

# HhC 2620 Ventless Submittal Information

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Spec Sheet .....	1.1
UL Ventless Label .....	2.1
Certificate of Compliance .....	3.1
Emissions Test Results .....	4.1
UL Listing .....	5.1
UL KNLZ Explained .....	6.1
TurboChef Installation Recommendations .....	7.1
Emissions by Product .....	8.1
Energy Usage Estimate .....	9.1
Surface Temperatures .....	10.1



## HIGH h CONVEYOR 2620™

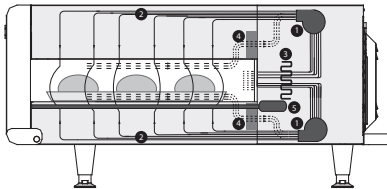


### PERFORMANCE

- The High h Conveyor 2620 offers high-heat transfer rates for accelerated cooking, a small enough footprint to fit virtually any application, and does not require the energy consumption and higher HVAC needs of larger ovens.

### VENTILATION

- UL (KNLZ) listed for ventless operation.<sup>†</sup>
- EPA 202 test (8 hr):
  - Product: Pepperoni Pizza
  - Results: 2.4 mg/m<sup>3</sup>
- Internal catalytic filtration to limit smoke, grease, and odor emissions.



1. Blower Motor
2. Impinged Air
3. Impingement Heater
4. Catalytic Converters (optional)
5. Conveyor Motor

Project \_\_\_\_\_

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

Quantity \_\_\_\_\_

### EXTERIOR CONSTRUCTION

- 430 stainless steel front, top, sides and back
- Cool to touch covers and panels

### INTERIOR CONSTRUCTION

- Stainless steel interior
- 26-inch cook chamber

### STANDARD FEATURES

- Small footprint with even more throughput than the HhC 2020
- Independently-controlled top and bottom air impingement
- Variable-speed High h recirculating impingement airflow system
- Stackable design up to 3 high (requires stacking kits)
- Variable-speed blower motors
- Easy to clean mono-finger design
- Idle mode for energy conservation
- Built-in self diagnostics for monitoring oven components
- Left or right feed conveyor belt direction via software
- Includes plug and cord (6 ft. nominal)
- Includes two 6" conveyor extensions
- Warranty – one year parts and labor
- Smart voltage sensor technology (U.S. only)

### OPTIONAL FEATURES

- Split belt with individually-adjustable speed settings (split 50/50 or 70/30)
- Dual catalytic converters for ventless operation.<sup>†</sup>

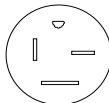
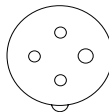
### CERTIFICATIONS

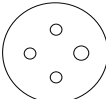
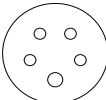
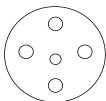


This product conforms to the ventilation recommendations set forth by NFPA96 using EPA202 test method.

<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.

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

DIMENSIONS		
SINGLE UNITS		
Height	17.0"	432 mm
Width	48.3"	1227 mm
Depth	41.7"	1059 mm
Weight	260 lb.	118 kg
Cook Chamber		
Baking Area	3.6 ft <sup>2</sup>	0.33 m <sup>2</sup>
Belt Length	48.3"	1227 mm
Belt Width (Single)	26"	660 mm
Belt Width (50/50 Split)	12.5" / 12.5"	318 mm / 318 mm
Belt Width (70/30 Split)	17" / 8"	431 mm / 203 mm
Adjustable Opening (Min/Max)	1" / 3"	25 mm / 76 mm
Max Operating Temp	550°F	288°C
Bake Time Range	30 seconds to 15 minutes	
Wall Clearance		
Top	10"	254 mm
Sides	0"	0 mm
Back	0"	0 mm
ELECTRICAL SPECIFICATIONS - USA		
Single: HCW-9500-1 / HCW-9500-1-V (Ventless) 50/50 Split: HCW-9500-6 / HCW-9500-6-V (Ventless) 70/30 Split: HCW-9500-11 / HCW-9500-11-V (Ventless)		 NEMA 15-50P
Phase	3 Phase	
Voltage	208/240 VAC	
Frequency	50/60 Hz	
Current Draw	40 Amp	
Supply	4 Wire	
Breakers	50 Amp	
ELECTRICAL SPECIFICATIONS - CANADA		
Single: HCW-9500-2C / HCW-9500-2C-V (Ventless) 50/50 Split: HCW-9500-7C / HCW-9500-7C-V (Ventless) 70/30 Split: HCW-9500-12C / HCW-9500-12C-V (Ventless)		 UL 4 Pin, 60 Amp
Phase	3 Phase	
Voltage	208/240 VAC	
Frequency	50/60 Hz	
Current Draw	40/46 Amp	
Supply	4 Wire	
Breakers	50/60 Amp	

ELECTRICAL SPECIFICATIONS - EUROPE/ASIA (DELTA)		
Single: HCW-9500-3D / HCW-9500-3D-V (Ventless) 50/50 Split: HCW-9500-8D / HCW-9500-8D-V (Ventless) 70/30 Split: HCW-9500-13D / HCW-9500-13D-V (Ventless)		 IEC 4 Pin, 63 Amp
Phase	3 Phase	
Voltage	220 - 240 VAC	
Frequency	50/60 Hz	
Current Draw	40 Amp	
Supply	4 Wire	
Breakers	50 Amp	
ELECTRICAL SPECIFICATIONS - EUROPE/ASIA (WYE)		
Single: HCW-9500-4W / HCW-9500-4W-V (Ventless) 50/50 Split: HCW-9500-9W / HCW-9500-9W-V (Ventless) 70/30 Split: HCW-9500-14W / HCW-9500-14W-V (Ventless)		 IEC 5 Pin, 32 Amp
Phase	3 Phase	
Voltage	380 - 415 VAC	
Frequency	50/60 Hz	
Current Draw	20 Amp	
Supply	5 Wire	
Breakers	32 Amp	
ELECTRICAL SPECIFICATIONS - AUSTRALIA		
Single: HCW-9500-5W / HCW-9500-5W-V (Ventless) 50/50 Split: HCW-9500-10W / HCW-9500-10W-V (Ventless) 70/30 Split: HCW-9500-15W / HCW-9500-15W-V (Ventless)		 IEC 5 Pin, 32 Amp
Phase	3 Phase	
Voltage	380 - 415 VAC	
Frequency	50/60 Hz	
Current Draw	20 Amp	
Supply	5 Wire	
Breakers	32 Amp	
SHIPPING INFORMATION		
<b>U.S.:</b> All ovens shipped within the U.S. are packaged in a double-wall corrugated box banded to a wooden skid. <b>International:</b> All International ovens shipped via Air or Less than Container Loads are packaged in wooden crates.		
<b>Box size:</b> 54" (1,372 mm) x 48" (1,219 mm) x 26" (660 mm) <b>Crate size:</b> 57" (1,449 mm) x 51" (1,295 mm) x 27" (686 mm) <b>Item class:</b> 110 NMFC #26710 HS code 8419.81		
<b>Approximate boxed weight:</b> 345 lb. (156 kg) <b>Approximate crated weight:</b> 450 lb. (204 kg)		
<b>Minimum entry clearance required for box:</b> 26.5" (673 mm) <b>Minimum entry clearance required for crate:</b> 27.5" (699 mm)		

**TurboChef Global Operations**  
 2801 Trade Center Drive | Carrollton, Texas 75007 USA  
 USA: 800.90TURBO (800.908.8726) | International: +1 214.379.6000  
 Fax: +1 214.379.6073 | [www.turbochef.com](http://www.turbochef.com)

**SEE OPPOSITE SIDE FOR ILLUSTRATIONS**



Commercial Cooking Appliance  
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

NGC-1168-1 / Rev. D / Aug 2018



# CERTIFICATE OF COMPLIANCE

**Certificate Number** 20180918-E151487  
**Report Reference** E151487-20080725  
**Issue Date** 2018-SEPTEMBER-18

**Issued to:** TURBOCHEF TECHNOLOGIES INC  
2801 Trade Center Dr  
Carrollton TX 75007

**This is to certify that  
representative samples of**

COMMERCIAL COOKING APPLIANCES WITH INTEGRAL  
SYSTEMS FOR LIMITING THE EMISSION OF GREASE-  
LADEN AIR

Conveyor Ovens, Models: HCS1618, HCT2020, HHC2620,  
HHC2020, HHC1618 and HCW2620.

Have been investigated by UL in accordance with the  
Standard(s) indicated on this Certificate.

**Standard(s) for Safety:** UL197 Standard for Commercial Electric Cooking Appliances  
CSA C22.2 NO. 109, the Standard for Commercial Cooking  
Appliances

**Additional Information:** See the UL Online Certifications Directory at  
[www.ul.com/database](http://www.ul.com/database) for additional information

Only those products bearing the UL Certification Mark should be considered as being covered by UL's  
Certification and Follow-Up Service.

Look for the UL Certification Mark on the product.



Bruce Mahrenholz, Director North American Certification Program  
UL LLC

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contact a local UL Customer Service Representative at <http://ul.com/aboutul/locations/>



Project No. 12NK11491

File E151487

Page 1

Tested by: \_\_\_\_\_

Date \_\_\_\_\_

Printed Name

Signature

Number of pages in this package \_\_\_\_ [ including additional pages \_\_\_\_ ]

(Fill in when using printed copy as record)

TEST LOCATION:	
<input checked="" type="checkbox"/> UL or Affiliate	<input type="checkbox"/> WTDP <input type="checkbox"/> CTDP <input type="checkbox"/> TPTDP <input type="checkbox"/> TCP <input type="checkbox"/> PPP
	<input type="checkbox"/> WMT <input type="checkbox"/> TMP <input type="checkbox"/> SMT
Company Name UL/NBK	
Address	

CLIENT INFORMATION	
Company Name	TurboChef Technologies
Address	4240 International Pky Carrollton, TX 75007 Suite 105

AUDIT INFORMATION:				
Description of Tests	Per	UL 197	Edition/	10 <sup>TH</sup>
	Standard		Revision	June 24, 2011
	No.	CSA C22.2 No.	Date	M1981
		109		R2009
		UL 710B		2 <sup>nd</sup>
				September 2, 2011

<input checked="" type="checkbox"/> Tests Conducted by +	Ken Kingsbury/D.DeFord
	Printed Name Signature
<input type="checkbox"/> UL Staff supervising	
UL Staff in training	Printed Name Signature
Reviewed and accepted by	William G. Morler
qualified Project Handler	<i>William G. Morler</i>
	Printed Name Signature

TESTS TO BE CONDUCTED:				
Test No.	Start	Done+++	Test Name	<input type="checkbox"/> Comments/Parameters
				<input type="checkbox"/> Tests Conducted by ++
1	2012/10/25	2012/10/29	POWER INPUT TEST (THREE PHASE): RATING (CSA 22.2 109-M1981):	
2	2012/11/7	2012/11/14	EMISSION TEST (UL 710B)	++Shane M. Keller

## GENERAL TEST CONSIDERATIONS - ALL TESTS:

## Power Supply Connections

Unless otherwise specified in the individual test methods, the appliance was connected to a 240 volt source of supply at 60 Hz.

This supply connection was based on

☒ The marked voltage rating

☐ The highest voltage of the applicable range of voltages

Project No. 12NK11491

File E151487

Page 2

Tested by: \_\_\_\_\_

Date \_\_\_\_\_

Printed Name

Signature

## TEST EQUIPMENT INFORMATION

Inst. ID No.	Instrument Type	Test Number +, Test Title or Conditioning	Function /Range	Last Cal. Date	Next Cal. Date

+ - If Test Number is used, the Test Number must be identified on the data sheet pages or on the Data Sheet Package cover page.

The following additional information is required when using client's or rented equipment, or when a UL ID Number for an instrument number is not used. The Inst. ID No. below corresponds to the Inst. ID No. above.

Inst. ID No.	Make/Model/Serial Number/Asset No.

**[X]** UL test equipment information is recorded on Meter Use in UL's Laboratory Project Management (LPM) database.

## TEST SAMPLE IDENTIFICATION:

The table below is provided to provide correlation of sample numbers to specific product related information. Refer to this table when a test identifies a test sample by "Sample No." only.

Sample Card No.	Date Received	<b>[ ]</b> Test No.+	Sample No.	Manufacturer, Product Identification and Ratings
1489401	2012/10/19	ALL	1	TurboChef Technologies, Conveyor Oven, Model HCW2620, rated 240 V, 14400 W, 3ph.

Project No. 12NK11491

File E151487

Page 3

Tested by: \_\_\_\_\_

Date \_\_\_\_\_

Printed Name

Signature

POWER INPUT TEST (THREE PHASE RATED OVER 120V):  
 RATING (CSA 22.2 109-M1981):

UL 197 Sec. 47  
 (6.2)

## METHOD

☒ The supply voltage was adjusted to voltage and frequency as noted in "General Test Considerations", 240 V, 60 Hz.

~~☐ The supply voltage was adjusted to the [rated voltage] [mean of the rated voltage range] at rated frequency, [\_\_\_ V], [\_\_\_ Hz].~~

The power input was measured with the appliance at the intended operating temperature under full-load conditions.

☒ (c-UL) To determine the proper test voltage for the Temperature (Normal) and Temperature (Abnormal) tests, the supply voltage was adjusted to the increased test voltage as noted below. Following the test at increased test voltage, the supply voltage was adjusted to the value necessary to cause the appliance to draw the increased test [current] [and] [power], calculated as specified below.

Increased Test Voltage ( $V_t$ ): 216V for appliances rated 208V.  
 250V for appliances rated between 220V-250V.

Increased Test Current ( $I_t$ ):  $I_r(V_t/V_r) = \underline{\hspace{2cm}}$  A

Increased Test Power ( $W_t$ ):  $W_r(V_t/V_r)^2 = \underline{15625}$  (W) ~~(kW)~~

Where  $V_r$ ,  $I_r$ , and  $W_r$ , are the rated voltage, current, and power of the appliance, respectively. Note: when the appliance is rated for a range of voltages, the mean of the range is to be used as  $V_r$ .

## PARAMETERS

Appliance Ratings:

Volts: 240; Current: 40 A; Power: 14400 (W) ~~(kW)~~

Project No. 12NK11491

File E151487

Page 4

Tested by: \_\_\_\_\_

Date \_\_\_\_\_

Printed Name

Signature

POWER INPUT TEST (THREE PHASE RATED OVER 120V): (CONT'D)  
RATING (CSA 22.2 109-M1981):UL 197 Sec. 47  
(6.2)

## RESULTS

Operating Conditions	Specified					Measured						
	Volts	Amps			Power, (W) (kW)	Volts			Amps			Power, (W) (kW)
		L1	L2	L3		L1-L2	L2-L3	L1-L3	L1	L2	L3	
Full power operation, rated voltage	240	---	---	---	---	241	240	246	38.9	35.9	33.6	13372
<input type="checkbox"/> Full power operation, rated current	---				---							
<input checked="" type="checkbox"/> Full power operation, rated power	---	---	---	---	14400	251	250	257	39.9	38.3	34.2	14427
<input type="checkbox"/> Full power operation, V		---	---	---	---							
C-UL Operating Conditions												
Full power operation, increased test voltage	250	---	---	---	---	251	250	257	39.8	38.2	34.1	14384
<input type="checkbox"/> Full power operation, increased test current	---				---							
<input checked="" type="checkbox"/> Full power operation, increased test power	---	---	---	---	15625	258	258	264	42.1	39.0	36.6	15626

☐ The input current [was] [was not] between 90% and 105% of the rated input current when the appliance was energized at rated voltage.

☒ The input power [was] ~~[was not]~~ between 90% and 105% of the rated input power when the appliance was energized at rated voltage.

~~☐ The input current [was] [was not] over \_\_\_\_\_ A when the appliance was energized at \_\_\_\_\_ V. (Note: see paragraph 47.3 of UL 197)~~

~~☐ The input current [was] [was not] over \_\_\_\_\_ A when the appliance was energized at rated wattage. (Note: see paragraph 47.3 of UL 197)~~

Project No. 12NK11491

File E151487

Page 5

Tested by: \_\_\_\_\_

Date \_\_\_\_\_

Printed Name

Signature

## EMISSION TEST:

UL 710B Sec. 59

## METHOD

TEST FOR EVOLUTION OF SMOKE OR GREASE-LADEN AIR ( 550 ~~°F~~ ):

The Model HCW2620 cooking appliance was placed under a hood operating at 500 CFM, and was tested using a method derived from EPA Method 202.

A 12 in. by 6 in. rectangular, 108 in. tall sheet metal stack was constructed on top of the hood and mounted above the exhaust vent of the appliance. 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 was operated normally by cooking the following foods:

~~{Griddles} {Broiler}~~

~~Meat cakes, 5 minutes per side, \_\_\_\_\_ per load. Each load took 10 minutes.~~

~~{Fryer}~~

~~The fryer was operated normally by cooking the following foods at a temperature of \_\_\_\_\_°F with Clear Frying Oil (Soybean w/ additives):~~

~~French Fries were used, \_\_\_\_\_ baskets with \_\_\_\_\_ lbs. per basket. Each load took \_\_\_\_\_ minutes to cook with a \_\_\_\_\_ minute recovery time.~~

Conveyor Oven - 12 in. pepperoni pizza (Tombstone, with 19 pepperonis per pizza), each cooked for 3 minutes with 0 seconds between loads for 8 hours (total of 576 pizzas). Oven was set to maintain 550 °F

The cooking cycle was repeated for 8 hours of continuous cooking.

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 ft<sup>3</sup>/min.

Project No. 12NK11491

File E151487

Page 6

Tested by: \_\_\_\_\_

Date \_\_\_\_\_

Printed Name

Signature

## EMISSION TEST:

UL 710B Sec. 59

After being allowed to cool, the sampling equipment was disassembled. The glass-filter is to be removed using a pair of forceps and placed in a clean petri dish. The dish is to be sealed and labeled "sample 1".

A sample of the acetone of the same volume that will be used to rinse-out the nozzle and probe is to be placed into a clean sample bottle, sealed, and labeled "sample 2". The level of the liquid in the sample bottle is to be recorded.

The inside of the nozzle and probe is to be rinsed with acetone taking care to collect all the rinse material in a clean sample bottle. The sample bottle is to be sealed, labeled "sample 3", and the level of the liquid in the bottle is to be recorded.

The liquid in the first three impingers is to be measured and the total volume is to be recorded which will be compared to the original volume. The liquid is to be quantitatively transferred to a clean sample bottle. Each impinger and the connecting glassware including the probe extension are to be rinsed twice with water. The rinse water is to be collected and added to the same sample bottle. The sample bottle is to be sealed, labeled "sample 4" and the level of the liquid in the bottle is to be recorded.

This rinse process is to be repeated with two rinses of methylene chloride ( $\text{MeCl}_2$ ). The rinses are to be recovered in a clean sample bottle. The sample bottle is to be sealed, labeled "sample 5" and the level of the liquid in the bottle is to be recorded.

A volume of water approximately equivalent to the volume of water used to rinse and a volume of  $\text{MeCl}_2$  approximately equivalent to the volume of  $\text{MeCl}_2$  used to rinse is to be placed in two clean sample bottles. The sample bottles are to be sealed, labeled "sample 6" and "sample 7" respectively, and the level of the liquid in the bottles is to be recorded.

The weight of the fourth impinger containing the silica gel is to be recorded and then the silica gel can be discarded.

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

## RESULTS

The results [are] ~~[are not]~~ considered acceptable because there ~~[was]~~ [was no] visible smoke emitted from the exhaust of the hood during the normal cooking operation. There ~~[was]~~ [was no] noticeable amounts 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 was found to be 2.40  $\text{mg/m}^3$ , which is [less] ~~[more]~~ than  $5 \text{ mg/m}^3$ .

**Reported Grease Emission 0.00063 lb/hr/ft**

Note: Additional spreadsheet is to be used when conducting the Emission Test. This spreadsheet (EPA 202) can be found in the Lab Equipment Management System (LEM) under global ID 58255.

Project No. 12NK11491

File E151487

Page 7

Tested by: \_\_\_\_\_

Date \_\_\_\_\_

Printed Name

Signature

## EMISSION TEST:

UL 710B Sec. 59

CONDENSIBLE MATTER  
(Lab Analysis)

Sample Bottle No.	Description	Volume, ml	Final Wt, mg
1	Filter Paper	-	652.3
2	Acetone (Blank)	45	0.1
3	Acetone (Wash)	40	0.4
4&5	Solvent Phase (Wash)	150	4.3
4&5	Water Phase (Wash)	530	10.2
6&7	Solvent Phase (Blank)	80	0.5
6&7	Water Phase (Blank)	520	0.5

Filter paper weight before test- 644.7 mg**Analysis**

1. The liquid level of all the sample bottles is to be measured.
2. The filter from sample one is to be removed and dried to constant weight by means of a desiccator or an oven. The weight of the filter is to be recorded.
3. The volume of sample two is to be determined. The liquid is then to be transferred to a beaker and evaporated to dryness. The volume of the liquid and the final weight of the condensable matter are to be recorded.
4. The volume of sample three is to be determined. The liquid is then to be transferred to a beaker and evaporated to dryness. The volume of the liquid and the final weight of the condensable matter are to be recorded.
5. The volumes of sample four and five are to be measured.
6. Samples four and five are to be combined. The solvent phase is to be mixed, separated, and then repeated with two MeCl<sub>2</sub> washes.
7. The solvent extracts obtained from the procedure in 6 are to be placed in a beaker and evaporated to a constant weight. The final weight is to be recorded.
8. The water phase is to be placed in a beaker and evaporated to dryness. The final weight is to be recorded.
9. The volumes of samples six and seven are to be determined. Sample bottles six and seven are to be analyzed according to procedures 8 and 7 respectively.



Project No. 12NK11491

File E151487

Page 8

Tested by: \_\_\_\_\_

Date \_\_\_\_\_

Printed Name

Signature

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# KNLZ.E151487 - COMMERCIAL COOKING APPLIANCES WITH INTEGRAL SYSTEMS FOR LIMITING THE EMISSION OF GREASE-LADEN AIR

## 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\*, 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

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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

### 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/m<sup>3</sup> 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-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 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."

\* \* \* \* \*

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Last Updated on 2013-05-16

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# 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.

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

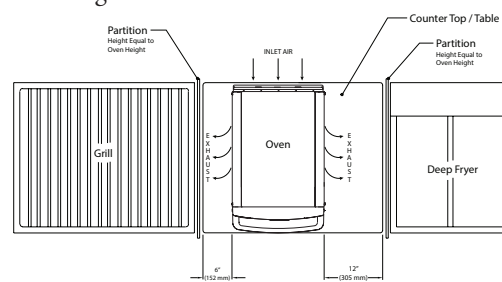
To ensure continued compliance with all health, building, and fire codes, users are required to:

- ☐ 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
Bullet	5" (127 mm)	2" (51 mm)
C3	4" (102 mm)	2" (51 mm)
Double Batch	2" (51 mm)	2" (51 mm)
Eco	5" (127 mm)	1" (25 mm)
Eco ST	5" (127 mm)	1" (25 mm)
Encore/Encore 2	5" (127 mm)	2" (51 mm)
Fire	2" (51 mm)	2" (51 mm)
HhB 2	2" (51 mm)	2" (51 mm)
HhC 1618	10" (254 mm)	0" (0 mm)
HhC 2020	10" (254 mm)	0" (0 mm)
HhC 2620	10" (254 mm)	0" (0 mm)
i1 (Panini, Söta / Söta Single Mag, Waterless Steamer)	5" (127 mm)	1" (25 mm)
i3	19" (483 mm)	2" (51 mm)
i5	19" (483 mm)	2" (51 mm)
Single Batch	2" (51 mm)	2" (51 mm)
Tornado	4" (102 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.

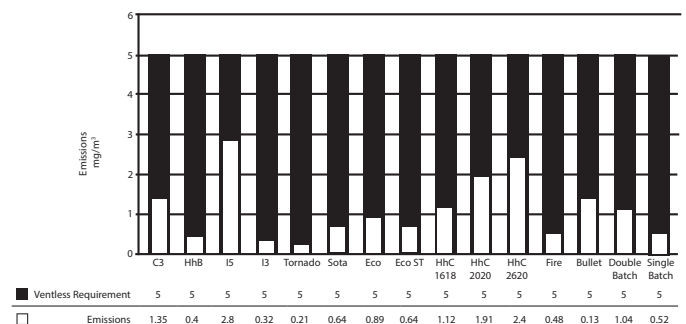
The heat load from TurboChef ovens is mostly sensible. The only latent heat present is due to evaporation during the cooking process. When installing a TurboChef oven, the space must have the following tons of AC per oven installed.

Oven	Tons of AC
Bullet	0.5
C3	0.63
Double Batch	1.15
Eco	0.89
Eco ST	0.28
Encore/Encore 2	0.45
Fire	0.55
HhB 2	0.84
HhC 1618	1.00
HhC 2020	1.47
HhC 2620	1.82
i1 (Panini, Söta/ Söta Single Mag, Waterless Steamer)	0.3
i3	0.9
i5	1.3
Single Batch	0.75
Tornado	0.58

## 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.

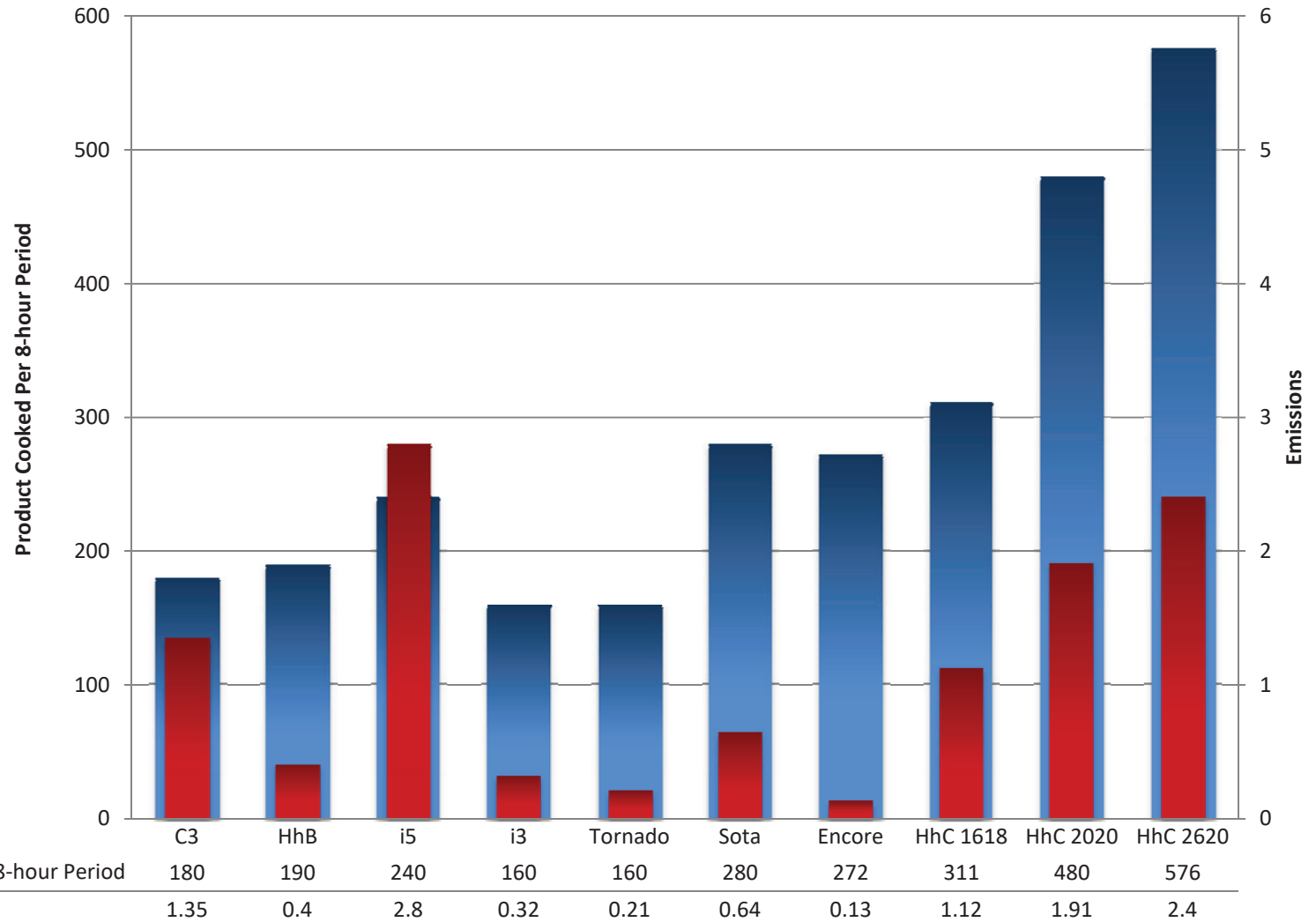
TurboChef ovens are well below the 5.0 mg/m<sup>3</sup> threshold as shown below.



## 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.

**UL® (KNLZ)**  
**Emissions by Product**  
 Ventless Requirement: <5.00 mg/m<sup>3</sup>



## TurboChef Energy Calculator

### User Inputs

Total Operation Time per Day (hours)	12	hours
Percent of Day Heavy Cooking (0-100%)	25%	%
Balance of Day in Snooze Mode (0-100%)	34%	%
Energy Cost/kWhr (\$)	0.11	\$/kWhr

Constants	HhC 1618	HhC 2020	HhC 2620
Power Warm-up (watts)	6,850	14,000	14,000
Power Cooking (watts)	6,850	9,200	11,500
Power Idle (watts)	4,340	6,750	8,400
Power Snooze (watts)	2,120	4,500	5,600
Time Warm-up (seconds)	600	600	600

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

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

Ave Power =  $E_{total} / \text{total time per day}$

Calculated times	HhC 1618	HhC 2020	HhC 2620
Time Heavy Cooking (seconds)	10,650	10,650	10,650
Time Snoozing (seconds)	10,863	10,863	10,863
Time Idle (seconds)	21,087	21,087	21,087
Error check (hours)	12	12	12
Ewarm-up (kJ)	4,110	8,400	8,400
Eidle (kJ)	91,518	142,337	177,131
Ecooking (kJ)	72,953	97,980	122,475
Etotal (kJ)	168,580	248,717	308,006
Etotal (kWhr)	46.83	69.09	85.56
Avg Power/Day (kW)	3.90	5.76	7.13
Tons of Cooling	1.02	1.51	1.87
Cost/Day (\$)	\$5.15	\$7.60	\$9.41
Cost/Month (\$)	\$154.53	\$227.99	\$282.34
Cost/year (\$)	\$1,880.14	\$2,773.89	\$3,435.12



TURBOCHEF TECHNOLOGIES, INC.



# HhC 2620 Oven Surface Temperatures

This document illustrates the surface temperature testing data reported for the TurboChef High h Conveyor 2620 oven. Measurements were recorded after four hours of idle. The oven temperature was set to 550°F (288°C) for the duration of the test.

After 4-hour Idle at 550°F/288°C (Values in °F/°C)

