

## **Recirculating Kitchen Ventilation Systems and Grease Limiting Appliances**

This bulletin clarifies City of Vancouver policy for the application of NFPA 96 to “recirculating”, “ventless”, or “ductless” ventilation systems, with respect to:

- 1) The acceptable use of commercial kitchen equipment or appliances listed to UL product categories KNKG, KNLZ, and YZCT.
- 2) Fire suppression systems.

This bulletin is intended to supplement the City of Vancouver Kitchen Ventilation Guide (provided as an attachment to Bulletin 2007-005-BU/PL/EL/EV/AD).

### **Background**

Commercial kitchens are an essential part of many facilities and often represent a substantial investment for building owners and operators. In existing buildings, the aggregate costs of the installation of commercial cooking systems can be particularly onerous in spaces where there are inherent limitations on size of available kitchen ducting, the lack of acceptable exhaust points, or where no kitchen ducting exists. As a result, a number of owner or operators have sought to use “recirculating”, “ventless”, or “ductless” kitchen equipment as a solution to this challenge.

### **Applicable Regulations**

Commercial kitchen systems are regulated through Part 6 of the Building By-law, for which the provisions of Article 6.3.1.7. require the design of commercial kitchen ventilation systems to comply with National Fire Protection Association (NFPA) Standard 96, “Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations”. Chapter 13 of NFPA 96, contains specific provisions that cover the use of recirculating systems which in turn make reference to other standards.

### **Equipment Listings and Fire Suppression**

As many forms of cooking involve the application of substantial amount of heat, there is an inherently elevated risk of fire from this activity due to the production of grease laden vapours, and the presence of hot surfaces or ignition sources. NFPA 96 requires the use of listed equipment, and does not waive the requirements for fire extinguishing systems except where specifically permitted through Chapter 13.

All recirculating systems are required to utilize equipment tested for such use. NFPA 96 identifies ANSI/UL 710B as the acceptable test standard. As such, listed equipment is required to demonstrate that ventilation equipment or appliances have compliance with this standard.

### **UL Equipment Categories**

Underwriters Laboratories (UL) has a number of different product categories for kitchen equipment, three of which are classified as recirculating systems under NFPA 96, but which often collectively referred to as “recirculating”, “ventless”, or “ductless” systems. These products are tested to the same performance requirements but are quite different in their specific applications.

These are as follows:

- KNKG - Commercial Cooking Appliances with Integral Recirculating Ventilation Systems
- YZCT - Hoods/ Recirculating Systems, For Use with Specified Commercial Cooking Appliances
- KNLZ - Commercial Cooking Appliances with Integral Systems for Limiting the Emission of Grease-laden Air

### **Recirculating Systems KNKG**

Systems listed to KNKG consist of:

1. an integral ventilation and grease removal hood system which is recirculating in that exhaust air is returned to the space from which the intake air is drawn,
2. an integral fire extinguishing system, and
3. one or more appliances that are directly attached to the hood system.

Where cooking appliances are provided separately, the listing of the hood component will specify the particular appliances that are permissible as part of the recirculating system.

The fire extinguishing system of a recirculating system is typically designed to protect its integral hood and its appliance. The fire extinguishing system must comply with UL 197 or ANSI/UL 710B. There are exceptions for an extinguishing system within UL 710B, including:

- Enclosed deep-fat fryers, and
- Enclosed cooking compartments listed and tested to produce no more than 0.236 m<sup>3</sup>/s of grease at an exhaust rate of 500 cfm.

### **Recirculating Hood Assembly YZCT**

System listed to YZCT cover only the hood, recirculating and extinguishing systems. These hood systems resemble typical Class I ducted exhaust system, and have been listed for compatibility with specific appliances, and listing of the hood component will specify the particular appliances that are permissible for use under the recirculating hood

### **Grease-Limiting Appliances KNLZ**

Appliances listed to KNLZ have been tested to limit the emission of grease laden vapours. These appliances with an integral system to limit the emission may not directly comply with NFPA 96 requirements as a recirculating system because they do not contain an integral fire extinguishing system. However, some systems (such as popcorn making machines) currently listed under KNLZ may also have a KNKG listing which indicates that it is possible to add an integral fire extinguishing system and be qualified as a recirculating system under NFPA 96.

Other systems that are currently listed under the KNLZ category are oven-type appliances or have an enclosed cooking compartment of robust construction. With these appliances, the provision of a fire extinguishing system nozzle within the enclosure may not be practical, and hence a KNLZ system may be exempt by UL710B from having a fire extinguishing system.

Therefore, the City of Vancouver accepts the following measures as meeting the intent of the VBBL and VFBL for a recirculating system if an appliance listed under category KNLZ is proposed without a separate Type I hood and duct above the appliance, or without a fire extinguishing system for the hood and duct:

1. The cooking compartment must be of robust construction (e.g. enclosed oven of brick or steel construction, or an enclosed deep fat fryer of steel construction).
2. Where a hood and duct is provided for extraction of heat and steam, and the duct is enclosed in a required fire-rated enclosure, the hood and duct shall be of Type II construction.

**Maintenance**

Systems shall be maintained in accordance with the manufacturer’s instructions. Systems must not be operating without the filters or other grease removal devices required by the manufacturer to be in place.

Whether a recirculating or a grease-limiting system is installed, according to the Fire By-law, hoods, grease removal devices, fans, ducts, and other appurtenances shall be cleaned at frequent intervals to prevent surfaces from becoming heavily contaminated with grease or other residues. The cleaning shall be performed and tagged by a service agent as defined in the Fire By-law where any part of the hood, grease removal device, fan or duct is not readily accessible for cleaning, or the duct is enclosed in a fire-rated shaft.

**Other Considerations**

While a recirculating system has obvious benefits in that dedicated ducting and exhaust point are not required, there are other design considerations that must be considered.

A recirculating system is designed to remove grease particulate from the air, and must pass stringent emission standards in this regards. However, this does not capture gas phase emissions, nor does this remove heat or moisture from the air. Designers must consider the impact on the space in which these are located and confirm that the installation of these systems do not create additional concerns for health and safety. Excessive moisture, heat, contaminants, and noise may lead to unhealthy environments or unsafe working conditions over extend periods of time.

Further, maintenance is a major consideration of these systems. Many recirculating systems rely heavily on extensive filtration, which may lead to frequent filter replacements and their ensuing costs.

**Building Permit Requirements**

Although an installation of a recirculating system or a grease-limiting system may not involve a physical alteration of the building, a building permit is required in many cases. Refer to BULLETIN 2007-005-BU/PL/EL/EV/AD for requirements for a building permit application as a Class 4 cooking operation.

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