

Fire Protection Gypsum Chase Construction and Wrap
Alternatives for Commercial Kitchen Exhaust Ductwork and
1 or 2-Hour Fire-Rated Ventilation Air Ductwork in Canada

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Forward

Fire protection systems are employed to limit the spread of fire within ductwork to other locations in commercial buildings, and in the case of emergency ventilation air ductwork to externally insulate and protect the duct in order to provide the building occupants additional time to safely vacate the premises. The intention is to provide a fire-rating around the ductwork, to protect the air from high temperature, fire and smoke contamination within the ductwork for a period of time as in the case of emergency ventilation air ducts, and to reduce the risk of premature structural collapse of the ductwork in the event of a fire.

NFPA-96

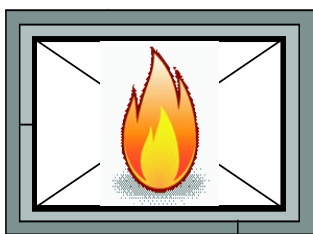
NFPA-96 is the building code specified standard for ventilation control and fire protection of commercial cooking operations in Canada and is the document that should be referenced for all aspects of commercial kitchen grease duct installations and clearance requirements.

This document is published to compliment the NFPA-96 document and provide information regarding requirements and recommendations for the construction of fire-rated gypsum duct enclosures and alternate methods for clearance and space reduction around commercial kitchen grease ductwork and either 1 or 2-hour fire-rated ventilation air ductwork.

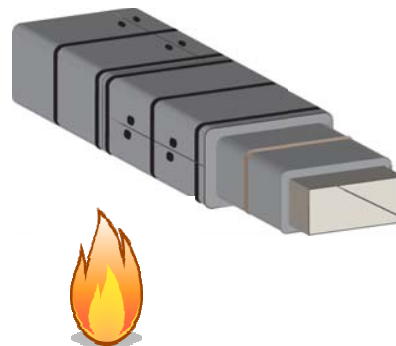
Hourly Rating requirements for Commercial Kitchen Grease Ductwork clearance reduction systems

The Canadian ULC internal fire testing methods for clearance reduction systems around Commercial kitchen grease ductwork do not provided an hourly rating. However, per NFPA-96 this ductwork must also contain an external fire rating based on the height of the building. Whenever the ductwork requires both an internal and external fire rating, the system employed must meet both requirements.

Internal Duct Fire Testing for Commercial Kitchen Exhaust Ductwork and other internal fire protection applications



External Duct Fire Testing for Commercial Kitchen Exhaust Grease Ducts and 1 or 2-hour external fire rated ductwork applications



Ductwork without dampers

Whenever ductwork does not contain dampers at the fire-rated wall or floor separation, the ducts must employ a fire-rated shaft or shaft alternative to maintain the required fire resistance.

Determining the suitability of a fire protection gypsum enclosure or alternative product for fire protecting ductwork.

Gypsum shaft alternatives such as fire protection ductwrap insulation systems can be approved for use in commercial kitchen grease ductwork if it has been subjected both to the required hourly external fire testing (per NFPA-96) tested per ISO 6944-A standard and the Canadian ULC grease duct requirements. Emergency ventilation air ductwork is only required to have an ISO 6944-A external fire rating. It is important to observe the system requirements for threaded support rod diameter and spacing of hanging supports as well as firestopping requirements through fire separations.

Fire-rated gypsum wall assemblies are normally constructed with gypsum panels on both sides of the wall separated by structural components such as metal studs. Gypsum shafts normally require a similar assembly as a fire rated wall separation as the fire-rated gypsum panels are separated by metal studs. One or more layers of fire-rated gypsum are normally required on both sides of the assembly to produce the 1 or 2-hour fire rating. The space required for a fire rated gypsum shaft protecting a commercial kitchen grease duct requires an allowance for the thickness of the two-sided gypsum assembly plus the additional NFPA-96 specified clearance (normally 6") between the duct and the inside of the limited combustible gypsum shaft. Structural integrity and the soundness of the gypsum panels are integral to the installation of a proper fire-rated gypsum shaft.

Fire Protection Gypsum Shaft Systems

It is important to note that gypsum shaft constructions have not traditionally been fire tested for use as a fire protection ductwork shaft enclosure and determining a suitable construction for this application can often be challenging. Prior to installing this type of fire protection system it is important for the gypsum manufacturer to provide certified documentation from the approval source (often the Building Material Evaluation Commission) regarding the specific system details and installation limitations. These system details must include the type and thickness of the gypsum panels, installation and spacing details and shaft corner construction. The gypsum manufacturer must also provide fire protection structural details that are to be used for supporting the shaft.

Using Fire Protection Insulation Ductwrap Systems as an alternative to gypsum shaft installations.

Fire protection ductwrap insulation systems approved for Canada employ high temperature insulation materials time rated for temperatures applications of approximately 1100°Celsius. Historically, the insulation was constructed from ceramic fibre which is classified with a 2B 'possible carcinogen' rating by the International Agency for Research on Cancer 'IARC'. Materials now used for this application normally utilize a soluble fibre alternative that is designed to dissolve in the human body and has been assessed for safe installation by the Ontario Construction Safety Association for use under the same safety guidelines as fiberglass or mineral wool insulation. 'Synthetic Vitreous Fibres' safety guidelines may be obtained directly from the Ontario Construction Safety Association.

In order for a gypsum shaft alternative to be considered for use in Canada the product must be tested to Canadian ULC guidelines for internal and also for a 2-hour fire rating for external fire commercial grease duct applications. Ventilation air ductwork typically requires a 1 or 2-hour exterior fire rating as specified by the NFPA-96 standard.

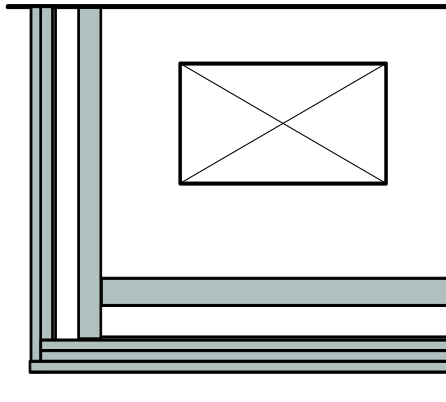
Once fire tested these applications must receive a 'listing' approval from a Standards Council of Canada approved testing laboratory indicating that the product has been tested, what the product is approved for, and the document also

contains a recipe for proper installation of the product. Typical Canadian approval agencies are Underwriters' Laboratories of Canada 'ULC or cUL', Warnock Hersey 'WH' or Intertek Testing Services 'ITS' .

Listing documents also include installation details such as:

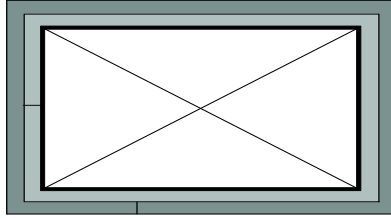
- Duct thickness and maximum size allowances
- weld-pinning approvals and spacing between the pins
- banding type, size, thickness and spacing
- Duct support details including sizes and spacing between supports
- Special application details such as cocoon wrapping of supports or 2 and 3-sided installation details

Fire-rated Gypsum Shaft Installation Requirements



1. All commercial kitchen exhaust – fire-rated gypsum shaft installations must meet NFPA-96 guidelines for clearance between the ductwork and gypsum shaft.
An exception to this requirement can be made if the gypsum system has been fire tested for application under Canadian ULC guidelines and contains a relevant for Fire Resistant Ductwork 'FRD' listing through a Standards council of Canada approved fire testing laboratory - normally ULC or WH.
2. All fire-rated gypsum shaft assemblies must offer documented construction details specifically approved for the required fire protection hourly rating by the Ontario Building Material Evaluation Committee.
Manufacturer's documentation shall not be considered as a substitute for these documents unless submitted for approval by the mechanical project engineer and the authority having jurisdiction.
3. Gypsum shaft support systems for supporting the ductwork and gypsum shaft must have written authorization for acceptance for the fire protection application by the gypsum manufacturer.
4. All gypsum used for fire-protecting commercial kitchen exhaust ductwork or emergency ventilation air ductwork must be reviewed for soundness and be void of penetrations.
Any penetrations of the shaft must be submitted to the engineer and authority having jurisdiction prior to installation.
5. All installed firestops shall be in compliance with an approved ULC-S115 listed system.
6. Upon completion, the gypsum manufacturer or their designated agent shall review all fire-rated gypsum shaft installations and offer written confirmation that to the best of their knowledge that the shaft is properly installed and sufficiently supported for the application.

Installation Requirements for Fire-rated FRD listed Ductwrap Insulation



1. Application of fire-rated thermal insulation is required for use on commercial kitchen grease ductwork or other ductwork such as emergency ventilation air ductwork as a gypsum shaft alternative. Material shall be applied directly to the ductwork in accordance with the ULC or WH listed system and manufacturer's instructions.
2. 1-hour exterior rated installations must contain a minimum of 1 ½" thickness of minimum 6 lb density fire protection ductwrap insulation to minimize heat infiltration into the ductwork during a fire.
3. 2-hour exterior rated installations or commercial kitchen grease duct installations must contain a minimum of 3" installed thickness of minimum 6 lb density fire protection ductwrap insulation to minimize heat infiltration into the ductwork during a fire.
4. Access door openings insulation must be snugly fitted and free from overlaps or other potential sources of heat leakage around the opening perimeter.
5. Ductwrap shall be encapsulated with a tear resistant cover to ensure protection of the product during and after installation. Any damage to the product during installation shall be rectified by the installer to the satisfaction of the insulation manufacturer, engineer and authority having jurisdiction.
6. Applicable Ductwork fire rating standards are:
 - *NFPA-96 – standard for Ventilation Control & Fire Protection for Cooking Operations*
 - *Canadian ULC guidelines for Grease Duct Testing*
 - *ISO-6944 Duct 'A' Standard with 1 or 2-hour external duct fire rating*
 - *ULC-S115-95 – Firestop testing standard*
 - *ULC-S102 for 25/50 Flame Spread & Smoke Development Rating*
7. Commercial kitchen grease ductwork or 2-hour external fire-rated emergency ventilation air ductwork requiring 2-layers of fire-rated soluble fibre thermal insulation must be installed with staggered butted seams per listed system instructions in order to minimize heat infiltration.
8. 1-hour external fire-rated emergency ventilation air ductwork requiring the use of 1-layer of fire-rated soluble fibre thermal insulation must be installed with overlapping seams.

Overlapped seams are preferred for insulating single layer 1-hour fire rated installations to further ensure that fire & heat do not penetrate any seams.
9. All banding, weld-pins, support rods and anchors must be properly sized and spaced to match the duct size per listing requirements. All banding, anchors and support rods not matching the system requirements will be removed and replaced at the installing contractor's expense.
10. Upon completion of the ductwrap installation and prior to enclosure of the ductwork, the ductwrap insulation manufacturer or their designated agent shall review all fire-rated insulation ductwrap installations and offer written confirmation that to the best of their knowledge that the shaft is properly installed and sufficiently supported for the installed fire-protection application.