



IAPMO Code Answers and Analysis Request *Commercial Food Heat Processing Requirements*

1. Are Type II hood systems required to be placed over UL710B recirculating hood systems?
2. Are Type II hood systems required to be placed over UL KNLZ listed equipment?
3. Are Type II hood systems required to be placed over processes tested by recognized third party test labs using recognized ANSI test standards to be in compliance with the method of test referenced in UL710B an UL KNLZ eg., EPA 202?
4. Can good engineering practices for sizing HVAC systems be used to deal with sensible heat loads in lieu of Type II hood systems?

Background

507.0 General Requirements.

507.1 Cooking equipment used in processes producing smoke or grease-laden vapors shall be equipped with an exhaust system that complies with all the equipment and performance requirements of this standard, and all such equipment and performance shall be maintained per this standard during all periods of operation of the cooking equipment. Specifically, the following equipment shall be kept in good working condition:

- (A) Cooking equipment
- (B) Hoods
- (C) Ducts (if applicable)
- (D) Fans
- (E) Fire suppression systems
- (F) Special effluent or energy control equipment

General requirements in UMC 507 specify that when a **process** generates smoke or grease-laden vapors that an exhaust system complying with that section shall be provided.

When UL710B listed recirculating hood systems are used the interpretation is that no hood is required. Its recognized that these systems mitigate the fire hazard and as such do not require Type I hoods that discharge effluent and heat outdoors. Though the total heat emitted into the space may be significant, there is no requirement for additional supplemental ventilation. Cooking equipment used with recirculating systems is intended to thermally process raw animal and plant foods to a ready-to-eat (RTE) form. The process of cooking from raw to RTE produces latent heat as moisture in the food is evaporated during the heating

process. Since these systems are not discharged outdoors there is sensible heat gain due to both the cooking equipment and the fan motors needed to force cooking effluent through the series of filters and grease removal devices inside the recirculating hood system. I am not aware of any of these listed systems being required to be placed beneath a Type II hood. It is assumed this is because it is understood that whatever heat is emitted into the space is either dealt with by the air conditioning system or (as is the case in Northern design climates) is desirable and simply offsets whatever incremental heat may be needed to achieve set-point comfort from the building heating system.



The method of test referenced in UL 710B and in NFPA 96 chpt. 13 is EPA 202, the *Test Method for Condensable Particulate*. The threshold limit value (TLV) for the test is 5.0mg/m³. UL published a new standard last year, UL KNLZ titled *Commercial 'food heat processing equipment' with Integral Systems for Limiting the Emission of Grease-laden Air*. This standard uses EPA 202 and together with other KNLZ criteria quantifies emissions of all particulate, including that in the condensing train. So too does the test measure total heat emissions, both sensible and latent. UL developed and published this new standard due to the development of new technology that integrates (heavy metal, platinum) catalytic combustion technology integral with the cooking equipment itself. Whatever effluents do arise from the heat treated food products are destroyed via catalytic combustion with continuous passes through the system as long as the unit is in operation. Thus far the only models to be listed to this standard are sealed cooking vessels enabling absolute separation of cooking atmosphere from occupied space. The result is a food heating process that emits sensible heat into the occupied space in the same manner as a compressor on a refrigerator or an ice machine.

Codes and interpretations that mandate Type II localized ventilation to deal with sensible heat loads are baseless. The amount of energy required to condition make-up air for such systems always exceeds whatever energy is required by the HVAC system to overcome sensible loads emitted into the space because these system are fixed volume system, yet process heat varies with the process. When mechanical requirements have no correlation to public health or safety they are trade restraints and a waste of public and private resources.

Several documents are attached to help clarify the issue.

Sincerely,

A handwritten signature in black ink that reads "Tom Johnson". The signature is written in a cursive, flowing style.

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**Particulate Matter Emissions for
TurboChef Oven Model C3**

Application of EPA Method 202
Summary Report

**Food Service Technology Center
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June 2002

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TurboChef Model C3 Summary Report

The Food Service Technology Center (FSTC) tested the TurboChef Model C3 electric oven to determine the quantity of particulate matter (PM) emissions produced during the baking of pepperoni pizza under a full-load cooking scenario. Testing was performed under UL supervision in accordance with EPA Method 202¹ under the guidelines of UL 197, *UL Standard for Safety for Commercial Electric Cooking Appliances*, and UL guide KNLZ.² The oven operates on the principles of hot air convection combined with microwave energy and uses a proprietary catalytic grease filtration system to reduce cooking emissions. The main objective of this test was to measure the total quantity of particulate matter produced during the cooking process expressed as a concentration (mg/m^3). From the measured total emissions concentration, a total emissions rate, expressed in pounds of PM per hour (lb/h), can be determined for any specified hood's airflow rate. Furthermore, these emission concentrations can also be normalized to the amount of food cooked and expressed as an emissions factor for pounds of PM per thousand pounds of food cooked (lb PM/ Mlb food).



Figure ES-1.
TurboChef C3 inside test hood.

The 8-hour emissions test of the TurboChef C3 took place in the FSTC emissions test cell under a dedicated test hood that ensured capture and containment of the convective plume and all PM emissions (see Figure ES-1). The exhaust fan, which operated at a low volumetric flow rate of 200 cfm, was located approximately 120 inches from the entrance of the stack. The sampling probe was placed exactly 8 stack diameters above the entrance of the stack per UL 197 specifications and continuously drew samples at an isokinetic flow rate (preserved particulate matter velocity) to the sampling apparatus. A diagram of

¹ Environmental Protection Agency (EPA), *Method 202-Determination of Condensable Particulate Emissions from Stationary Sources, Emission Measurement Technical Information Center Test Method*, prepared by Emissions Branch, Technical Support Division, OAQPS, EPA, 1991.

² Underwriters Laboratories' UL KNLZ.GuideInfo, *Commercial, with Integral Systems for Limiting the Emission of Grease Laden Air*, contains the same certification criteria as UL 197, *Standard for Safety for Commercial Electric Cooking Appliances*, but applies the $5 \text{ mg}/\text{m}^3$ total PM concentration limit more specifically to appliances with integrated systems that limit the emission of grease laden air.

TurboChef Model C3 Summary Report

the emissions test cell is shown in Figure ES-2 and includes hood specifications and oven placement during the test.

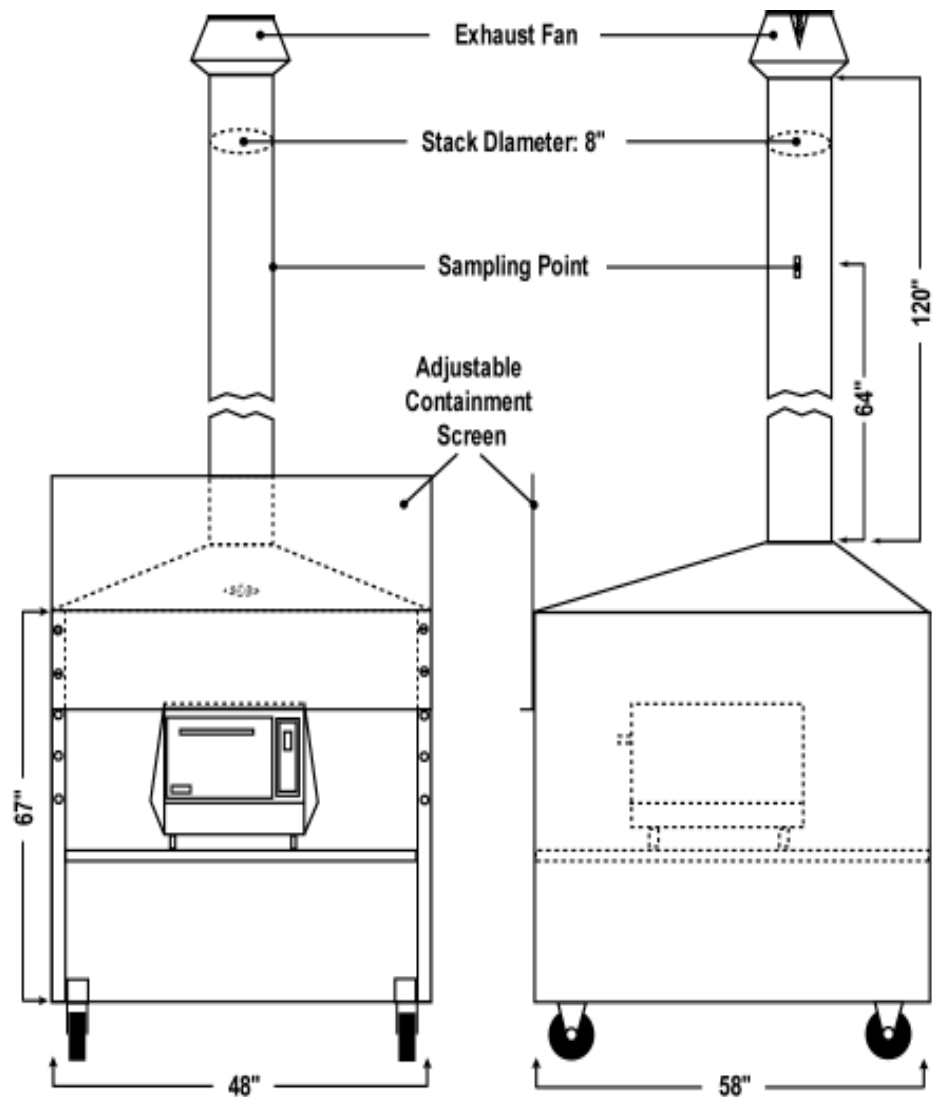


Figure ES-2.
Emissions Test Cell.

The TurboChef C3 oven operated consistently during the 8-hour test and produced a total condensable PM emissions concentration of 3.84 mg/m^3 , at a test ventilation rate of 200 cfm, which is less than the UL 197 / UL KNLZ condensable PM limit of 5.0 mg/m^3 . A summary of the test results is presented in Table ES-1. The measured PM concentration of 3.84 mg/m^3 at 200 cfm of

TurboChef Model C3 Summary Report

exhaust flow translates into an absolute emissions rate of 0.003 lb/h. An emissions factor of 0.08 lb of PM/ Mlb of food was also determined from the findings. Furthermore, if placed under a typical exhaust hood with an applied ventilation rate of 900 cfm, the TurboChef Model C3 would have only produced 0.85 mg/m³ of total particulate matter.

Test Results

*Table ES-1.
Emissions Measurements for the TurboChef, Model C3 Electric Oven.*

Sampling Period (minutes)..... 480

PM Concentration at the Test Ventilation Rate of 200 cfm

Total PM Concentration (mg/m³)..... 3.84

Particulate Matter Emission Factor

Pounds of PM Produced per Thousand Pounds
of Food Cooked (lb/Mlb) 0.08

Particulate Matter Production Rate

Pounds of PM Produced per Hour (lb/h)0.003

PM Concentration at an applied Ventilation Rate of 900 cfm

Total PM Concentration (mg/m³)..... 0.85

With respect to the applied cooking scenario of this study, the TurboChef Model C3 electric oven, with its low emission rate, is eligible for operating without the benefit of a dedicated Type I exhaust hood. When compared to a re-circulating appliance/hood system listed under UL 197, the C3 emitted below the allowable concentration of 5.0 mg/m³ for condensable PM. The C3 emitted a total PM concentration of 3.84 mg/m³ at an applied ventilation rate of 200 cfm over the course of the 8-hour test, which also conforms to the criteria specified under the UL KNLZ classification.

Test Parameters

Tables ES-2 and ES-3 summarize the food product specifications and cooking parameters during the course of the emissions testing. Table ES-4 outlines the constant test conditions during the 8-hour test.

Table ES-2. Food Product Specifications

| | |
|---|-----------------|
| Test Food Product | Pepperoni Pizza |
| Number of Pepperoni per Pizza | 24 |
| Sauce Weight (lb) | 0.25 |
| Cheese Weight (lb) | 0.375 |
| Average Par Baked Pizza Crust Weight (lb) | 0.886 |
| Average Total Weight of Each Pizza (lb) | 1.60 |

Table ES-3. Cooking Parameters

| | |
|-------------------------------------|------------|
| 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) | 40.0 ± 2.0 |
| Number of Pizza | 182 |
| Production Rate (lb/h) | 36.6 |

Table ES-4. Test Conditions

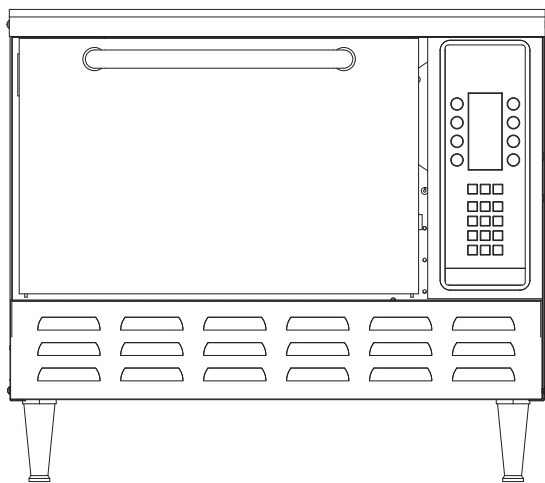
| | |
|--|------|
| Sampling Time (minutes) | 480 |
| Exhaust Duct Ventilation Rate (cfm) | 200 |
| Number of Probe Sampling Points | 3 |
| Time Interval at Each Sampling Point (minutes) | 30.0 |

References

1. Underwriters Laboratories, Inc., *UL Standard for the Safety for Commercial Cooking Appliances, UL 197, 8th Edition*, Northbrook, IL, 1993.
2. Environmental Protection Agency (EPA), *Method 202-Determination of Condensable Particulate Emissions from Stationary Sources, Emission Measurement Technical Information Center Test Method*, prepared by Emissions Branch, Technical Support Division, OAQPS, EPA, 1991.
3. Bell, Todd, *Particulate Matter Emission for a TurboChef Oven, Model C3, Application of EPA Method 202*, Proprietary FSTC Report PR.0101.02, 2001.



TORNADO
MICROWAVE / CONVECTION
OVEN



EXTERIOR CONSTRUCTION:

- Stainless steel front, top, sides and back
- 4" (101.6 mm) chrome plated adjustable legs
- Nickel plated handle
- Cool to the touch pull down door

INTERIOR CONSTRUCTION:

- 304 Stainless steel liner
- Fully insulated cooking chamber
- Removable wire cooking rack
- Adjustable lower cooking element

STANDARD FEATURES:

- Recirculating airpath with TurboChef Technologies patented catalytic converter system
- Multi-speed convection blower
- Conventional wire baking rack
- Independently controlled bottom browning element
- Smart Voltage Sensor Technology
- Programmable with up to 128 cooking programs
- Stackable design
- Manual Sleep Mode
- Warranty - 1 year parts and labor
2 additional years part only for Magnetron



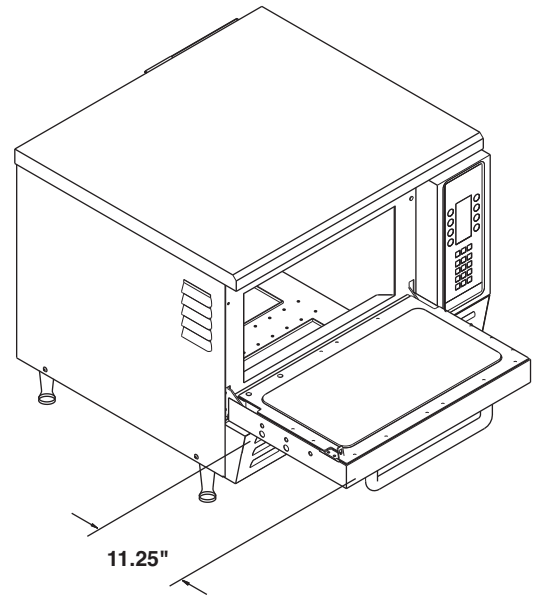
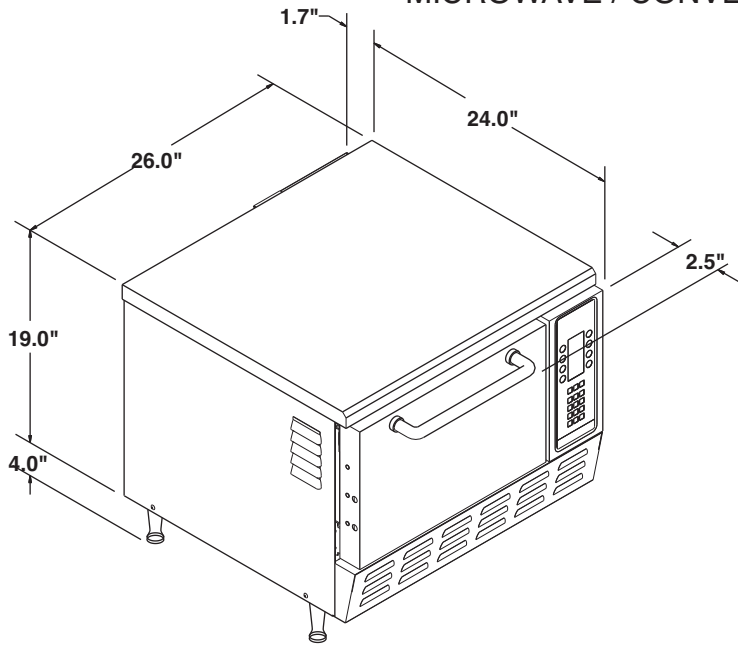
*multiple patents pending

TURBOCHEF TECHNOLOGIES INC
10500 Metric Drive, Suite 128, Dallas, TX, 75243
Phone: (214) 379-6000 / Fax: (214) 379-6073

WWW.TURBOCHEF.COM



TORNADO
MICROWAVE / CONVECTION OVEN



DIMENSIONS:

Exterior dimensions:

Width: 26"
Height (includes 4" legs): 23"
Depth: 25.7"

Cook cavity dimensions:

Width: 15.5"
Height: 8"
Depth: 14.7"

Wall Clearances:

Back: 0" (none)
Sides: 2"

Weight:

190 Lbs.

Packaging:

Double-wall corrugated box with integrated corrugated skids.

Minimum Entry Clearance:

Uncrated: 24"
Crated: 30"

POWER SUPPLY - NORTH AMERICA:

Smart Voltage Sensor Technology

- Universal Voltage; 208 / 240 VAC*, 60Hz, 1 phase
- Amperage: Nameplate rating 30 Amp (3-wire including ground)
- Cordset: 10 guage, 3 conductor, 5 foot cordset
- Plug: NEMA 6-30

*NOTE: The 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 above specifications.

- Heating Circuit: 6240 watts
- Microwave Input: 3200 watts

Certifications:

UL, cUL, NSF, FDA, FCC

TURBOCHEF TECHNOLOGIES, INC.

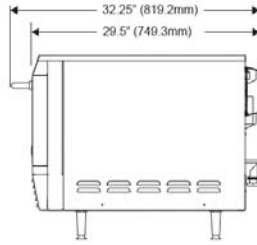
10500 Metric Drive, Suite 128

Dallas, Texas 75243

1-800-908-8726

www.turbochef.com

NOTE: The company reserves the right to make substitutions of components or change specifications without prior notice.



Specs and Dimensions

TURBOCHEF C3 OVEN - SINGLE AND DOUBLE UNITS

| PROJECT |
|-------------|
| ITEM NUMBER |
| QUANTITY |

FEATURES

STANDARD

- Two cooking platters
- Two Wave Guide Caps
- One year parts and labor oven warranty*

ADDITIONAL

Oven Stands with locking casters

- 19.5" (495.3mm) stainless steel with adjustable feet for stacked units
- 24.5" (622.3mm) stainless steel with adjustable feet for single units

CONTROL OPTIONS

C3 PROFESSIONAL

- Simplified interface. Non-programmable.

C3 SMART

- Smart intuitive control with built-in cooking profiles to assist the operator

C3 CUSTOM

- Customer/item specific profiles that are developed with TurboChef for ease of operation
- RS 232 communication port provides direct computer access update menu selections and change product information

OPERATION

- Forced vertical recirculated convection hot air system
- Bottom-launched microwave system
- Variable speed blower motor
- Two control compartment cooling fans
- Fully programmable control panel with touchpad interface storing up to 64 product cooking profiles
- Self-diagnostic control
- Catalytic converter eliminates flavor transfer between foods, reduces emissions/qualifies for ventless operation

CONSTRUCTION

EXTERIOR

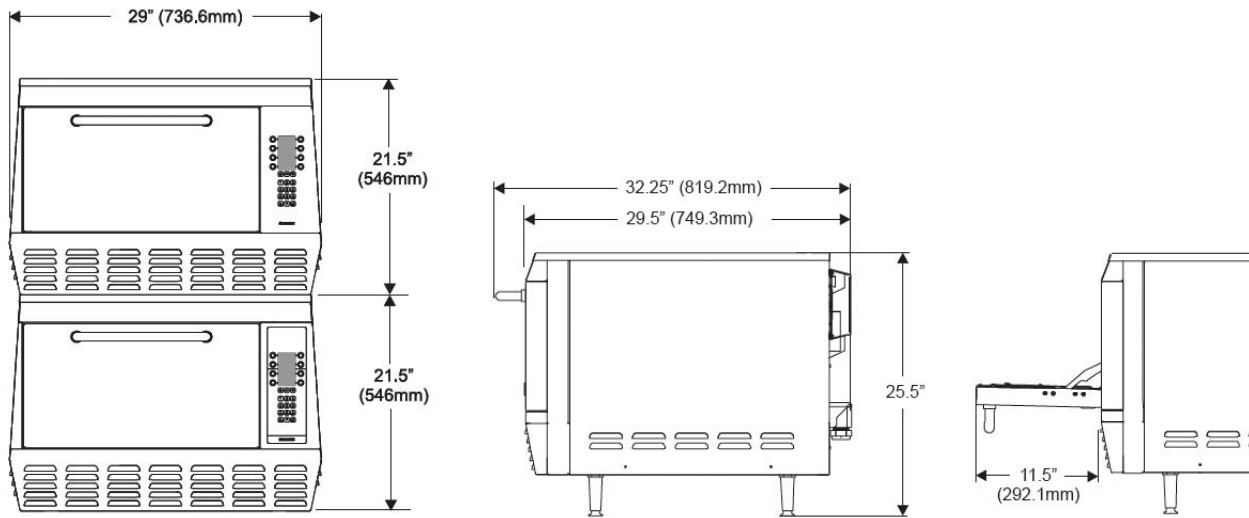
- 430 stainless steel front, top, sides and back
- 4" (101.6mm) chrome plated adjustable legs
- Powder coated handle
- Cool to the touch pull down door with microwave seal

INTERIOR

- Fully insulated cooking chamber
- 304 stainless steel liner with large radius corners
- Removable ceramic cooking platter with molded product
- Removable Wave Guide Cap
- 304 stainless steel removable grease collection pan

* For all international markets contact your local distributor.

Specs and Dimensions for the C3 Oven are for a standard depth baking compartment. All data shown is per oven section, unless otherwise noted.



DIMENSIONS

SINGLE UNIT/DOUBLE UNIT

| | |
|--------|-----------------------------|
| Height | 21.5" / 43" |
| | 25.5" on legs / 60" on cart |
| Width | 29" |
| Depth | 29.5" (32.3" with handle) |
| Weight | 255lbs./510lbs. |

| CAVITY | WALL CLEARANCE | |
|--------|----------------|-------------|
| Height | Sides | 2" |
| Width | Top | 2" |
| Depth | | |
| Volume | | 1.1 cu. ft. |

SHIPPING INFORMATION

APPROX. WEIGHT CRATED

- Single 300lbs. (136kg)
- Double Stack 600lbs. (272kg)

APPROX. WEIGHT UNCRATED

- Single 255lbs. (116kg)
- Double Stack 510lbs. (231kg)

CRATE SIZES

29.25" (743mm) x 35.5" (902mm) x 32" (813mm)

MINIMUM ENTRY CLEARANCE

- Uncrated 25.38" (644.7mm)
- Crated 30.5" (775mm)

ELECTRICAL SPECIFICATIONS

NORTH AMERICAN MARKETS

- Single Phase: 208/230-240 VAC, 60 Hz, 35/30 amp, 3 wire (inc. ground)
- Connector Type: NEMA 6-50P
- Convection Power In: 5.2 kw
- Microwave Power In: 2 kw

EUROPE AND ASIA MARKETS

- Three Phase: 380-415 VAC, WYE, 50/60 Hz, 15 amp, 5 wire (inc. ground); or 230-240 VAC, Delta, 50/60 Hz, 30 amp, 4 wire (inc. ground)
- Single Phase: 230-240 VAC, 50 Hz, 30 amp, 3 wire (inc. ground)

SHORT TERM SPECIFICATIONS

Each C3 Oven (single or double stacked) shall provide the following features and/or functions:

Each compartment shall have 304 stainless steel liner with radius corners and shall accept one microwaveable cooking platter. Stainless steel front, top, sides and back.

Door shall be of 430 stainless steel with powder coated cool grip handle. Unit shall be electrically heated and utilize dual cooking mediums (vertical forced hot air convection and bottom launched microwave). Forced convection air to be recirculated by means of a variable speed blower motor. Includes removable ceramic cooking platter with molded product standoffs. Fully programmable, self-diagnostic control panel with touchpad interface capable of storing 64 product cooking profiles.

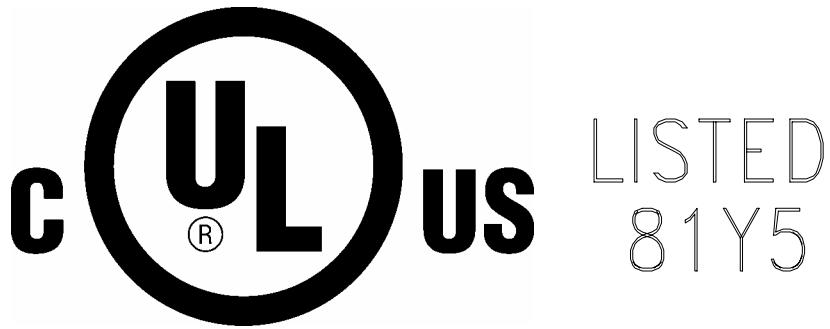


Accelerating the World of Cooking

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Commercial Microwave/Convection Oven
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

 Underwriters Laboratories Inc.

KNLZ7.GuideInfo

Commercial, with Integral Systems for Limiting the Emission of Grease-laden Air Certified for Canada

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

[Guide Information](#)

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 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/m³ for the emission of grease-laden air to the room ambient in accordance with the recommendations of the National Fire Protection Association, 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 NFPA 96.

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

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.

UNEVALUATED FACTORS

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

RELATED PRODUCTS

For products with integral recirculating systems including fire extinguishing systems, refer to Commercial, with Integral Recirculating Systems Certified for Canada ([KNKG7](#)).

ADDITIONAL INFORMATION

For additional information, see Heaters and Heating Equipment Certified for Canada ([KKBV7](#)), Heating, Cooling, Ventilating and Cooking Equipment Certified for Canada ([AAHC7](#)) and Electrical Equipment for Use in Ordinary Locations Certified for Canada ([AALZ7](#)).

REQUIREMENTS

The basic standard used to investigate products in this category is C22.2 No. 109, "Commercial Cooking Appliances."

UL MARK

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 UL Mark for Canada 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, along with the words "with integral system for limiting the emission of grease-laden air."

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TurboChef Tornado Energy Results

| Changeable Parameters | | |
|-----------------------|--------|-----------|
| Operating Time | 12 | Hours |
| Energy Costs | \$0.10 | kWHR |
| Snooze Mode | 0.00 | Hours |
| Cook Cycles/Day | 100 | Cooks/Day |
| Typical Cook Time | 45 | Seconds |

Do Not Change the following values

| | Time (min) | Power (Watts) | Cost/Day | Balance of Time (hrs) |
|--------------------|------------|---------------|----------------|-----------------------|
| Warm up | 15 | 5277 | \$0.13 | 11.75 |
| Cooking | 75 | 5995 | \$0.75 | 10.50 |
| Snooze Idle | 0 | 1100 | \$0.00 | 10.50 |
| Idle | 630 | 1300 | \$1.37 | 0 |
| Total/Day | | | \$2.25 | Yearly |
| Total/Month | | | \$67.39 | \$808.67 |

| 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) |
| 76117500 | 4749300 | 80866800 | 1872 | 6 | 0.532 |



Tornado™ Owner's Manual

FOR THE TURBOCHEF TORNADO™ SPEED COOK OVEN




Accelerating the World of Cooking™

800.90TURBO

Part Number: NGC-1006.Doc / Revision A, January 1, 2005

IMPORTANT SAFETY INFORMATION - PLEASE READ FIRST

 **WARNING:** Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

This product employs an exposed radiant heating element on the bottom of the cavity. This element is HOT during operation and will remain at dangerous temperatures after the unit is switched off. NEVER attempt to touch the element during operation or while the oven is warm.

- ❑ DO NOT store or use gasoline or any other flammable vapors or liquids in the vicinity of this or any other appliance.

The information contained in this manual is important for the proper installation, use and maintenance of this oven. Adherence to these procedures and instructions will result in satisfactory cooking results and long trouble-free service. Please read this manual carefully and retain it for future reference.

Errors — descriptive, typographic or pictorial — are subject to correction. Specifications are subject to change without notice.



How the Technology Works

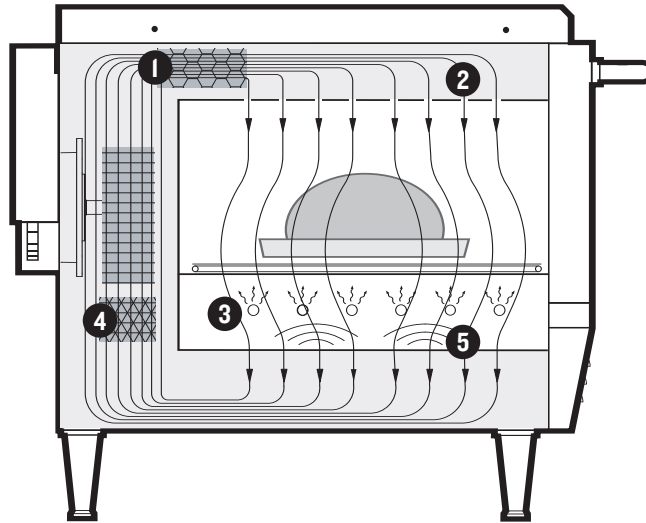


FIGURE 2: How the Technology Works

THE TECHNOLOGY BEHIND THE TORNADO™

The Tornado™ uses a patented combination of high speed forced air convection heating and microwave energy to cook food up to 12 times faster than conventional methods.

At a very high speed of circulation, a controlled, smoothly flowing field of hot air forms a shroud around the food. This takes place in conjunction with measured, precise bursts of microwave energy, creating a unique set of temperature and moisture control conditions within the food that preserves and enhances flavor.

Figure 2 illustrates the five steps of the technology used by the Tornado™ Oven. These steps, described below, are all computer controlled.

1. The internal heaters transfer energy to the recirculating airflow.

2. The recirculating airflow circulates at speeds up to 60mph down and around the food item.

3. Simultaneously, a bottom radiant heater provides heat transfer to the bottom of the food product.

4. The recirculating air passes through a Catalytic Converter where excess grease and odors are combusted and removed.

5. Working in parallel with the recirculating airflow and bottom IR element, the microwave system couples microwave energy from the bottom of the cavity evenly into the food items.

NOTE: An easy way to understand our cooking is to think of the microwave cooking from the inside out and the airflow cooking from the outside in. The two energy gradients meet and greatly reduce the cook time.

Assembly and Installation

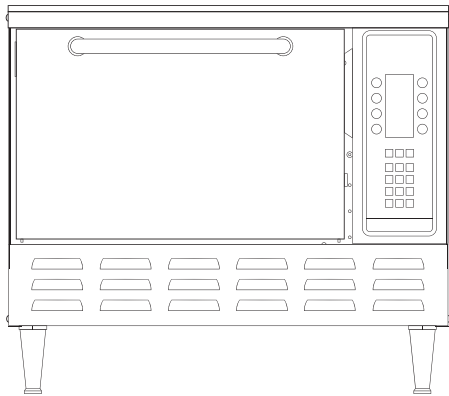


FIGURE 3: Single Oven on Legs

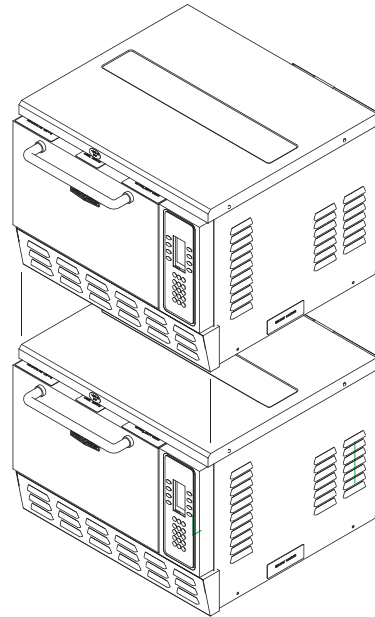


FIGURE 4: Double Stacking Ovens


OVEN ASSEMBLY

Oven Assembly

1. Carefully remove packing materials from the wire rack.
2. Open the Cook Chamber door.
3. Remove packing materials from inside the oven.
4. Place wire rack in oven.

Double Stacking Ovens


1. Remove the legs – by unscrewing them – from the top and bottom oven.
2. Carefully align and stack the top oven on the bottom one. See Figure 4.

 **WARNING:** Make sure ovens are aligned correctly for maximum stability. Death, injury and equipment damage can result from improper alignment when stacking two ovens.

INSTALLATION INSTRUCTIONS

The TurboChef Tornado™ is manufactured to comply with applicable CE, NSF, UL, cUL, FDA and FCC requirements. All equipment is designed and certified for safe operation when installed in accordance with local and/or national codes. It is the owner and/or installer's responsibility to comply with any codes that may exist.

Install this oven according to the policies and procedures outlined below and throughout this manual.

 **WARNING:** Death, injury and equipment damage can result from improper installation of the oven or installation of a unit damaged during shipment or storage.

☒ DO NOT install an oven suspected of damage.

NOTE: Improper installation or the installation of a unit damaged during shipment or storage may result in the voiding of the Limited Warranty.

Delivery and Initial Inspection


All TurboChef® speed cook ovens are shipped so as to prevent damage.

Upon delivery, inspect the shipping container for external damage. Any evidence of damage should be noted on the delivery receipt which must be signed by the driver.

Upon removing the oven from its shipping carton, check for any possible damage. Make note of any damage and contact the shipping company to file a claim. Carriers will accept claims for concealed damage if notified within fifteen (15) days of the delivery and if the shipping container is retained for inspection.

TurboChef does not assume responsibility for any loss or damage suffered in transit. The carrier assumes full responsibility for delivery in good order when the shipment is accepted. However, when necessary, TurboChef can assist in filing a claim.


Lifting the Oven

 **WARNING:** Oven weighs approx. 190 lbs. Two or more persons are required to lift it.

Position one or more persons on either side of the oven and lift from the bottom. Never lift the oven from the front and rear. The countertop surface on which the oven is placed must be at least 30" deep and capable of supporting 200 lbs.

Once properly positioned on the counter, plug the oven into a the wall mounted electrical receptacle. See Electrical Specifications on page 6.

Oven Location and Placement

 **WARNING:** Death, injury and equipment damage may result from improper positioning. It is the operator's responsibility to ensure the oven is properly positioned on countertop. TurboChef will not warrant any damage or injury to ovens that fall off countertops due to improper placement.

Proper placement of the oven will enhance long-term operator convenience and satisfactory performance. Be sure to place the oven in an area accessible for proper operation and servicing.

The surface on which the oven is placed must be at least 30" deep and capable of supporting 200 lbs. The manufacturer shall not assume liability for damage or injury resulting from the improper installation of equipment including temporary or unstable work stations or countertops.

There must be at least 6" between the top of the unit and any shelf or surface.

The oven must be installed level front to back and side to side. For additional stability, the oven legs may be bolted to the countertop if desired. An optional Restraint Oven Kit is also available and can provided additional stability for the oven. See RESTRAINT OVEN KIT (P/N TC3-0240) for further information.

Ventilation Requirements

The Tornado™ has been tested by Underwriters Laboratory which has concluded that this oven can be installed and operated ventless for all food items except for fatty raw proteins, such as bone-in, skin-on chicken, uncooked hamburger, fat laden steaks, etc.

For installations cooking fatty-raw proteins, supplemental ventilation may be required depending on usage and/or code. Please consult the factory if uncertain as to whether a food item is considered a fatty-raw protein.

NOTE: In no event shall the manufacturer assume any liability for damages or injuries resulting from installations which are not in compliance with the instructions and codes previously listed.





Tentative Interim Amendment

NFPA 96

Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations

2004 Edition

Reference: 4.1.1.1*, 4.1.1.2, Annex A and Annex B

TIA 04-1 (NFPA 96)

(SC-04-7-10/Log 791)

Pursuant to Section 5 of the NFPA Regulations Governing Committee Projects, the National Fire Protection Association has issued the following Tentative Interim Amendment to NFPA 96, *Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations*, 2004 edition. The TIA was processed by the Venting Systems for Cooking Appliances Committee, and was issued by the Standards Council on July 15, 2004, with an effective date of August 4, 2004.

Tentative Interim Amendment is tentative because it has not been processed through the entire standards-making procedures. It is interim because it is effective only between editions of the standard. A TIA automatically becomes a proposal of the proponent for the next edition of the standard; as such, it then is subject to all of the procedures of the standards-making process.

1. *Add new section 4.1.1.1 as follows:*

4.1.1.1* Cooking equipment that has been listed in accordance with UL197 or an equivalent standard for reduced emissions is not required to be provided with an exhaust system.

2. *Add new section 4.1.1.2 as follows:*

4.1.1.2 The listing evaluation of cooking equipment covered by 4.1.1.1 shall demonstrate that the grease discharge at the exhaust duct of a test hood placed over the appliance shall not exceed 5 mg/m^3 when operated with a total airflow of 0.236 cubic meters per second (500 cfm).

3. *Add new section to Annex A*

A.4.1.1.1 See UL 710B.

4. *Add new section to Annex B*

Add UL 710B, Outline of Investigation for Recirculation Exhaust Systems.

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/m³ 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





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,

A handwritten signature in black ink that reads "K. Besey".

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



California
Department of
Health Services

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.

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



commerce.wi.gov

Wisconsin
Department of Commerce

Evaluation #

200424-H

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

Wisconsin Alternate Standard Evaluation

Standard

2003 International Mechanical Code
Section 507.2.2

SCOPE OF EVALUATION

Section 507.2.2 of the **2003 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 alternate standard and methodology as described below is 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 this alternate standard is 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 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.

Exceptions: (No change to 1 and 2)

3. A Type II hood is not required for heat producing appliances where an engineering analysis demonstrates that there is no increase in annual energy consumption as a result of not providing a hood.

LIMITATIONS/CONDITIONS

The evaluation number assigned to this alternate standard is to accompany each plan submitted for projects that utilizes this alternate standard.

Deviations from this alternate standard 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 modifications are made to the alternate standard or a re-examination is deemed necessary by the department.

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:

Approval Date: September 30, 2004 By: _____

Lee E. Finley, Jr.
Product & Material Review
Integrated Services Bureau



Working Together to Promote Food Safety

- Policy
- Informational

RE: TurboChef Rapid Cook Oven
 Model No. C3
 Subway Sandwich Shops

TO: MDH Environmental Health Services Sanitarians
 All Local Environmental Health Directors
 Minnesota Department of Agriculture

FROM: Colleen Paulus, R.S., Manager
 Section of Environmental Health Services
 Minnesota Department of Health

Kevin Elfering, Interim Director
 Dairy and Food Inspection Division
 Minnesota Department of Agriculture

DATE: April 9, 2003

IARC FILE 03-01V

Background:

The InterAgency Review Council (IARC) Ventilation Committee has reviewed the request to accept the installation of the aforementioned equipment without a mechanical exhaust hood. Specifically, the manufacturer of this oven provided the following information on the TurboChef C3 oven:

C3

The TurboChef C3 is a rapid cook oven that utilizes both microwave and impingement heat transfer mechanisms (hot air convection), and uses a catalytic grease filtration system to reduce cooking emissions. Food Service Technology Center (FSTC) tested this oven in accordance with EPA Method 202, *Determination of Condensable Particulate Emissions* (a measurement of grease-laden effluent at the exhaust outlet of the unit). The test results produced 3.84 mg/m³ of total particulate matter, which is below the maximum allowable limit of 5.0 mg/m³. Additionally, FSTC, tested under the guidelines of UL 197 and UL KNLZ. All of the food and products recommended for use in the unit are pre-cooked, and consists of toasting sub sandwiches in a bun with meat and cheese.

The energy input rate during cooking is 6.1 KW for 25 seconds; 5.1 KW for 16 seconds in the warm-up phase and 0.9 KW when idle; the food is heated in a gasketed compartment.

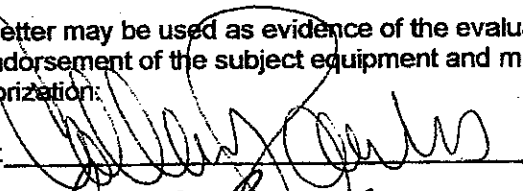
12. All installations and use of the countertop oven shall comply with applicable local building and fire code requirements.

The above comments and recommendations of the IARC Ventilation Committee do not constitute regulatory approval. The local building official may approve the use of this unit under the 1991 UMC.

Prior to any proposed installation of this equipment, it is imperative that the appropriate local fire and building officials are notified for their approval. Additionally, the appropriate health or agriculture regulatory authority must also be notified well in advance of all proposed new installations so that an assessment of the facilities can be made, a plan review conducted, and licenses can be affected.

This letter may be used as evidence of the evaluation of the oven; however, it is not to be construed as an endorsement of the subject equipment and may not be use for advertising or promotional purposes.
Authorization:

MDH:



Date:

5/15/03

MDA:



Date:

5/15/03

- cc: *IARC Ventilation Members
- cc: Lorna Girard, R.S., IARC Ventilation Chair
- cc: Sue Hibberd, R.S., IARC Chair

** The IARC Ventilation Committee membership comprises of persons representing the State of Minnesota Departments of Agriculture, Health, Public Safety (Fire Marshal), Administration (Building Codes), local building, local city and county health regulatory agencies (metro), local county health regulatory agency (greater MN) and food service and retail food industries.*



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 Models C3/C and NGC ovens have been extensively tested and conform to UL 923 and UL KNLZ standards. The UL 923 standard is the electrical/product safety standard and the KNLZ is the low particulate matter emissions standard to which we conform. While both standards address different aspects of the oven, they both have inherent overlap as it relates to grease/smoke/fire handling.

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

Section 57 Cavity Fire Containment Test:

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

- a) There is no emission of fire, flame, or molten metal outside the appliance nor glowing or ignition of the cheesecloth, tissue paper, or wood surface;*
- b) The fuse rated 3 A does not open;*
- c) Following the test, the appliance complies with the requirements of Leakage Current, Section 33, and Dielectric Voltage-Withstand Test, Section 39, as applicable to primary circuits; and*
- d) Following the test and following 10 c of operation (opening and closing the door), the appliance complies with the requirements in 57.12. The radiation emission shall not exceed 5mW/cm².*

Test Method:

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

As it relates to grease handling and smoke handling, UL KNLZ:

UL KNLZ Guide Information Excerpt:

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

Test Method:

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

The C3/C's and NGC's particulate matter emissions were determined to be 3.0 and 0.5 mg/m³, respectively; therefore, they conform to the above standard.

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



October 27, 2004

Mr. Joe Fiander
Building Codes
City of Alexandria,
Virginia 22303
Ph: 703.838.4400 ext. 255

Ref: TurboChef/Orion Food Systems

Please allow me to introduce myself. My name is Thomas Johnson and I am a consultant in the field of commercial kitchen ventilation and fire suppression. I am a long-time voting member of the Minnesota Code Uniformity Committee and our States mechanical code advisory committee to the State Department of Administration. My clients include a number of national chains and multi-unit operators, manufacturers and also to a international trade association: The North American Association of Food Equipment Manufacturers (NAFEM). My role with NAFEM is as their sole consultant in the field of standards development (voting member of the NSF Joint Committee for Food Equipment) and regulatory relations in general. In that capacity I work with ANSI, ASHRAE, NFPA 96 committee and with the revision committee of ICC.

I have below provided some screen shots of some code sections from ICC Section 507.2:

507.2 Where required. A Type I or Type II hood shall be installed at or above all commercial food heat processing appliances. A Type II hood shall be installed above commercial dishwashing machines.

Exception: Under-counter-type commercial dishwashing machines.

507.2.1 Type I and Type II hoods. A Type I hood shall be installed at or above all commercial food heat-processing appliances that produce grease vapors or smoke. A Type I or Type II hood shall be installed at or above all commercial food heat-processing appliances that produce fumes, steam, odor or heat.

Some clarification of this section can be found in the definitions section as is shown in the following screen shot:

COMMERCIAL FOOD HEAT-PROCESSING APPLIANCES. Appliances used in a food-processing establishment for heat-processing food or utensils, and which produce grease vapors, steam, fumes, smoke or odors that are required to be removed through a local exhaust ventilation system. Such appliances include deep fat fryers; upright broilers; griddles; broilers; fry grills; steam-jacketed kettles; hot-top ranges;

The definition ties back to the core concept of processes that produce a quantity of smoke and grease laden that in turn comprises a fire hazard. One of the committee's which I have served on with ASHRAE (TC5.10) has made a recommendation for revision to the ICC Revision committee for the next code cycle in February. The IMC Revision committee is chaired by an ICC staffer, Mr. Greg Gress (800-214-4321 x343). Here are recommendations for this next code cycle:

Revised IMC |

Reason: To not include heat or odor from a cooking process as a requirement for a hood. The heat shall be accounted for in the heating and cooling load calculation of the general HVAC. Odor will be removed with the smoke and grease vapor. Expand the list of Type II hood exceptions to agree with ASHRAE Standard 154 *Ventilation for Commercial Cooking Operations*.

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 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, ranges and wok ranges.

507.2.2 Type II hoods. Type II hoods shall be installed where cooking or dishwashing appliances produce heat, steam, and/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 convection, bread, ~~retainers~~ or microwave ovens, ~~toasters~~, steam tables, popcorn popper, hot dog cooker, coffee maker, rice cooker, egg cooker, holding/warming oven. However, many unhooded appliances may produce unacceptable temperature and humidity in the space. The additional heat and moisture loads must be addressed by the mechanical HVAC system.

Griddles broilers and ranges present open cooking operations where effluents are directly emitted into the space. TurboChef has a closed cooking system with gasketed doors and a heavy metal catalyst (platinum) which reduces condensable

particulates to carbon, CO² and water as is evidenced by the third party test data previously provide.

The commentary from IMC 2000 includes this:

| | |
|--|--|
| <p>grease-laden vapors that are representative of cooking operations conducted within a dwelling unit. Note that this exception does not override the requirements of Section 507.2.2, meaning that a Type I or II hood would be required over food heat-processing appliances in dwelling units if those appliances are used for commercial purposes (see commentary, Sections 507.2.2, 917.2 and 917.3).</p> | <p>little to no grease.</p> |
| <p>507.2.1 Type I and Type II hoods. A Type I hood shall be installed at or above all commercial food heat-processing appliances that produce grease vapors or smoke. A Type I or Type II hood shall be installed at or above all commercial food heat-processing appliances that produce fumes, steam, odor or heat.</p> | <p>Commercial cooking appliances that require Type II hoods as opposed to Type I hoods produce little, if any, grease-laden vapor. Some examples include completely enclosed ovens such as convection or conveyor-type pizza ovens, appliances that produce only steam, such as steam tables, dishwashing machines and other auxiliary food heat-processing appliances that do not produce grease-laden vapors such as toasters, warming ovens, coffee makers and egg cookers.</p> |
| <p>❖ This section categorizes hoods into Type I hoods for handling grease-laden vapors and smoke and Type</p> | <p>The code official should examine the frequency, duration and nature of cooking operations before determining whether a Type I or Type II hood is required for a particular food heat-processing appliance or a food heat-processing appliance installation. Bear in mind the primary purpose of Type I hood is to control a potential fire hazard associated with grease and the purpose of</p> |

There is very little sensible or latent heat gain to the space associated with the TurboChef, and whatever heat is emitted into the space of more than easily accommodated by their HVAC system. There are no odors, haze, smoke or grease laden vapors. You cannot smell anything cooking until the door is opened at the end of the cycle. This is a truly unique patented technology.

Another key concept within UL 197SB, and KNLZ listings is that though a 2 slice toaster can produce smoke, and a hot dog roller grill does warm hot dogs, these processes do not generate grease laden vapor or smoke to the extent that they present a fire hazard requiring commercial exhaust hoods (Type I or II, or fire systems). Both fall outside of the scoping statements of NFPA 96 for Type I as independent test data from a certified third party test lab (Don Fisher PE, Principle, FSTC, San Ramon, CA, 925-866-5770) proves the effluent emissions below the threshold within EPA 202 is proof that the process it is not Type I. The REASON TurboChef equipment does not emit effluents beyond the threshold expressed in EPA 202 is their use of a heavy metal (platinum) catalyst that is always over 500 degrees F during the cooking cycle. Temperatures over 500F in the catalyst denature condensable particulate such as smoke and grease laden vapor. This is a patented feature and is exclusive to TurboChef's design. It is not found in other equipment that cook via radiant energy from light or other hot air impingement ovens that do not have the platinum catalyst as with TurboChef.



One of the more useful resources is a flow chart used in Minnesota and a vent guide which we are just now revising given our newly adopted rules which began with revision to IMC to accommodate adoption of NFPA 96 in its entirety. Page 49 of the linked document (<http://www.jdpinc.com/pdf/ventguide.pdf>) is that flow chart presently used by all AHJ's (Fire, Building and Health) within the State of MN to help differentiate Type I from Type II or no hood required. Note the reference to UL197 sb (soon to be changed to UL710B), in the flow chart.

If I can provide any further information that you may require to accept our claims of safety associated with using this equipment, please let me know.

Thank you.

Sincerely,

A handwritten signature in black ink that reads 'Tom Johnson'. The signature is written in a cursive style.

Thomas Johnson
President
Johnson Commercial Agents.

Cc Al Harvey and James Pool, TurboChef, Inc.

Additional references available upon request, or on-line at <http://www.jdpinc.com>