joints, seams and penetrations for Type I hoods shall be made with a continuous external liquid-tight weld or braze to the lowest outermost perimeter of the hood. Internal hood joints, seams, penetrations, filter support frames, and other appendages attached

inside the hood shall not be required to be welded or brazed but shall be otherwise sealed to be grease tight.

### Exceptions:

1. Penetrations shall not be required to be welded or brazed where sealed by devices that are listed for the application.
2. Internal welding or brazing of seams, joints, and penetrations of the hood shall not be prohibited provided that the joint is formed smooth or ground so as to not trap grease, and is readily cleanable.

**507.7.2 Type II hoods.** Joints, seams and penetrations for Type II hoods shall be constructed as set forth in Chapter 6, shall be sealed on the interior of the hood and shall provide a smooth surface that is readily cleanable and water tight.

**507.8 Cleaning and grease gutters.** A hood shall be designed to provide for thorough cleaning of the entire hood. Grease gutters shall drain to an approved collection receptacle that is fabricated, designed and installed to allow access for cleaning.

**507.9 Clearances for Type I hood.** A Type I hood shall be installed with a clearance to combustibles of not less than 18 inches (457 mm).

**Exception:** Clearance shall not be required from gypsum wallboard attached to noncombustible structures provided that a smooth, cleanable, nonabsorbent and noncombustible material is installed between the hood and the gypsum wallboard over an area extending not less than 18 inches (457 mm) in all directions from the hood.

**507.10 Hoods penetrating a ceiling.** Type I hoods or portions thereof penetrating a ceiling, wall or furred space shall comply with all the requirements of Section 506.3.10.

**507.11 Grease filters.** Type I hoods shall be equipped with listed grease filters designed for the specific purpose. Grease-collecting equipment shall be provided with access for cleaning. The lowest edge of a grease filter located above the cooking surface shall be not less than the height specified in Table 507.11.

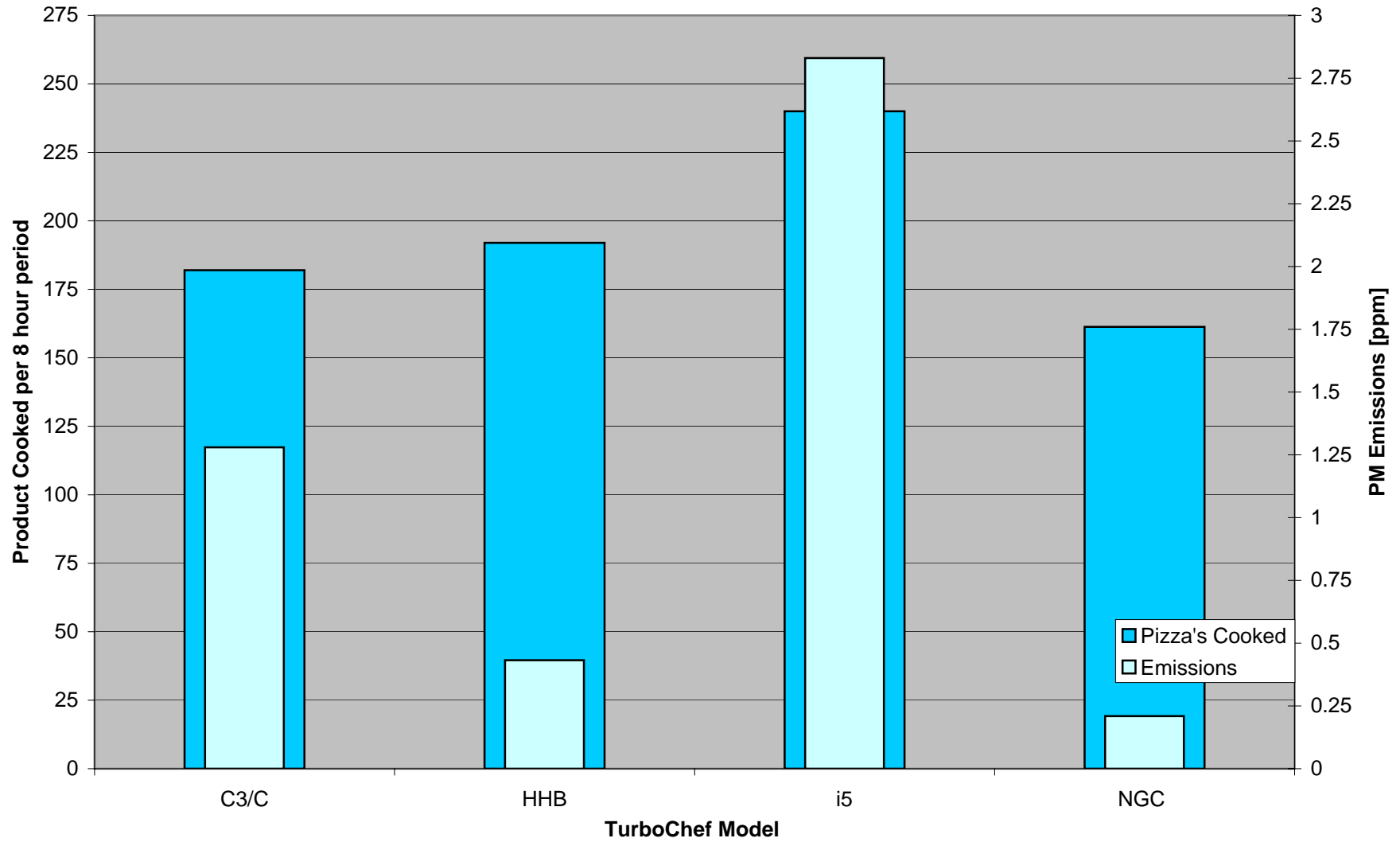
TABLE 507.11  
MINIMUM DISTANCE BETWEEN THE LOWEST EDGE OF A  
GREASE FILTER AND THE COOKING SURFACE OR THE  
HEATING SURFACE

TYPE OF COOKING APPLIANCES	HEIGHT ABOVE COOKING SURFACE (feet)
Without exposed flame	0.5
Exposed flame and burners	2
Exposed charcoal and charcoal type	3.5

For SI: 1 foot = 304.8 mm.

**507.11.1 Criteria.** Filters shall be of such size, type and arrangement as will permit the required quantity of air to pass through such units at rates not exceeding those for which the filter or unit was designed or approved. Filter units shall be installed in frames or holders so as to be readily removable without the use of separate tools, unless

### UL 710B (KNLZ) Emissions by Product





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/cm<sup>2</sup>.*

*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/m<sup>3</sup> 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/m<sup>3</sup> 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

# NGC Tornado (1 PHASE)



Changeable Parameters		
Operating Time	12	Hours
Energy Costs	\$0.11	kWHR
Snooze Mode	0.00	Hours
Cook Cycles/Day	100	Cooks/Day
Typical Cook Time	60	Seconds

Do Not Change the following values

	Time (min)	Power (Watts)	Cost/Day	Balance of Time (hrs)
Warm up	15	5277	\$0.15	11.75
Cooking	100	5000	\$0.96	10.08
Snooze Idle	0	1100	\$0.00	10.08
Idle	605	1400	\$1.62	0
<b>Total/Day</b>			<b>\$2.72</b>	<b>Yearly</b>
<b>Total/Month</b>			<b>\$81.72</b>	<b>\$980.62</b>

## HVAC Requirements Per Operating Time -- Note: Approximations Only

Average Energy Cooking And Idle (J)	Warmup Energy (J)	Total Energy (J)	Total average Power (W)	Total Environmental Load kBtu/hr	Average Cooling Requirement (ton of AC)
80820000	4749300	85569300	1981	6.759028	0.563





**SANDRA SHEWRY**  
Director

State of California—Health and Human Services Agency  
**Department of Health Services**



**ARNOLD SCHWARZENEGGER**  
Governor

July 23, 2004

Ruth Sender  
OhCal Foods, Inc.  
20501 Ventura Blvd., Suite 375  
Woodland Hills, CA 91364

RE: Exemption from Mechanical Exhaust Ventilation for  
TurboChef Model NGC Rapid Cook Oven

Dear Ms. Sender:

Thank you for your application of April 26, 2004, for a review of the TurboChef Model NGC Rapid Cook Oven for exemption from the mechanical exhaust ventilation requirements of Section 114140 of the California Uniform Retail Food Facilities Law (CURFFL). Specifically, you have requested an exemption to allow unventilated NGC Rapid Cook Ovens to be installed and operated at various Subway locations throughout California.

You have provided documentation and I have verified that the TurboChef Model NGC Rapid Cook Oven has been evaluated and listed by UL for conformance with ANSI/NSF Standard 4.

Under the provisions of CURFFL Section 114140, the Department may exempt heating and cooking equipment that does not produce toxic gases, grease, smoke, or heat when properly installed and operated as recommended by the manufacturer. Based on the information and documentation you have provided, the TurboChef Model NGC Rapid Cook Oven is granted LIMITED exemption from mechanical exhaust ventilation under the following conditions:

1. Unless approval is granted by the local enforcement agency, there shall be no more than one unventilated oven in operation at each Subway location.
2. No other heating or cooking appliances subject to mechanical ventilation requirements may be operated without mechanical ventilation in the food facility, unless permission to operate more than one unventilated appliance is granted by the local enforcement agency.

Ms. Ruth Sender  
July 23, 2004  
Page 2

3. The oven shall not be used for cooking meats, poultry, fish, or other foods that may produce grease laden vapors. Such use will require that mechanical ventilation be installed over the unit.
4. The oven must be operated and installed in a well-ventilated area approved for food preparation.
5. The oven must be installed, maintained, operated, and serviced according to the specifications of the manufacturer and local codes.
6. This exemption shall not be deemed to supersede any local fire or building code requirements.

This exemption shall be in effect until revoked. However, should any local enforcement agent find that the operation of the TurboChef Model NGC Rapid Cook Oven without mechanical ventilation creates a sanitation or safety problem, the local enforcement agent may require the unit to be used only with mechanical ventilation. These problems may include, but are not limited to, problems of installation, use, maintenance, cleaning or other site specific considerations which exceed the above limitations or pose a discernable health or safety hazard.

This letter may be used as evidence of the evaluation of the TurboChef Model NGC Rapid Cook Oven. However, it is not to be construed as an endorsement of the subject item and may not be used for advertising or promotional purposes.

If you have any questions you may call me at (916) 650-6617.

Sincerely,

Susan Strong, REHS  
Program Specialist, Retail Food Unit

Cc: Mike Boian, REHS  
Northern California Technical Advisory Committee

Ms. Ruth Sender  
July 23, 2004  
Page 3

Virginia Lineberry, REHS  
Bay Area Technical Advisory Committee

Donna Fenton, REHS  
Central Valley Technical Advisory Committee

Nelson Kerr, REHS  
Southern California Technical Advisory Committee

Gary Erbeck, REHS  
CCDEH, Food Safety Policy Committee



California  
Department of  
Health Services  
**DIANA M. BONTÁ, R.N., Dr. P.H.**  
Director

State of California—Health and Human Services Agency  
**Department of Health Services**  
Food & Drug Branch



**GRAY DAVIS**  
Governor

October 25, 2002

Peter J. Ashcraft  
TurboChef Technologies, Inc.  
10500 Metric Drive, Suite 128  
Dallas, Texas 75243

Dear Mr. Ashcraft:

RE: Exemption from External Mechanical Exhaust Ventilation

Thank you for your letter of October 7, 2002 requesting exemption from mechanical exhaust ventilation requirements specified in Section 114140 of the California Uniform Retail Food Facilities Law (CURFFL) for the Model C3/C Rapid Cook Oven.

Descriptive materials and cut sheets accompanying your application specify that this oven is Sanitation Classified by NSF International for compliance with ANSI/NSF Standard 4 for commercial heating and cooking appliances.

Under the provisions of Section 114140, the Department may exempt heating and cooking equipment that does not produce toxic gases, grease, smoke, or heat when properly installed and operated as recommended by the manufacturer. Results of tests conducted by the Pacific Gas & Electric, Food Service Technology Center, indicate that the oven produces no significant emissions of smoke and grease-laden air while in use. Based on the information you have provided and the certifications by recognized testing laboratories, the TurboChef Technologies Model C3/C Rapid Cook Oven is granted LIMITED exemption from mechanical ventilation requirements under the following conditions:

1. There may be up to two (2) unventilated Model C3/C ovens in Subway sandwich stores in California.
2. The oven(s) must be installed, maintained, operated, and serviced according to the specifications of the manufacturer and local codes.
3. Any modification, alteration, or removal of any component of the integral air filtration system voids this limited exemption.
4. All air filtration components must be installed and operational at all times the appliance is in use.
5. The oven must be installed in an approved food preparation area with sufficient room ventilation to maintain acceptable working conditions.



Do your part to help California save energy. To learn more about saving energy, visit the following web site:

[www.consumerenergycenter.org/flex/index.html](http://www.consumerenergycenter.org/flex/index.html)

Peter Ashcraft  
October 25, 2002

This exemption shall be in effect until revoked. However, should any local enforcement agent find that the operation of the TurboChef Technologies Model C3/C Rapid Cook Oven without mechanical ventilation creates a sanitation or safety problem, the local enforcement agent may require the unit to be used only with external mechanical ventilation. These problems may include but are not limited to problems of installation, use, maintenance, cleaning or other site specific considerations which exceed the above limitations or pose a discernable health or safety problem.

This letter may be used as evidence of the evaluation of the TurboChef Model C3/C Rapid Cook Oven. However, it is not to be construed as an endorsement of the subject equipment and may not be used for advertising or promotional purposes.

If you have any questions you may call me at (916) 327-6905.

Sincerely,

Jeffrey C. Lineberry, MPH  
Chief, Retail Food Unit

Cc: Mike Boian, REHS  
Northern California Technical Advisory Committee  
Butte County Environmental Health  
P.O. Box 5364  
Chico, CA 95927

Leslie Gentry, REHS  
Bay Area Technical Advisory Committee  
Solano County Environmental Health  
601 Texas Street  
Fairfield, CA 94533

Donna Fenton  
Central Valley Technical Advisory Committee  
Environmental Health Services  
2700 "M" Street, Suite 300  
Bakersfield, CA 93301

Peter Ashcraft  
October 25, 2002

Elizabeth Quaranta  
Southern California Technical Advisory Committee  
San Diego County Environmental Health  
1255 Imperial Avenue  
San Diego, CA 92101

Gary Erbeck, Food Policy Committee  
California Conference of Directors of Environmental Health  
San Diego County Environmental Health  
1255 Imperial Avenue  
San Diego, CA 92101

NORTH CAROLINA  
DEPARTMENT OF INSURANCE

Jim Long  
Commissioner of Insurance  
State Fire Marshal

ENGINEERING

January 4, 2006

Mr. Tom Johnson  
President, JDP, Inc.  
1408 Northland Drive  
Suite 407  
Mendota Heights, MN 55120-1013

RE: TurboChef Model HHB

Dear Mr. Johnson:

I have received your request to have TurboChef model HHB ovens placed in Subway restaurants in the state of North Carolina without requiring the installation of a Type I or Type II hood above the appliance. I have reviewed the information you submitted with your request. On February 15, 2005, I wrote a letter allowing the use of Models C3 and NGC ovens to be used in Subway restaurants or other similar type establishments. A copy of the February 15, 2005, is enclosed. The requirements and approvals stated in the February 15, 2005, will also apply to the Model HHB.

If you have any further questions, feel free to contact me.

Sincerely,

Wanda D. Edwards, PE  
Deputy Commissioner  
Office of the State Fire Marshal  
NC Department of Insurance

*Enclosure*

cc: Phil Edwards, Mecklenburg County Inspections  
Members of the Building Code Council



NORTH CAROLINA  
DEPARTMENT OF INSURANCE

Jim Long  
Commissioner of Insurance  
State Fire Marshal

ENGINEERING

February 15, 2005

Mr. Thomas W. Johnson  
1408 Northland Drive  
Suite 407  
Mendota Heights, MN 55120-1013

Re: Turbo-Chef Convection/Microwave Oven Models C3 and NGC

Dear Mr. Johnson:

You requested consideration of the Turbo-Chef oven models C3 and NGC to be placed in Subway restaurants in the state of North Carolina without requiring installation of a Type I or Type II hood above the subject appliance. Upon review of the submitted materials and inspection by our engineering staff at a local Subway restaurant where the subject appliance is in service, neither a Type I nor Type II hood is required to be placed above the subject equipment in a Subway restaurant or similar establishment. The equipment shall be installed, maintained, operated, and serviced according to the manufacturer's installation instructions. The equipment shall be installed in an approved food preparation area with sufficient room ventilation to maintain acceptable working conditions.

This equipment includes product listings to UL KNLZ. The proprietary catalytic technology engineered into this equipment limits emission of grease laden air to an acceptable level below 5 mg/m<sup>3</sup> using the EPA-202 test method prescribed for cooking appliances provided with integral air recirculating systems.

Preparation in these ovens without ventilation by a local exhaust system shall be limited to pizzas, sub sandwiches, reheating of partially baked or cooked foods, other similar items, and baking. Cooking of raw, fatty protein products (i.e., raw meat) shall only be performed in these ovens according to recommendations by the manufacturer and when properly located under an appropriate local exhaust system.

If you have any questions, please contact me at (919) 661-5880 x-255.

Sincerely,

Wanda D. Edwards, PE  
Deputy Commissioner  
Office of the State Fire Marshal  
NC Department of Insurance

WDE/jnw

cc: Members of the NC Building Code Council







Evaluation #

200424-H Revision 2

Safety & Buildings Division  
 201 West Washington Avenue  
 P.O. Box 2658  
 Madison, WI 53701-2658

## Wisconsin Building Products Evaluation

Material

Microwave Oven  
 TurboChef Model NGC

Manufacturer

TurboChef Technologies, Inc.  
 10500 Metric Dr., Suite 128  
 Dallas, TX 75243

### SCOPE OF EVALUATION

**Section 507.2.2** of the **2003 and 2004 Supplement** of the **International Mechanical Code, IMC**, regarding exhaust system requirements where commercial cooking and dishwashing appliances produce grease, smoke, heat or steam have been evaluated for compliance with certain requirements of the **Wisconsin Commercial Building Code (WCBC), Chapters Comm 61-65**. Pursuant to **s. Comm 61.61** the TurboChef Models Tornado (NGC), C3/C and High H (HHB) microwave ovens are approved for use in the State of Wisconsin to satisfy the intent and the provisions of **IMC 507.2.2** as adopted by the **Wisconsin Commercial Building Code**.

This evaluation does not include the review for compliance to provisions of the current **Wisconsin Commercial Building Code** other than those specifically referenced above.

The use of the TurboChef Models Tornado (NGC), C3/C and High H (HHB) microwave ovens are subject to the description, limitations and conditions described in this evaluation.

### DESCRIPTION AND USE

The current **Wisconsin Commercial Building Code** together with the 2000 edition of the **International Mechanical Code, IMC**, does not specifically address, acknowledge or prohibit the utilization of recirculating hoods and vent less steam removal systems in conjunction with commercial kitchen appliances and their operation where grease, smoke, heat or steam is produced. The revision under the **2003** edition and **2004 Supplement** of the **IMC** clarify the use of such appliances.

**Section 507.2.2** of the **2003 International Mechanical Code** read as follows:

**507.2.2 Type II hoods.** Type II hoods shall be installed where cooking or dishwashing appliances produce heat or steam and do not produce grease or smoke, such as steamers, kettles, pasta cookers and dishwashing machines.

## COMMERCE Product Evaluation No. 200424-H Revision 2

Page 2

**Exception:**

3. A single light-duty electric convection, bread, retherm or microwave oven designed for installation on a counter or that is enclosed on five sides in a counter, provided that such appliances do not increase the ambient temperature more than 10° F at a distance greater than 5 feet away from such appliance during operation.

**LIMITATIONS OF APPROVAL**

The evaluation number assigned to this approval is to accompany each plan submitted for projects that utilizes the TurboChef Models: Tornado (NGC), C3/C and High H (HHB) ovens.

Deviations from this approval shall void the use of the approval.

Pursuant to s. **Comm 61.61(7)**, the department may reexamine an approval and issue a revised approval at any time.

This approval will be valid through December 31, 2009, unless manufacturing modifications are made to the product or a re-examination is deemed necessary by the department. The product approval is applicable to projects approved under the current edition of the applicable codes. This approval may be void for project approvals made under future applicable editions. The Wisconsin Building Product Evaluation number must be provided when plans that include this product are submitted for review.

**DISCLAIMER**

The department is in no way endorsing or advertising this product. This approval addresses only the specified applications for the product and does not waive any code requirement not specified in this document.

Revision Date: March 22, 2006

Approval Date: September 30, 2004 By: \_\_\_\_\_  
Lee E. Finley, Jr.  
Product & Material Review  
Integrated Services Bureau

200424-H.doc



*Working Together to Promote Food Safety*

**DATE:** June 11, 2004

**TO:** All Local Health Agencies  
Minnesota Department of Health (MDH) EHS Sanitarians and Supervisors  
Minnesota Department of Agriculture (MDA)

**FROM:** Colleen Paulus  
Manager, MDH Environmental Health Services Section

Kevin Elfering  
Director, MDA Meat, Food and Dairy Division

**SUBJECT:** Inter Agency Review Council Document 04-04V  
TurboChef Tornado Oven Model NCG

Please distribute the attached information to sanitarians on your staff who work in the Food Program.

Attached please find IARC Guidance Document #04-04V regarding the new TurboChef Tornado Microwave/Convection Oven Model NCG that is being proposed in Subway Sandwich Shops throughout Minnesota. This document is very similar, *but not exactly the same* as IARC Document #03-01 issued April 9, 2003, which addresses the TurboChef Rapid Cook Oven Model No. C3. The emissions test for total particulate matter was much lower from the test conducted on the previous oven (0.5mg/m<sup>3</sup> vs. 3.8 mg/m<sup>3</sup>). However, as you will note in the attached conditions for acceptance, unless there is a sufficient amount of general ventilation existing in the space, additional cooling capacity may be needed and verified by a certified testing and balancing contractor.

**If you have any questions regarding the TurboChef Tornado Oven Model NCG use, you may contact the Vent Committee Chair, Lorna Girard, at 651/296-1591 or at [lorna.girard@state.mn.us](mailto:lorna.girard@state.mn.us)**

**If you have any questions regarding the IARC, please contact Sue Hibberd at 651/215-0866 or at [sue.Hibberd@health.state.mn.us](mailto:sue.Hibberd@health.state.mn.us)**



STATE OF MICHIGAN  
DEPARTMENT OF AGRICULTURE  
LANSING

JENNIFER M. GRANHOLM  
GOVERNOR

DAN WYANT  
DIRECTOR

April 14, 2004

Mr. James Boyd, Plan Review Specialist  
Kent County Health Department  
Environmental Health Division  
700 Fuller Avenue, N.E.  
Grand Rapids, MI 49503

**Re: Turbo-Chef Convection / Microwave Oven Models C3/C and NGC**

Dear Mr. Boyd:

You requested an evaluation of the Turbo Chef oven model NGC, that is proposed to be installed in Subway restaurants state-wide. MDA recommends that both model NGC and C3/C may be installed and used without ventilation in any food establishment as they are UL197SB listed. These ovens contain an internal filter and vent that has been shown, under proper test conditions, to emit very little grease (pepperoni pizzas were used in testing).

Preparation in these ovens without additional ventilation should be limited to pizzas, sub sandwiches, reheating of par-baked or cooked foods, other similar items and baking. Neither MDA nor the manufacturer recommends cooking raw, fatty protein products (i.e. raw meat) in these ovens.

Michigan's mechanical code rules (R 408.30935a) specifically exempt from ventilation "listed factory-built commercial cooking recirculating systems which are tested in accordance with UL 197" and installed per listing and manufacturer's directions. However, a mechanical inspector may require ventilation if the building has inadequate general ventilation.

If you have any questions please call me at (517) 373-2779.

Sincerely,

Kevin Besey, Supervisor  
Food Service Sanitation Section  
Food and Dairy Division

cc: James Pool, Turbo Chef  
Dave Adams, Assistant Chief, Mechanical Division, BCC, MDCIS  
Michigan local Health Departments / MDA Regions



# Board of Building Appeals

City of St. Louis  
 Room 400, City Hall  
 1200 Market Street

Saint Louis, Missouri 63103 - 2850

**622-3332**

June 22, 2005

TURBO CHEF  
 TOM JOHNSON  
 1408 NORTHLAND DR STE 407  
 MENDOTA HEIGHTS MN 55120-1013

RE: Board of Building Appeal 3723  
 423 LYNCH  
 WARD 9

## Proceedings

On June 2, 2005, the Board of Building Appeals of the City of St. Louis met, pursuant to Section 121.0 of the Building Code, to consider Appeal 3723 from the determination of the Building Commissioner relative to complying with Sections 507.1 and 507.2 of the Mechanical Code for the premises at 423 Lynch.

Dave Thomas Johnson appeared in favor of this appeal.

James Kelly Poole appeared in favor of this appeal.

Mechanical Inspection Supervisor Jerry Corbin and Lead Mechanical Inspector Gene Miller represented the Building Commissioner.

The following items were presented to the Board and entered as evidence:

- a.) A violation letter dated 04-26-05
- b.) Appellant's appeal form
- c.) Certified copy of the Building Code, Ordinance 64771, and a certified copy of the Mechanical Code, Ordinance 65021

## Findings of Fact

1.) Mr. Kelly Poole and Mr. Thomas Johnson appeared and stated they are requesting a variance from installing a Type II hood over a Turbo Chef microwave/convection oven, which would be installed according to manufacturers instructions, at Anheuser Busch and to allow the HVAC system installed to compensate for any sensible heat emissions from the equipment.

2.) They stated there are new provisions to model building codes which excludes some cooking processes as not requiring hoods, and that the Turbo Chef with its patented catalyst grease filtration system fits this category.

3.) The Turbo Chef equipment was tested under UL supervision using the UL KNLZ and UL 197 guidelines from UL and found to produce less than 5 mg/m<sup>3</sup> particulate matter concentration for a hood flow rate of 200 cfm.

423 Lynch  
 Appeal 3723  
 Page 2

4.) This grease concentration is below any that would pose a fire hazard and therefore would not require a hood to capture and exhaust the grease.

5.) This equipment is also portable and does not fall into the category of permanent commercial heat processing appliances. New provisions being adapted by some model codes recognize that per each 100 s.f. of kitchen floor area, a Type II hood is not required for a single light-duty electric convection, bread, retherm or microwave oven provided it is less than 3 feet in outside dimensions. The Turbo Chef appliances fits into this category.

6.) The appliance does not emit effluent emissions above the threshold within EPA 202.

7.) Mr. Jerry Corbin and Mr. Gene Miller appeared and stated they were following the building code adopted by City and under those present provisions a Type II hood is required.


#### Conclusion of Law

The Board concludes that new provisions to model building codes are being incorporated to provide exceptions to installing Type II hoods over microwave/convection ovens which limit grease emissions to levels below a threshold that would present a fire hazard. Those provisions are not adopted by the City. The Board also concludes that the Turbo Chef appliances meets the requirements and has proven so with the UL rating for the equipment. Use of this appliance without a Type II hood does not present a fire safety hazard. Therefore, the Board grants the appeal as stated below.

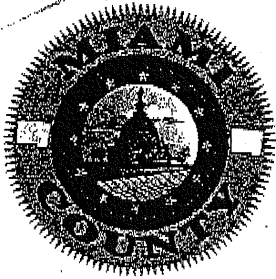
#### Decision

It is the decision of the Board of Building Appeals that this appeal be granted.

By Order of the Board of Building Appeals,

  
 Lynn Wentz  
 Secretary

CC: Building Commissioner  
 Randy Mourning  
 NSO  
 Don Hubeli  
 Frank Oswald  
 Fire Marshal  
 Court Section  
 Central File  
 Lenita Moore, SLDC  
 Alan Schmidt



# MIAMI COUNTY BUILDING REGULATIONS

510 W. Water Street, Suite 120 Troy, Ohio 45373  
Phone (937) 440-8075 • 440-8066

## ADDENDUM 2 TO PARTIAL PLAN APPROVAL

DATE: 12/30/05  
PROJECT: TENANT BUILD OUT - W.G. GRINDERS  
ADDRESS: 1260 EAST ASH ST.  
PIQUA, OH 45356  
PERMIT # 3014  
APPROVAL DATE: 12/30/05

This PARTIAL PLAN APPROVAL is limited to the following:

**ALL WORK EXCEPT SPRINKLER REVISIONS.**

This is a PARTIAL PLAN APPROVAL in accordance with the provisions of Section 106.3.3 of the Ohio Building Code. The various stages of construction shall proceed in their normal sequence.

This addendum shall be attached to the Certificate of Plan Approval and shall become part of the approved plans. All items listed below will be performed and incorporated into the structure.

This PARTIAL PLAN APPROVAL is contingent upon the following:

1. The proposed project plans are sealed by: PETER MACRAE - ARCHT #9040, HVAC, PLUMBING, ELECTRICAL - JOHN SANDERS - P.E. #58219 to comply with Sections 106.3.4.1 and 105 OBC.
2. Construction Documents at project site:  
An approved set of Construction Documents shall be kept at the site of the work and shall be available for reference by the building official or the building officials designated representative at all times during working hours while such work is in progress; Section 106.3.1 OBC.
3. The Board of Appeals Variance, Case #05-453, dated September 20, 2005 is a part of the permit Approval, (Building Permit #2835).
4. Install Fire Extinguishers per Section 906 (maximum travel distance = 75') Verify size and location with the local fire authority.
5. The letters from Thomas Johnson, President JDP, Inc. and the accompanying UL710 test data indicates that the Turbochef microwave / convection oven HHB complies with 2005 OMC Sections 507.2.1 exception 1 and 507.2.2 exception 3, when used and installed in accordance with the manufacturer's listing and instructions. Therefore a type I hood and fire suppression and a type II hood are not required. No cooking of raw fatty animal proteins is permitted. No other cooking appliances are permitted. The dishwasher equipment and installation shall comply with Section 507.2.2 exception 1 or 2 or a type II hood is required for heat and vapor removal. The HVAC system shall be designed for the additional heat and moisture loads generated by such appliances.

Page 2

The holder of a **PARTIAL PLAN APPROVAL** may proceed only to the point for which approval has been given, at his own risk and without assurance that approval for the entire building will be granted.

The citation of certain items in this document does not exempt the owner from the obligation to comply with all portions of the Ohio Revised Code, the OBC, local requirements or any other applicable Code. The Building Department reserves the right to cite additional requirements of the OBC upon further review or inspection of the project. You have the right to appeal listed interpretations or decisions in accordance with Section 3781.19 of the Ohio Revised Code. Contact this department for further information.

Plans Reviewed by: DAVID J. DURBIN/DJD ENG.

Chief Building Official:

Robert D. Bauman



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BUILDING AND SAFETY  
COMMISSIONERS

MARSHAL L. BROWN  
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VICE-PRESIDENT

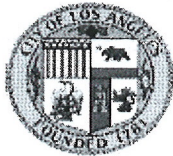
VICTOR H. CUEVAS

HELENA JUBANY

ELENORE A. WILLIAMS

CITY OF LOS ANGELES

CALIFORNIA



ANTONIO R. VILLARAIGOSA  
MAYOR

DEPARTMENT OF  
BUILDING AND SAFETY  
201 NORTH FIGUEROA STREET  
LOS ANGELES, CA 90012

ROBERT R. "BUD" OVROM  
GENERAL MANAGER

RAYMOND S. CHAN, C.E., S.E.  
EXECUTIVE OFFICER

**James K Pool III**  
**TurboChef Technologies**  
**4240 International Parkway**  
**Carrollton, TX 75034**  
Telephone: 214-379-6020

Models:

File Number: M-100012  
Effective Date: 04/01/2011  
Expiration Date: 04/01/2012  
Manufacturer: SAME  
Item: WARMING OVEN

NGC\*, NGO (\*new model added).

PLEASE REFER TO THE APPLICATION NUMBER ON ALL CORRESPONDENCE, PHONE CALLS & SAMPLES

The item processed under the above file number has been tested, examined and found to comply with applicable Los Angeles Plumbing Code (LAPC) and/or Los Angeles Mechanical Code (LAMC) and is hereby approved unless revoked for cause.

This letter or the letterhead copy may not be reproduced for use in labeling or advertising, but copies of this letter may be used within your organization and shown as evidence of approval.

CONDITIONS OF APPROVAL:

1. This product shall be used to warm pre-cooked hot food items only. Any other type of cooking shall not be allowed.
2. Installation of this product is not required to have an exhaust system per Sections 95.507.1.1 and 95.507.1.2 of LAMC, 2011 Edition.
3. This product shall be installed, operated, and maintained in accordance with printed instructions from the manufacturer and LAMC, 2011 Edition.

Each item shall have the name or trademark of manufacturer and model number where it will be visible for inspection.

In order to renew this approval, an application and reexamination fee must be submitted on or before the expiration date shown above. Arrangement shall be made to remove any test samples remaining in the Laboratory. Samples remaining after 21 days from the date of this notice will be shipped collect by the most convenient carrier or disposed of in accordance with applicable regulation.

**Jason T Tran**  
Mechanical Testing Laboratory, Test Engineer

Plumbing / Mechanical Inspection  
Inspection Bureau



**CYNTHIA A. HARDING, M.P.H.**  
Interim Director

**JEFFREY D. GUNZENHAUSER, M.D., M.P.H.**  
Interim Health Officer

**ANGELO J. BELLOMO, REHS, QEP**  
Deputy Director for Health Protection

**TERRI S. WILLIAMS, REHS**  
Director of Environmental Health

5050 Commerce Drive  
Baldwin Park, California 91706  
TEL (626) 430-5374 • FAX (626) 813-3000

[www.publichealth.lacounty.gov](http://www.publichealth.lacounty.gov)

**BOARD OF SUPERVISORS**

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Fourth District

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Fifth District

September 8<sup>th</sup>, 2016

James K. Pool III  
Senior Vice President, Engineering  
TurboChef Technologies, Inc.  
4240 International Parkway, Suite 101  
Carrollton, Texas 75007

Ventilation Exemption Plan Check No.	ME-2010-009
Application Type:	Equipment specific
Effective Date:	8/1/2016
Expiration Date:	8/1/2021
Telephone:	(214) 379-6020
Email:	James.Pool@turbochef.com

**RE: Exemption from mechanical exhaust ventilation for TurboChef Technologies, Inc. Model Tornado (NGC) and Tornado 2 (NGCD6) ovens**

Dear Mr. Pool:

The County of Los Angeles Department of Public Health, Environmental Health, Plan Check has completed a review of the TurboChef Technologies, Inc. Model: Tornado (NGC) and Tornado 2 (NGCD6) ovens for exemption from the mechanical exhaust ventilation requirements of Section 114149.1(a) of the California Retail Food Code.

You have provided documentation that these ovens have Underwriter's Laboratory KNLZ approval, and also provided the results of the eight-hour cooking emissions test conducted on the Tornado (NGC) oven. The test results indicate that the particulate matter concentration produced was 1.153 mg/m<sup>3</sup>, which is below the limit of 5 mg/m<sup>3</sup> to be considered a low grease emission appliance.

TurboChef Oven  
August 1, 2016

Therefore, additional mechanical ventilation in the form of a Type I and Type II hood is not required by the County of Los Angeles Department of Public Health, provided the following contingencies are met:

1. There shall be no more than two unventilated model Tornado (NGC) or Tornado 2 (NGCD6) oven per food facility.
2. No other heat producing food related equipment ventilation shall be permitted in a food facility without the addition of mechanical ventilation
3. The equipment must be installed, serviced, and maintained according to the manufacture's specifications.
4. Any modification, alteration, or removal of equipment, including any component of the integral air filtration systems voids both the ANSI certification of the equipment and this limited exemption. All air filtration components must be installed and operational at all times the appliance is in use.
5. The Tornado or Tornado 2 ovens shall be used for cooking or warming of pizza, bread, bakery products, or similar items only. No raw animal protein products shall be cooked in the equipment unless mechanical ventilation is provided.
6. No items that generate grease-laden vapors shall be prepared or cooked in the unventilated Tornado or Tornado 2 oven.
7. The Tornado or Tornado 2 oven must be operated in a well-ventilated area approved for food preparation.
8. If the ownership changes at a food facility that is operating the exempt equipment, then the new owner/ operator will be informed of the operating conditions.
9. This exemption from mechanical exhaust ventilation shall not be deemed to supersede any local building and fire code requirements pertaining to electrical and fire safety.

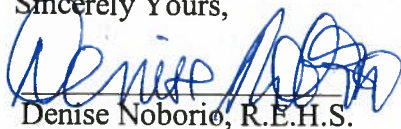
TurboChef Oven  
August 1, 2016

This exemption shall be in effect for a period of five years from the date of this letter, or until revoked. However, exemption shall not preclude this Department from requiring the installation of mechanical exhaust ventilation when operation of the Tornado or Tornado 2 oven at a specific location results in a sanitation or safety violation. These problems may include, but are not limited to, problems of installation, use, maintenance, cleaning or other site specific considerations which exceed the above limitations or pose a discernable health or safety hazard.

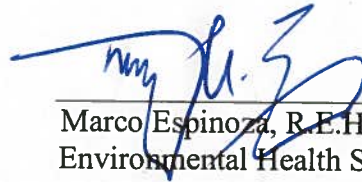
This letter may be used as evidence of the evaluation of the TurboChef Model Tornado (NGC) or Tornado 2 (NGCD6) rapid cooking ovens. However, it is not to be construed as an endorsement of the subject items and may not be used for advertising or promotional purposes.

Should you have any questions or need additional information, please contact me at (626) 430-5560.

Sincerely Yours,



Denise Noborio, R.E.H.S.  
Chief EHS  
Plan Check Program

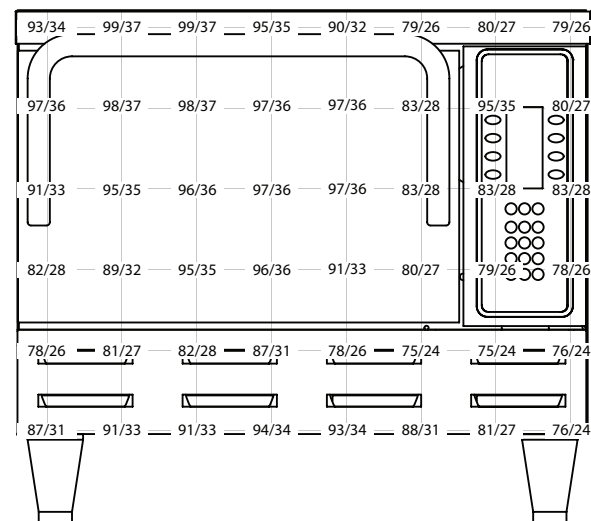
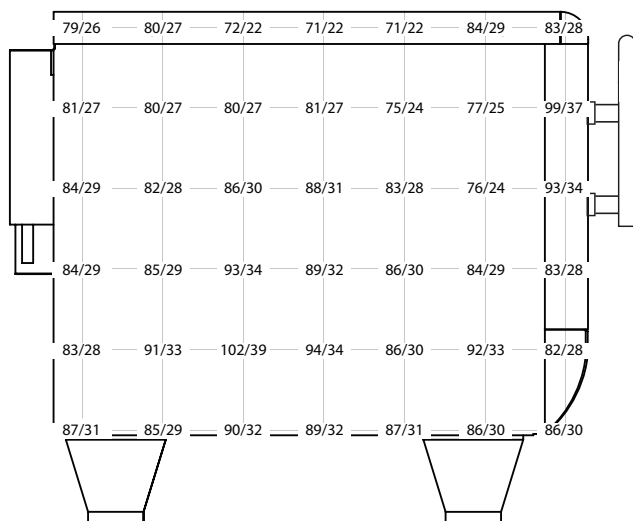
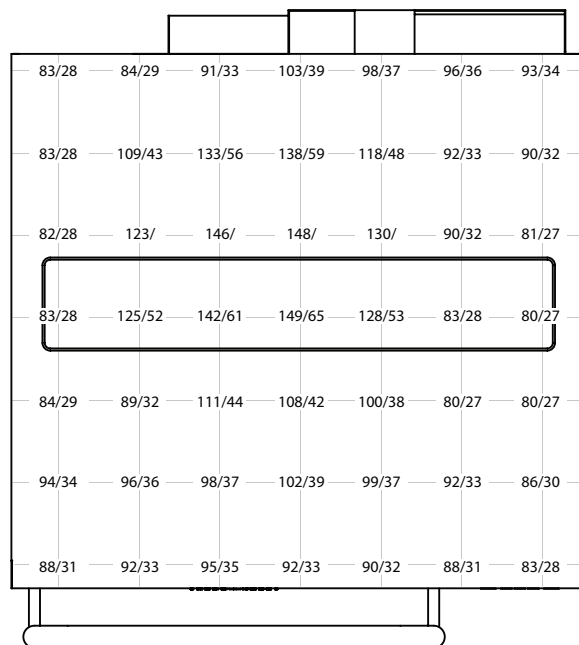
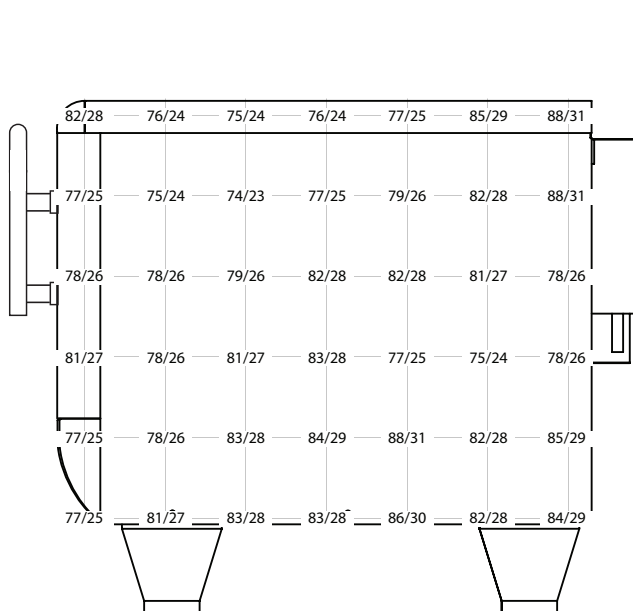


Marco Espinoza, R.E.H.S.  
Environmental Health Specialist IV  
Plan Check Program

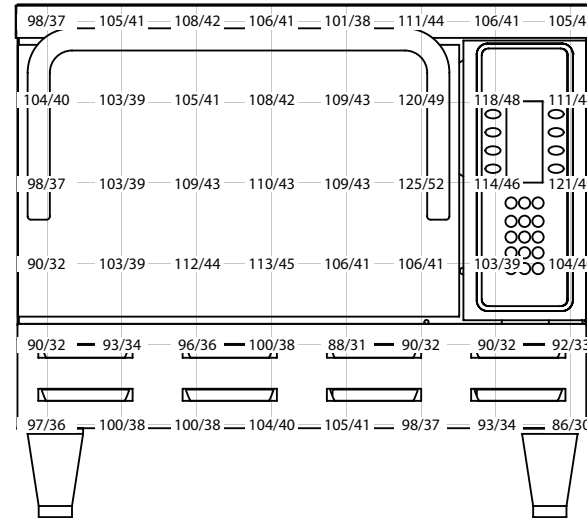
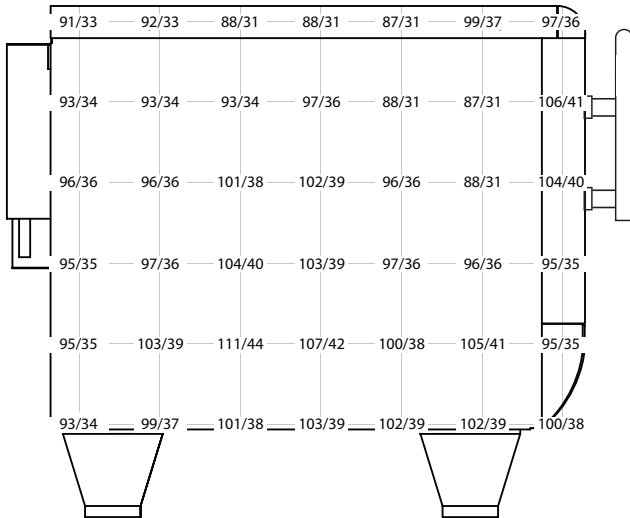
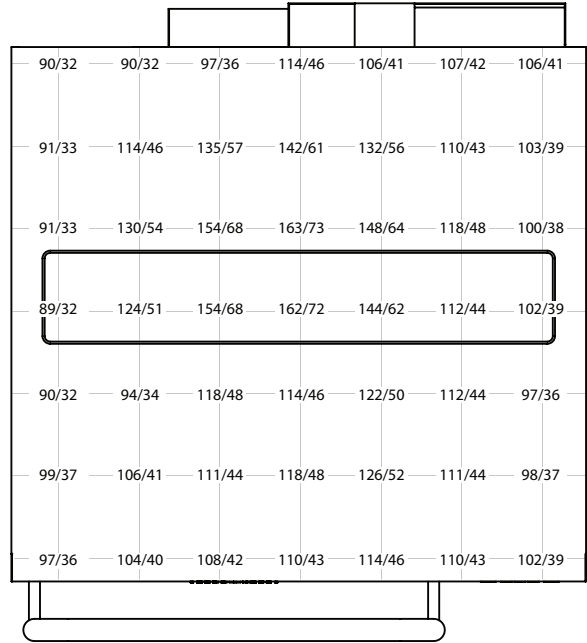
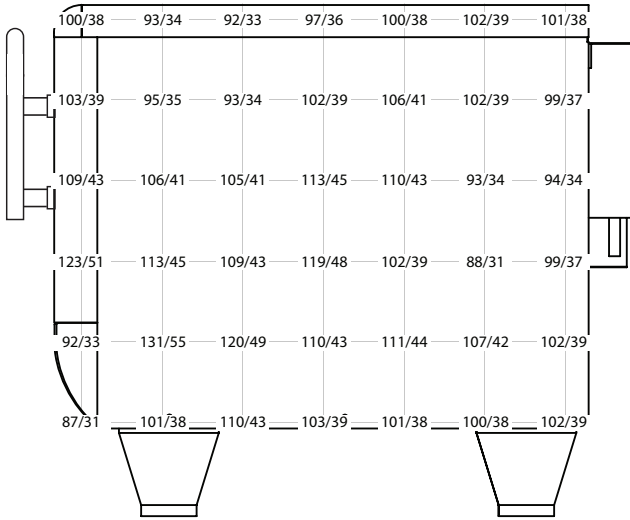
# Tornado 2 Oven Surface Temperatures

This document illustrates the surface temperature testing data reported for the TurboChef model Tornado 2 oven. Measurements were recorded after four hours of idle and after two hours of subsequent cooking. The oven temperature was set to 520°F (271°C) for the duration of the test.

## After 4-Hour Idle at 520°F/271°C (Values in °F/°C)



After 4-Hour Idle and 2 Hours of Cooking at 520°F/271°C (Values in °F/°C)



# 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<sup>\*</sup>  
 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.

Oven	Voltage	Current	Phase
Söta (i1)	208/240 VAC	30 amp	1 Ph
Söta Single Mag (i1)	208/240 VAC	20 amp	1 Ph
i3	208/240 VAC	40 amp	1 Ph
	208/240 VAC	30 amp	3 Ph
i5	208/240 VAC	50 amp	1 Ph
	208/240 VAC	30 amp	3 Ph
Encore/Encore 2	208/240 VAC	30 amp	1 Ph
Tornado	208/240 VAC	30 amp	1 Ph
C3	208/240 VAC	50 amp	1 Ph
HhC 2620	208/240 VAC	50 amp	3 Ph
HhC 2020	208/240 VAC	50 amp	3 Ph
HhC 1618	208/240 VAC	30 amp	3 Ph
	208/240 VAC	50 amp	1 Ph
HhB 2	208/240 VAC	30 amp	1 Ph
Double Batch	208/240 VAC	50 amp	1 Ph
	208/240 VAC	30 amp	3 Ph
Waterless Steamer (i1)	208/240 VAC	30 amp	1 Ph
Panini (i1)	208/240 VAC	30 amp	1 Ph
Fire	208/240 VAC	30 amp	1 Ph
Bullet	208/240 VAC	30 amp	1 Ph

\* 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

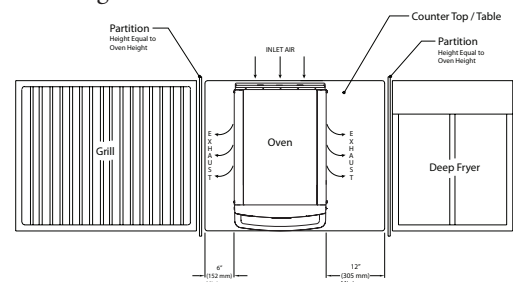
To ensure continued compliance with all health, building, and fire codes, users are required to:

- 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.



## 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.

Oven	Top	Sides
Sóta / Sóta Single Mag (i1)	5" (127 mm)	2" (51 mm)
i3	19" (483 mm)	2" (51 mm)
i5	19" (483 mm)	2" (51 mm)
Encore/Encore 2	5" (127 mm)	2" (51 mm)
Tornado	4" (102 mm)	2" (51 mm)
C3	4" (102 mm)	2" (51 mm)
HhC 2620	10" (254 mm)	0" (0 mm)
HhC 2020	10" (254 mm)	0" (0 mm)
HhC 1618	10" (254 mm)	0" (0 mm)
HhB 2	2" (51 mm)	2" (51 mm)
Double Batch	2" (51 mm)	2" (51 mm)
Waterless Steamer (i1)	5" (127 mm)	2" (51 mm)
Panini (i1)	5" (127 mm)	2" (51 mm)
Fire	2" (51 mm)	2" (51 mm)
Bullet	5" (127 mm)	2" (51 mm)

## 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 m<sup>2</sup>) 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.

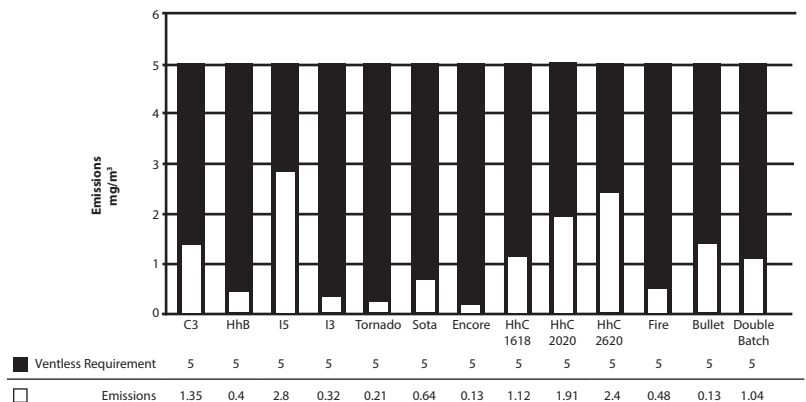
The heat load from TurboChef ovens is mostly sensible. The only latent heat present is due to evaporation during the cooking process. When installing a TurboChef oven, the space must have the following tons of AC per oven installed.

Oven	Tons of AC
Sóta (i1)	0.29
Sóta Single Mag (i1)	0.29
i3	0.94
i5	1.31
Encore/Encore 2	0.45
Tornado	0.58
C3	0.63
HhC 2620	1.82
HhC 2020	1.47
HhC 1618	1.00
HhB 2	0.84
Double Batch	1.04
Waterless Steamer (i1)	0.29
Panini (i1)	0.29
Fire	0.50
Bullet	0.13

## 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/m<sup>3</sup> for the oven to be certified for ventless operation. Cooking devices that measure above the 5.0 mg/m<sup>3</sup> 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/m<sup>3</sup> threshold as shown below.



NOTE: Certain configurations of TurboChef ovens, such as a triple stacked HhC 2620, may cause emissions to be greater than 5.0 mg/m<sup>3</sup>. In these situations, TurboChef recommends that the ovens be installed under a Type I or Type II hood.

## Contact Information

For questions regarding a ventless installation, email [ventless.help@turbochef.com](mailto:ventless.help@turbochef.com). For questions or concerns regarding an existing installation, contact Customer Service at 1.800.908.8726, Option 1.