TurboChef Technologies Inc.

i5 Ventless Submittal Information

TURBOCHEF

Project _____

Item No. _____

Quantity _____

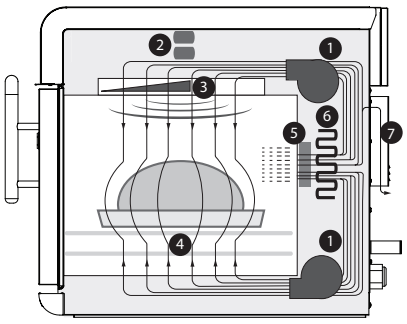
THE i5™

PERFORMANCE

Utilizing TurboChef's patented technology to rapidly cook food without compromising quality, the i5 oven maximizes versatility with its large cavity size and ability to cook with most any metal pan.

VENTILATION

- UL (KNLZ) listed for ventless operation.†
- EPA 202 test (8 hr):
  - Product: Pepperoni Pizzas
  - Results: 2.80 mg/m³
  - Ventless Requirement: <5.00 mg/m³
- Internal catalytic filtration to limit smoke, grease, and odor emissions.



1. Blower Motors
2. Microwave System
3. Stirred Impinged Air (Top) and Microwave
4. Impinged Air (Bottom)
5. Catalytic Converter
6. Impingement Heater
7. Vent Tube Catalyst

EXTERIOR CONSTRUCTION

- Two-tone stainless steel front, top and sides
- 304 stainless steel removable grease collection pan
- Ergonomic door handle
- Rubber seal for surface mounting
- Side hand grips for lifting

INTERIOR CONSTRUCTION

- 304 stainless steel
- Fully insulated cook chamber
- Removable rack with dual setting option
- Top and bottom jetplates

STANDARD FEATURES

- Integral recirculating catalytic converter for UL (KNLZ) listed ventless operation
- Independently-controlled dual motors for vertically-recirculated air impingement
- Top-launched microwave system
- Stirrer to help ensure even distribution of air and microwave
- Variable rack positioning
- External air filtration
- Smart menu system capable of storing up to 200 recipes
- Flash software updates via smart card
- Single or multiple-temperature interface
- Smart Voltage Sensor Technology* (U.S. only)
- Vent catalyst to further limit emissions
- Built-in self-diagnostics for monitoring oven components and performance
- Stackable (requires stacking stand)
- Field-configurable for single or 3-phase operation
- Includes plug and cord (6 ft. nominal)
- 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 PTFE Baskets (NGC-1331)

c UL US

ANSI/NSF #4
81Y5

TÜV PRODUCT SERVICE
Production monitored
Safety tested

CE

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

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

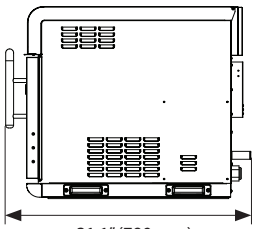
† Ventless certification is for all food items except for foods classified as "fatty raw proteins." Such foods include bone-in, skin-on chicken, raw hamburger meat, raw bacon, raw sausage, steaks, etc. If cooking these types of foods, consult local HVAC codes and authorities to ensure compliance with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

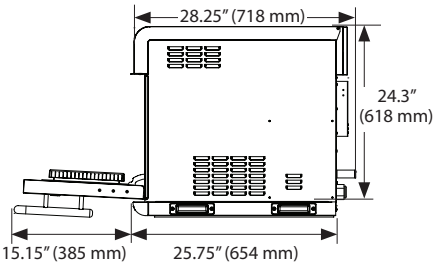
Ultimate ventless allowance is dependent upon AHJ approval, as some jurisdictions may not recognize the UL certification or application. If you have questions regarding ventless certifications or local codes please email ventless.help@turbochef.com

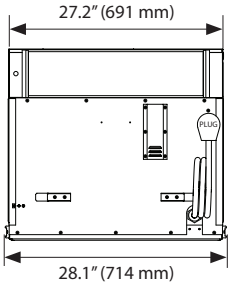
TurboChef reserves the right to make substitutions of components or change specifications without prior notice.

i5™

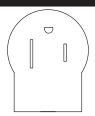
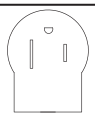
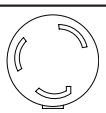
TURBOCHEF





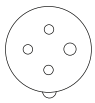
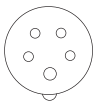
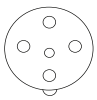
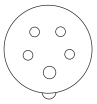
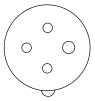
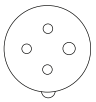


DIMENSIONS		
Single Units		
Height	24.3″	618 mm
Width	28.1″	714 mm
Depth	28.25″	718 mm
Weight	275 lbs.	125 kg
Cook Chamber		
Height	10″	254 mm
Width	24″	610 mm
Depth (Door Open / Closed)	16″ / 14″	406 mm / 356 mm
Volume	2.2 cu.ft.	62 liters
Wall Clearance (Oven not intended for built-in installation)		
Top	19″	483 mm
Sides	2″	51 mm

ELECTRICAL SPECIFICATIONS-SINGLE PHASE		
i5 US Model (I5-9500-1) - United States		 NEMA 6-50P
Voltage	208/240 VAC	
Frequency	60 Hz	
Current (Max Circuit Requirement)	48 amp (50 amp)	
Max Input	9500/11500 watts	
i5 UK Model (I5-9500-2-UK) - United Kingdom		 IEC 309, 3-pin
Voltage	230 VAC	
Frequency	50 Hz	
Current (Max Circuit Requirement)	48 amp (60 amp)	
Max Input	10000 watts	
i5 BK Model (I5-9500-6-BK) - Brazil		 IEC 309, 3-pin
Voltage	220 VAC	
Frequency	60 Hz	
Current (Max Circuit Requirement)	48 amp (50 amp)	
Max Input	10000 watts	
i5 LA Model (I5-9500-7-LA) - Latin America		 NEMA 6-50P
Voltage	220 VAC	
Frequency	60 Hz	
Current (Max Circuit Requirement)	48 amp (50 amp)	
Max Input	10000 watts	
i5 JK Model - 50 Hz (I5-9500-8-JK) - Japan 60 Hz (I5-9500-10-JK) - Japan		 NEMA L6-50, PSE, 3-blade
Voltage	200 VAC	
Frequency	50 Hz or 60 Hz	
Current (Max Circuit Requirement)	46 amp (50 amp)	
Max Input	9000 watts	

ELECTRICAL SPECIFICATIONS-MULTI PHASE		
i5 DL Model (I5-9500-14-DL) - United States		 NEMA 15-30P
Voltage	208/240 VAC	
Frequency	60 Hz	
Current (Max Circuit Requirement)	30 amp (30 amp)	
Max Input	9500/11500 watts	

TurboChef recommends installing a type D circuit breaker for European installations.
TurboChef reserves the right to substitute components or change specifications without notice.

i5 ED Model (I5-9500-3-ED) - International		 IEC 309, 4-pin
Voltage	230 VAC	
Frequency	50 Hz	
Current (Max Circuit Requirement)	28 amp (32 amp)	
Max Input	10000 watts	
i5 EW Model (I5-9500-4-EW) - International		 IEC 309, 5-pin
Voltage	400 VAC	
Frequency	50 Hz	
Current (Max Circuit Requirement)	19 amp (20 amp)	
Max Input	10000 watts	
i5 AU Model (I5-9500-5-AU) - Australia		 Clipsal, 5-pin
Voltage	400 VAC	
Frequency	50 Hz	
Current (Max Circuit Requirement)	19 amp (20 amp)	
Max Input	10000 watts	
i5 JD Model - 50 Hz (I5-9500-9-JD) - Japan 60 Hz (I5-9500-11-JD) - Japan		 NEMA L6-50, PSE 4-blade
Voltage	200 VAC	
Frequency	50 Hz or 60 Hz	
Current (Max Circuit Requirement)	25 amp (30 amp)	
Max Input	10000 watts	
i5 KW Model (I5-9500-12-KW) - Middle East & Korea		 IEC 309, 5-pin
Voltage	400 VAC	
Frequency	60 Hz	
Current (Max Circuit Requirement)	19 amp (20 amp)	
Max Input	10000 watts	
i5 SD Model (I5-9500-13-SD) - Middle East & Korea		 IEC 309, 4-pin
Voltage	230 VAC	
Frequency	60 Hz	
Current (Max Circuit Requirement)	28 amp (30 amp)	
Max Input	10000 watts	
i5 LD Model (I5-9500-15-LD) - Latin America		 NEMA 15-30P
Voltage	220 VAC	
Frequency	60 Hz	
Current (Max Circuit Requirement)	28 amp (30 amp)	
Max Input	10000 watts	
i5 BD Model (i5-9500-16-BD) - Brazil		 IEC 309, 4-pin
Voltage	220 VAC	
Frequency	60 Hz	
Current (Max Circuit Requirement)	28 amp (30 amp)	
Max Input	10000 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: 31″ x 32″ x 33″ (787 mm x 813 mm x 838 mm) Crate size: 40″x 36″ x 35″ (1016 mm x 914 mm x 889 mm) Item class: 110 NMFC #26710 HS code 8419.81
Appx. boxed weight: 330 lb. (150 kg) / Appx. crated weight: 410 lb. (186 kg)
Minimum entry clearance required for box: 31.5″ (800 mm) Minimum entry clearance required for crate: 35.5″ (902 mm)

Project _____

Item No. _____

Quantity _____

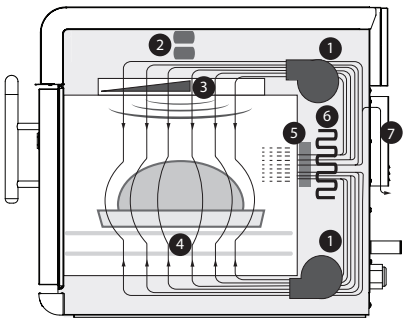
THE i5 Touch™

PERFORMANCE

Utilizing TurboChef's patented technology to rapidly cook food without compromising quality, the i5 Touch oven maximizes versatility with its large cavity size and ability to cook with most any metal pan.

VENTILATION

- UL (KNLZ) listed for ventless operation.†
- EPA 202 test (8 hr):
  - Product: Pepperoni Pizzas
  - Results: 2.80 mg/m^3
  - Ventless Requirement: <5.00 mg/m^3
- Internal catalytic filtration to limit smoke, grease, and odor emissions.



1. Blower Motors
2. Microwave System
3. Stirred Impinged Air (Top) and Microwave
4. Impinged Air (Bottom)
5. Catalytic Converter
6. Impingement Heater
7. Vent Tube Catalyst

EXTERIOR CONSTRUCTION

- Two-tone stainless steel front, top and sides
- 304 stainless steel removable grease collection pan
- Ergonomic door handle
- Rubber seal for surface mounting
- Side hand grips for lifting
- 7-inch capacitive touch screen with tempered glass cover

INTERIOR CONSTRUCTION

- 304 stainless steel
- Fully insulated cook chamber
- Removable rack with dual setting option
- Top and bottom jetplates

STANDARD FEATURES

- Simple and intuitive touch controls
- Integral recirculating catalytic converter for UL (KNLZ) listed ventless operation
- Independently-controlled dual motors for vertically-recirculated air impingement
- Top-launched microwave system
- Stirrer to help ensure even distribution of air and microwave
- Variable rack positioning
- External air filtration
- Smart menu system capable of storing up to 200 recipes
- Flash firmware updates via USB
- Programmable via USB or smart card
- Single or multiple-temperature interface
- Smart Voltage Sensor Technology* (U.S. only)
- Vent catalyst to further limit emissions
- Self-diagnostics for monitoring oven components and performance
- Stackable (requires stacking stand)
- Field-configurable for single or 3-phase operation
- Includes plug and cord (6 ft. nominal)
- 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 PTFE Baskets (NGC-1331)

c UL us

ANSI/NSF #4
81Y5

TÜV PRODUCT SERVICE
Production monitored
Safety tested

CE

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

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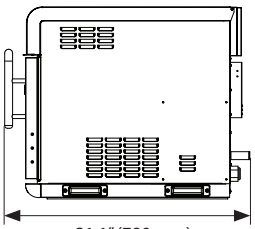
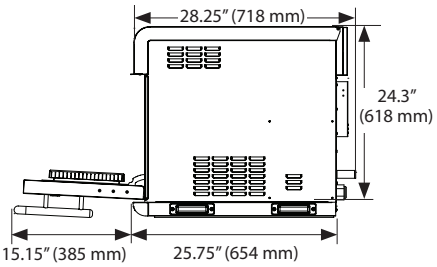
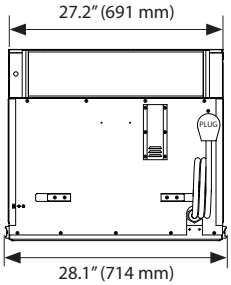
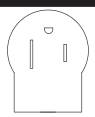
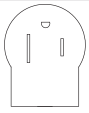
i5 Touch™







DIMENSIONS		
Single Units		
Height	24.3"	618 mm
Width	28.1"	714 mm
Depth	28.25"	718 mm
Weight	275 lbs.	125 kg
Cook Chamber		
Height	10"	254 mm
Width	24"	610 mm
Depth (Door Open / Closed)	16" / 14"	406 mm / 356 mm
Volume	2.2 cu.ft.	62 liters
Wall Clearance (Oven not intended for built-in installation)		
Top	19"	483 mm
Sides	2"	51 mm

ELECTRICAL SPECIFICATIONS-SINGLE PHASE		
i5 US Model (I5-9500-401) - United States		 NEMA 6-50P
Voltage	208/240 VAC	
Frequency	60 Hz	
Current (Max Circuit Requirement)	48 amp (50 amp)	
Max Input	9500/11500 watts	
i5 UK Model (I5-9500-402-UK) - United Kingdom		 IEC 309, 3-pin
Voltage	230 VAC	
Frequency	50 Hz	
Current (Max Circuit Requirement)	48 amp (60 amp)	
Max Input	10000 watts	
i5 BK Model (I5-9500-406-BK) - Brazil		 IEC 309, 3-pin
Voltage	220 VAC	
Frequency	60 Hz	
Current (Max Circuit Requirement)	48 amp (50 amp)	
Max Input	10000 watts	
i5 LA Model (I5-9500-407-LA) - Latin America		 NEMA 6-50P
Voltage	220 VAC	
Frequency	60 Hz	
Current (Max Circuit Requirement)	48 amp (50 amp)	
Max Input	10000 watts	
i5 JK Model - 50 Hz (I5-9500-408-JK) - Japan 60 Hz (I5-9500-410-JK) - Japan		 NEMA L6-50, PSE, 3-blade
Voltage	200 VAC	
Frequency	50 Hz or 60 Hz	
Current (Max Circuit Requirement)	46 amp (50 amp)	
Max Input	9000 watts	

ELECTRICAL SPECIFICATIONS-MULTI PHASE		
i5 DL Model (I5-9500-414-DL) - United States		 NEMA 15-30P
Voltage	208/240 VAC	
Frequency	60 Hz	
Current (Max Circuit Requirement)	30 amp (30 amp)	
Max Input	9500/11500 watts	

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

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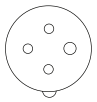
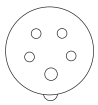
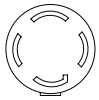
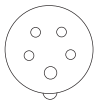
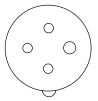
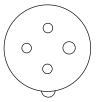
i5 ED Model (I5-9500-403-ED) - International		 IEC 309, 4-pin
Voltage	230 VAC	
Frequency	50 Hz	
Current (Max Circuit Requirement)	28 amp (32 amp)	
Max Input	10000 watts	
i5 EW Model (I5-9500-404-EW) - International		 IEC 309, 5-pin
Voltage	400 VAC	
Frequency	50 Hz	
Current (Max Circuit Requirement)	19 amp (20 amp)	
Max Input	10000 watts	
i5 AU Model (I5-9500-405-AU) - Australia		 Clipsal, 5-pin
Voltage	400 VAC	
Frequency	50 Hz	
Current (Max Circuit Requirement)	19 amp (20 amp)	
Max Input	10000 watts	
i5 JD Model - 50 Hz (I5-9500-409-JD) - Japan 60 Hz (I5-9500-411-JD) - Japan		 NEMA L6-50, PSE 4-blade
Voltage	200 VAC	
Frequency	50 Hz or 60 Hz	
Current (Max Circuit Requirement)	25 amp (30 amp)	
Max Input	10000 watts	
i5 KW Model (I5-9500-412-KW) - Middle East & Korea		 IEC 309, 5-pin
Voltage	400 VAC	
Frequency	60 Hz	
Current (Max Circuit Requirement)	19 amp (20 amp)	
Max Input	10000 watts	
i5 SD Model (I5-9500-413-SD) - Middle East & Korea		 IEC 309, 4-pin
Voltage	230 VAC	
Frequency	60 Hz	
Current (Max Circuit Requirement)	28 amp (30 amp)	
Max Input	10000 watts	
i5 LD Model (I5-9500-415-LD) - Latin America		 NEMA 15-30P
Voltage	220 VAC	
Frequency	60 Hz	
Current (Max Circuit Requirement)	28 amp (30 amp)	
Max Input	10000 watts	
i5 BD Model (i5-9500-416-BD) - Brazil		 IEC 309, 4-pin
Voltage	220 VAC	
Frequency	60 Hz	
Current (Max Circuit Requirement)	28 amp (30 amp)	
Max Input	10000 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: 31" x 32" x 33" (787 mm x 813 mm x 838 mm)
Crate size: 40"x 36" x 35" (1016 mm x 914 mm x 889 mm)
Item class: 110 NMFC #26710 HS code 8419.81

Appx. boxed weight: 330 lb. (150 kg) / Appx. crated weight: 410 lb. (186 kg)

Minimum entry clearance required for box: 31.5" (800 mm)
Minimum entry clearance required for crate: 35.5" (902 mm)

c UL us 81Y5

LISTED

Commercial Cooking Appliance with Integral Systems for Limiting the Emissions of Grease-Laden Air

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

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

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

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

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

See General Information for Heaters, Cooking Appliances

USE AND INSTALLATION

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

These appliances have been investigated for the limit of 5 mg/m^3 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."

*** ***

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

Last Updated on 2013-05-16

File: E151487

Project: 08NK02927

Date: 1/23/2008

Client:

Turbochef

Model:	Product Tested
i5 Oven	Pepperoni Pizza

Turbochef
Model: **i5 Oven**

Calculations needed for Nozzle Size

?H@	=	47.365		This number is calculated when device is calibrated
% Oxygen	=	20.61	$\%O_2$	Oxygen inside stack during operation
% Carbon	=	0	%CO2	Carbon Dioxide inside stack during operation
Stack Temperature	=	25	°C	Temperature inside stack during operation
Barametric Pressure	=	744.22	mmHg	Barametric pressure at location of meter
Stack Static Pressure	=	-5.08	mm H_2O	Static Pressure inside of duct
Average Square root ?P	=	2.336	?P mm H_2O	Enter pressure differential at each transvers point in mm H_2O, the take square root of ?P.

	Pressure	Velocity		Pressure	Velocity
1	5.08	1450	**5**	5.334	1500
2	5.334	1500	**6**	6.096	1600
3	5.08	1600	**7**	5.334	1450
4	5.842	1650	**8**	5.588	1400

 # Travers Points 8

1518.75 Velocity Average Ft/sec

Meter Temperature	=	25	°C	
Pitot Tube Coefficient	=	0.84		
% Moisture	=	23		
Sample Rate	=	21.24	Lpm	
Ideal Nozzle Size		8.194	mm	When numbers are entered into calculator, ideal nozzle size will be displayed. Enter number here
		0.322598	in	
Actual Nozzle Size Used		3/8	in	If ideal nozzle size is not available, locate nearest number. Enter what nozzle size was used for testing

Project No. 08NK02927 File: E151487

Turbochef
Model: **i5 Oven**

Start Time: 9:05 Product Tested: **Pepperoni Pizza** Cook Time: 3.5

End Time: 5:05 Barometric Pressure: 744.22 mmHg Recovery Time: 0.5

Test Date: 01/23/08 Room Ambient: 25

IMPINGER WEIGHT

Filter Paper Start of Test: 0.65 g Frit 150.92 152.03

Filter Paper End of Test: 0.68 g

Impinger	Start Volume/Weight	Start Weight (lbs)	End Volume/Weight	End Weight (lbs)
1 (ml)	100	1.550	26	1.386
2 (ml)	100	1.498	135	1.574
3 (ml)	0	1.338	10	1.362
4 (g)	200	1.766	256.03	1.888
		6.152		6.210

Timed Meter Readings

Traverse Point Number	Sampling Time Hr/Min	Gas Meter Reading (m^3)	Orafice Pressure Differential ?H	Velocity Head ?P	Pump Vaccum In.hg	Stack Temp °C	Probe Temp °C	Box Temp °C	Impinger Temp °C	Gas Meter Outlet °C
Initial	-	38.710	44	7.0	3.0	25	121	121	10	25
1	:10	38.932	45	7.0	3.2	24	121	121	13	27
1	:20	39.142	45	6.8	3.4	24	121	120	15	29
1	:30	39.354	45	6.9	3.3	24	121	121	15	30
1	:40	39.567	45	6.9	3.3	24	121	121	13	31
1	:50	39.778	45	6.6	3.5	25	121	121	13	32
1	1hr	39.989	45	6.5	3.5	25	121	121	15	33
2	:10	40.201	46	3.0	3.5	29	121	121	14	34
2	:20	40.414	46	3.2	3.5	30	121	121	13	34
2	:30	40.628	45	3.2	3.5	29	121	121	14	34
2	:40	40.841	42	3.4	3.4	30	121	121	12	34
2	:50	41.053	45	3.4	3.4	29	121	121	12	35
2	2hr	41.264	44	3.2	3.4	29	121	121	12	35

Traverse Point Number	Sampling Time Hr/Sec	Gas Meter Reading (m^3)	Orafice Pressure Differential ?H	Velocity Head ?P	Pump Vaccum In.hg	Stack Temp °C	Probe Temp °C	Box Temp °C	Impinger Temp °C	Gas Meter Outlet °C
3	:10	41.476	45	3.8	3.4	30	121	121	12	35
3	:20	41.688	45	3.6	3.4	30	121	122	11	35
3	:30	41.900	45	4.0	3.4	32	121	121	10	35
3	:40	42.112	45	3.6	3.4	29	121	122	10	35
3	:50	42.324	45	3.6	3.4	36	121	121	11	35
3	3hr	42.536	45	3.8	3.5	29	121	121	10	36
4	:10	42.747	44	5.0	3.4	27	121	121	10	36
4	:20	42.958	44	5.0	3.4	28	121	121	10	36
4	:30	43.168	44	5.1	3.4	28	121	121	11	35
4	:40	43.379	44	5.1	3.4	27	121	121	9	35
4	:50	43.589	44	5.1	3.3	27	121	122	9	35
4	4hr	43.798	44	5.1	3.3	27	121	121	9	35
5	:10	44.008	44	5.7	3.3	24	121	122	9	35
5	:20	44.219	44	5.8	3.3	25	121	121	9	35
5	:30	44.429	44	5.5	3.4	24	121	121	9	35
5	:40	44.640	44	5.7	3.4	24	121	121	9	35
5	:50	44.850	45	5.4	3.4	24	121	121	9	35
5	5hr	45.061	45	5.7	3.4	24	121	121	8	35
6	:10	45.272	45	4.9	3.4	36	121	121	8	35
6	:20	45.482	45	4.8	3.4	29	121	121	9	35
6	:30	45.693	45	4.7	3.4	30	121	122	9	35
6	:40	45.903	44	4.7	3.4	30	121	121	9	36
6	:50	46.113	45	4.6	3.5	29	121	122	9	36
6	6hr	46.325	45	4.5	3.5	30	121	121	9	36
7	:10	46.537	45	4.2	3.5	30	121	122	9	36
7	:20	46.749	45	4.3	3.5	29	121	121	9	36
7	:30	46.961	45	4.0	3.5	30	121	121	10	36
7	:40	47.172	45	4.1	3.5	37	121	122	9	36
7	:50	47.384	45	4.0	3.5	30	121	121	9	36
7	7hr	47.596	45	4.2	3.5	30	121	121	10	35
8	:10	47.807	45	5.2	3.5	25	121	121	10	36
8	:20	48.019	45	5.4	3.5	24	121	121	10	36
8	:30	48.230	45	5.6	3.5	24	121	121	9	36
8	:40	48.442	45	5.6	3.5	24	121	122	9	36
8	:50	48.653	45	5.4	3.5	24	121	121	9	36
8	8hr	48.865	45	5.4	3.5	24	121	121	9	35

Average Gas Meter Outlet Temperature: 34.46939 °C ? H = 44.72917 mm H_2O Tm = 554.04 R

Average Gas Meter Outlet Temperature: 94.0449 °F ? H = 1.760991 in H_2O

Turbochef
Model: i5 Oven

Start Time: 9:05 End Time: 5:05 Test Date: 01/23/08

Cook Time: 12:00 Product Tested: **Pepperoni Pizza**

Recovery Time: 12:00 Barometric Pressure: 744.22

Post-Test Data

Gas Meter Reading initial	38.71	m^3		Gas Meter Reading End	48.87 m^3
Vm	10.16	m^3			
	358.62	ft^3			
Y- Constant	1.017		This data is obtained during device calibration		
Tstd constant	528.0	R			
Tm	554.0	R	Number obtained from Datasheet		
Barometric Pressure	744.22	mmHg	Barometric Pressure on day of Test		
	29.3	inHg			
Pstd	30.42	inHg			
? H	1.760991	in H_2O			
Vmstd	336.25	ft3			
	9.521674	m3			

Post-Filter Data

Filter paper	680.00	mg	**Weight at End of Test**
	642.80	mg	**Weight from Analysis**
Filter AR	650.00	mg	**Weight at Begining of Test**
delta H	30.00	mg	**Change of Weight at End of Test**

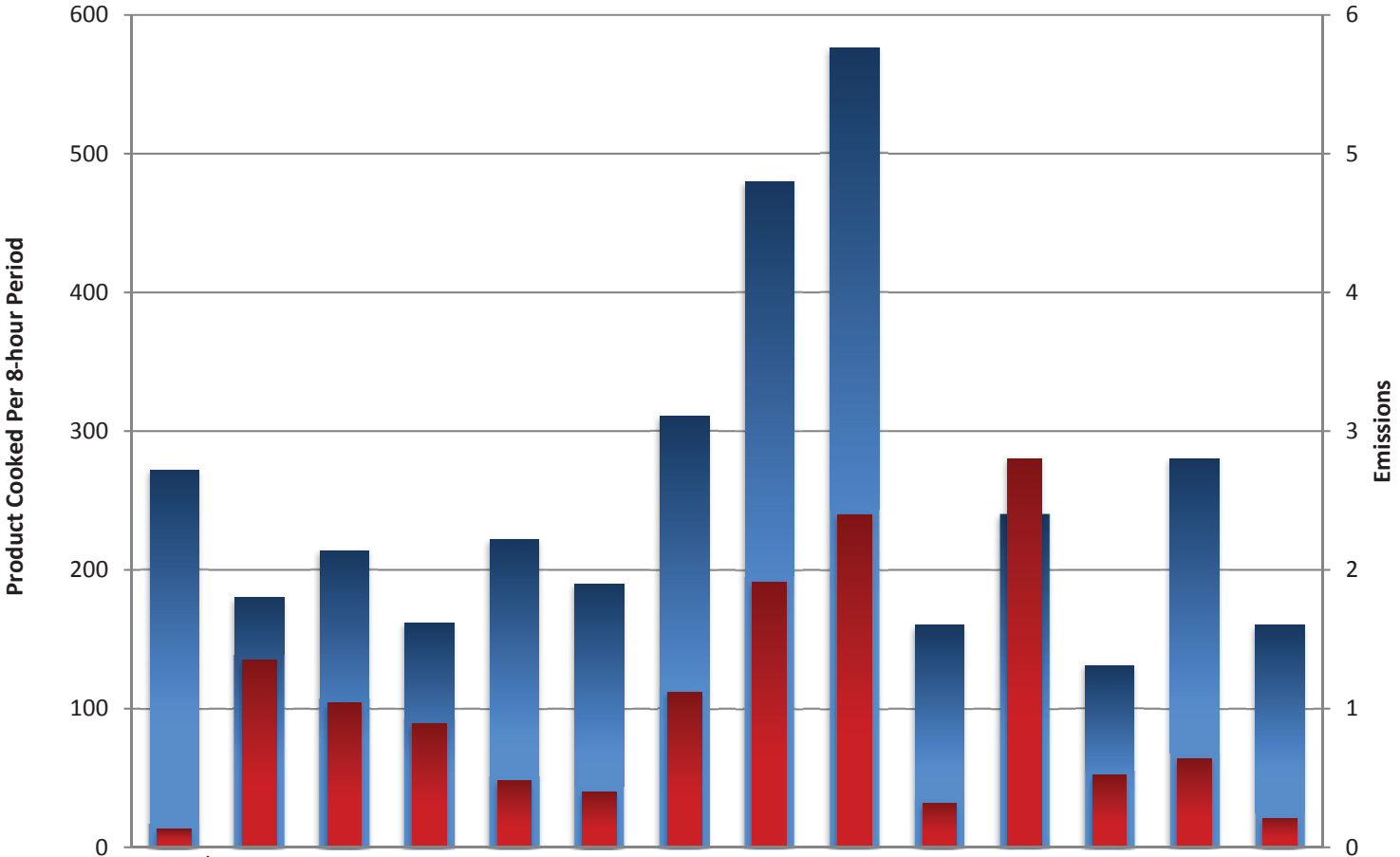
Post-Acid Used

Acetone Wash	0	mg	Bottle 2	Mc	-3.1	mg
Acetone Blank	0	mg	Bottle 3			
Impinger Contents	0	mg	Bottle 4	**Mn**	26.9	mg
MeCl Wash	0	mg	Bottle 5			
MeCl Blank	3.1	mg	Bottle 6			
Water Blank	0	mg	Bottle 7			

Total Grease Emisions

Cs=Mn/Vmstd **2.83 mg/m3**

UL® (KNLZ)
Emissions by Product
Ventless Requirement: <5.00 mg/m³



	Bullet/ Encore	C3	Double Batch	Eco	Fire	HhB	HhC 1618	HhC 2020	HhC 2620	i3	i5	Single Batch	Sota	Tornado
Product Cooked Per 8-hour Period	272	180	214	162	222	190	311	480	576	160	240	131	280	160
Emissions	0.13	1.35	1.04	0.89	0.48	0.4	1.12	1.91	2.4	0.32	2.8	0.52	0.64	0.21

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 difference 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 xceed 5mW/cm2.

Test Method:

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

As it relates to grease handling, UL KNLZ specifies:

UL KNLZ Guide Information Excerpt:

"These appliances have been evaluated for the limit of 5 mg/m^3 for the emission of grease-laden air to the room ambient in accordance with the recommendations of the National Fire Protection Association Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations, NFPA 96, using the EPA-202 test method prescribed for cooking appliances provided with integral recirculating air systems."

Test Method:

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

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

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

Best regards,

James K. Pool III

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

COUNTY OF LOS ANGELES
Public Health

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

September 8th , 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-2011-002
Application Type:	Equipment specific 208 / 240 V; 1000W
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 i5

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: i5 oven for exemption from the mechanical exhaust ventilation requirements of Section 114149.1(a) of the California Retail Food Code.

You have provided documentation that 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 2.83 mg/m^3, which is below the limit of 5 mg/m^3 to be considered a low grease emission appliance.

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 i5 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 i5 oven 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. Pre-cooked foods such as animal, fish or skinless poultry protein products may be reheated in the i5 oven.

7. The i5 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.

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 i5 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 i5 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

TurboChef Energy Calculator

User Inputs

Total Operation Time per Day (hours)	12	**hours**
Cook Cycle Time (seconds)	180	**seconds**
Number of Cooks per Day	100	**total**
Energy Cost/kWhr ($)	0.11	**$/kWhr**

Constants	i5
Power Warm-up (watts)	6,300
Power Cooking (watts)	8,000
Power Idle (watts)	2,100
Time Warm-up (seconds)	660

Energy = (Power x time), where power is in watts and time is in seconds
Etotal=Eidle+Ecooking+Ewarmup
Ave Power = Etotal/total time per day

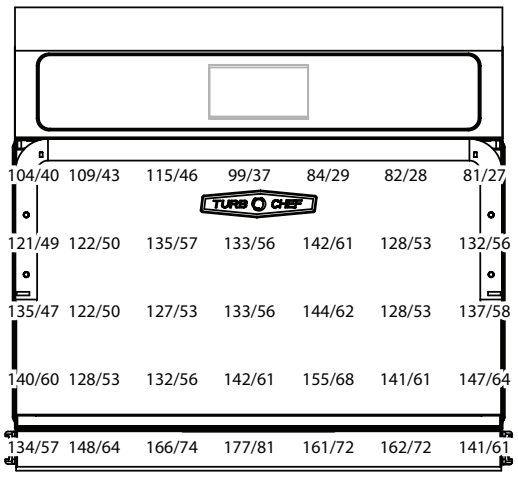
Calculated Times	i5
Time (cooking, sec)	18,000
Time (idle, sec)	24,540
Time Check	12
Eidle (kJ)	51,534
Ewarm-up (kJ)	4,158
Ecooking (kJ)	144,000
Etotal (kJ)	199,692
Etotal (kWHr)	55.47
Avg Power/Day (kW)	4.62
Tons of Cooling	1.31
Cost/Day ($)	$6.10
Cost/Month ($)	$183.00
Cost/Year ($)	$2,226.50

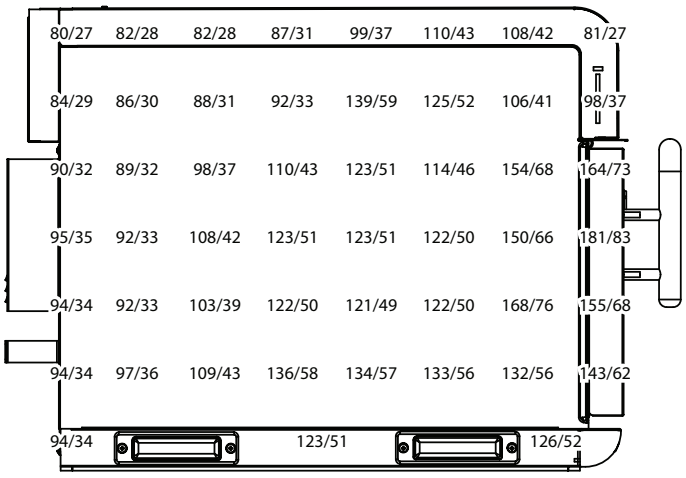
TURBOCHEF TECHNOLOGIES, INC.

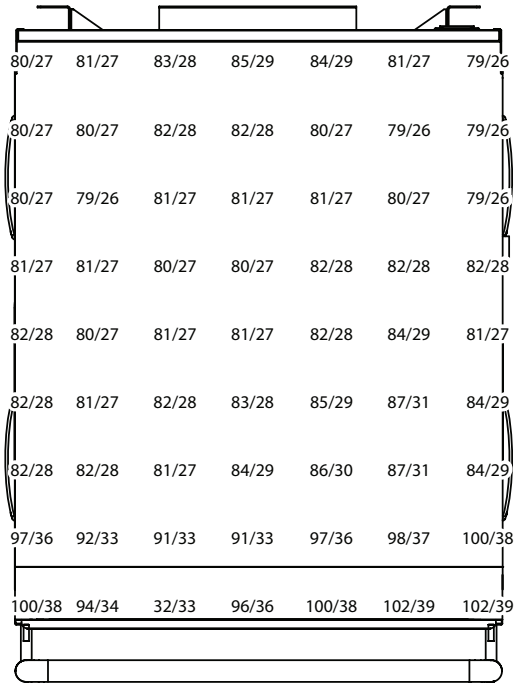
i5 Oven Surface Temperatures

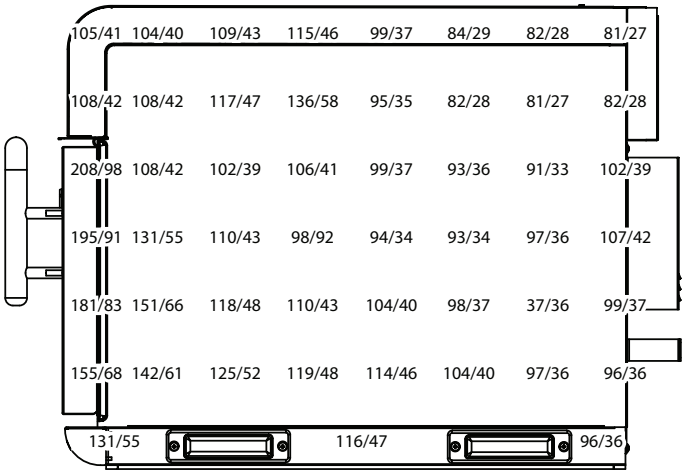
This document illustrates the surface temperature testing data reported for the TurboChef model i5 oven. Measurements were recorded after four hours of idle and after two hours of subsequent cooking. The oven temperature was set to 500°F (260°C) for the duration of the test.

After 4-Hour Idle at 500°F/260°C (Values in °F/°C)

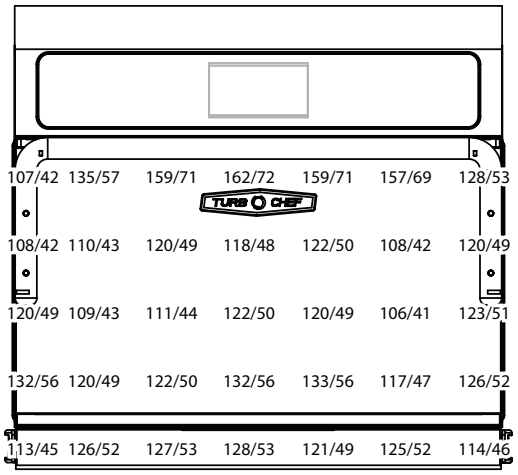


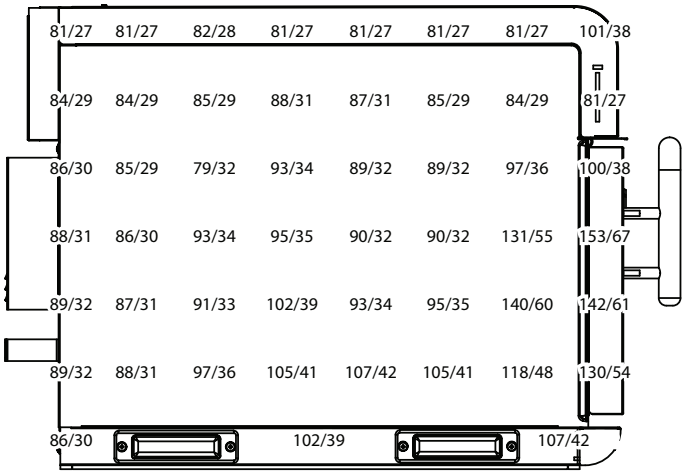


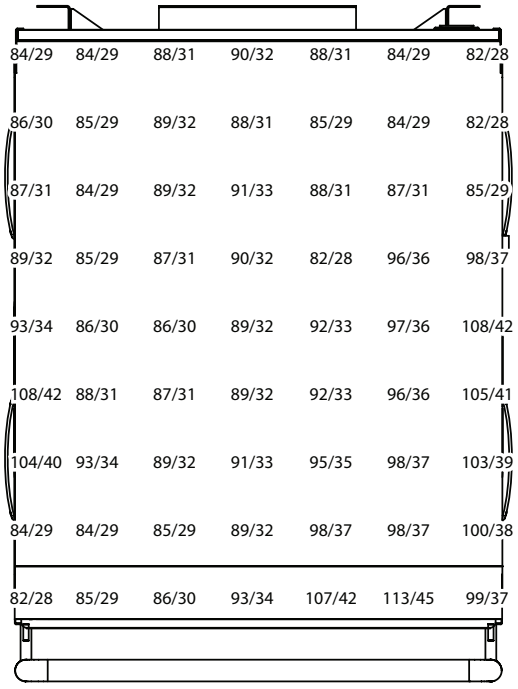


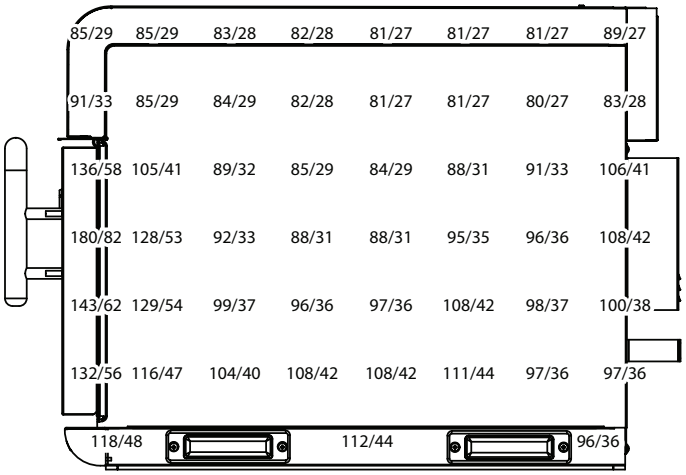


After 4-Hour Idle and 2 Hours of Cooking at 500°F/260°C (Values in °F/°C)









TURBOCHEF TECHNOLOGIES, INC.

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, permissable 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 208/240 VAC	50 amp 30 amp	1 Ph 3 Ph
Eco			
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 208/240 VAC	30 amp 50 amp	3 Ph 1 Ph
HhC 2020	208/240 VAC	50 amp	3 Ph
HhC 2620	208/240 VAC	50 amp	3 Ph
i1 (Panini, Sŏta, Waterless Steamer)	208/240 VAC	30 amp	1 Ph
i1 Sŏta Single Mag	208/240 VAC	20 amp	1 Ph
i3	208/240 VAC 208/240 VAC	40 amp 30 amp	1 Ph 3 Ph
i5	208/240 VAC 208/240 VAC	50 amp 30 amp	1 Ph 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

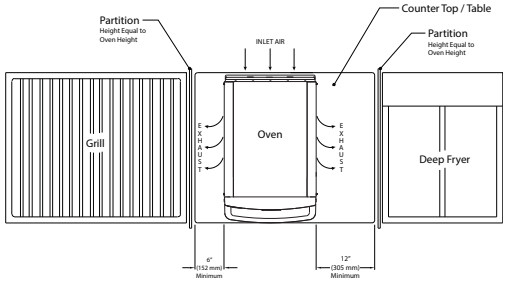
To ensure continued compliance with all health, building, and fire codes, users are required to:

- ☐ 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)
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, Sŏta / Sŏta 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^2) 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.

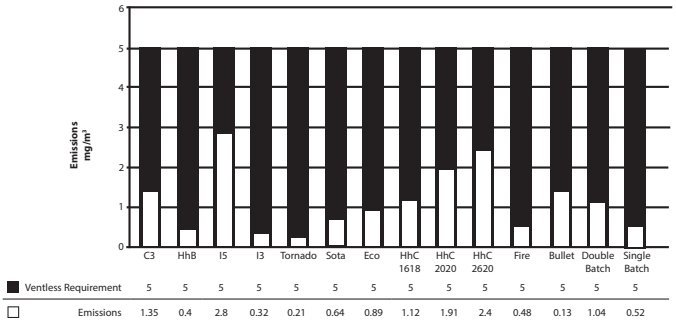
The heat load from TurboChef ovens is mostly sensible. The only latent heat present is due to evaporation during the cooking process. When installing a TurboChef oven, the space must have the following tons of AC per oven installed.

Oven	Tons of AC
Bullet	0.5
C3	0.63
Double Batch	1.15
Eco	0.89
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, Sŏta/ Sŏta 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^3 for the oven to be certified for ventless operation. Cooking devices that measure above the 5.0 mg/m^3 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^3 threshold as shown below.



Contact Information

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