



# Concord Department of Fire and Life Safety

## FIRE MARSHAL'S OFFICE

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### Restaurant Safety Issues

Normally when we think of a restaurant and the things that are associated with the occupancy type we think of ordinary construction, cooking operations and eating/drinking. Generally the incidents that fire and medical responders face involve these issues in some form or fashion. However, with the progress of foodservice, newer technologies are being used that can endanger the lives of firefighters in ways not previously seen.

Carbonization of soft drinks is an area of great concern. Systems utilizing small-pressurized CO<sub>2</sub> cylinders are being replaced with bulk CO<sub>2</sub> systems. Bulk liquefied systems offer an economic benefit for restaurants in the carbonization of soft drinks, due to the expansion ratio of liquid to gas of Carbon Dioxide it is often times more feasible to store liquid instead of gaseous CO<sub>2</sub>.

Storage of Liquefied Carbon Dioxide is accomplished through Cryogenic tanks housed inside the restaurant. Loading of this tank is performed by a series of connections from the tank through the restaurant interior walls and ceilings to an exterior connection point. A CO<sub>2</sub> delivery tanker comes periodically to the restaurant, connects to the exterior tank fill connections and refills the interior tank.

A myriad of hazards exist for firefighters on this subject from catastrophic overpressure of these bulk systems in fire situations to leaks and spills of gaseous and liquefied products during tank refilling operations. Sudden releases of pressure from the tank and or piping systems can cause impact injuries or death. Besides fire situations, slow leaks from these systems can create medical calls. Health concerns for exposure to carbon dioxide range from frost bite and freeze due the extreme coldness of the product to death from asphyxiation.



Mixing System Foreground - Tanks Background



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Buildings containing these systems should be identified and preplanned for scenarios of fires, leaks and spills and medical responses. Buildings containing these systems should be marked and identified with Hazardous Materials Identifications systems. NFPA 704 signs and/or other means should be utilized.

Firefighting tactics should include assessment of the condition of these systems and shutdown of tanks. Stabilization of the system can include a controlled bleed-off of the product to removal by pumping off the product to a tanker. Medical responses include health hazards created from exposure to Carbon Dioxide. Once again leaks must be contained and the scene stabilized.



Exterior NFPA 704 Sign & Fill connection door label.



CO2 Tank (Left) and Water Mixing Tank (Right)

Safety officers charged with monitoring fire conditions and scene operations need to be educated in the workings of these systems. Tank and piping conditions should be constantly monitored. Areas containing tanks and piping should be cordoned off and only essential personnel allowed in these areas. Any signs of impending rupture should promptly reported and scene operations halted until such hazards have been neutralized.

Fire investigators should be properly trained in the operation of these systems. Pipe and tank ruptures can change structural components and hamper fire scene investigation. Once again piping and tanks should be constantly monitored and any changes of these items should be reported and personnel evacuated until the hazard has been neutralized.

Another area of concern in restaurant responses is Fire Extinguishing Systems placed in cooking exhaust hoods. These systems are utilized to control or extinguish fires involving cooking operations. These systems are effective and efficient.

Systems are mounted in cooking exhaust hoods and other situations required by Code. The system contains a dry chemical or newer technology "Wet Chemical – UL 300 System" (similar to firefighting foam) and distribution of the chemical to the fire area is accomplished through a system of pipes and nozzles. System activation is accomplished either through the melting of a fusible link in the plenum area of the cooking hood or the pulling of a manual pull station. Other auxiliary functions of these systems include devices and relays that shutdown LP

and Natural Gas fuel valves, HVAC shutdown in the kitchen area and the disconnection of electricity to electrical outlets, devices and appliances situated beneath the cooking exhaust hood.

Due to incompatibilities between ABC/BC Dry Chemicals, "Wet Chemical" systems require the installation of a K-Class extinguisher. This extinguisher utilizes the same agent as the hood system. Firefighters should avoid using a Dry Chemical extinguisher on a Wet Chemical application. The mixing of these agents will hamper the systems ability to adequately extinguish a fire occurring under a cooking hood.



K-Class Extinguishers

The hazard created by this system is not the chemical but the method by which it is discharged. These Extinguishing Systems use pressurized gases to expel the chemical from tanks through the pipes and nozzles.



Hood Suppression System – Agent Tank (Red)

If the system has discharged prior to fire department arrival this is not an area of concern. However, if the system has not discharged firefighters could suffer injuries from the discharge of these systems during firefighting, salvage and overhaul operations. The same danger applies to fire investigators involved in investigation activities.

The status of systems must be checked prior to personnel being allowed in areas with these systems. Safety officers should be familiar with the operation of these systems. Any systems found to be operational should be identified and disengaged. Personnel involved in firefighting operations should be aware of the hazards and suppression operations should be conducted in a safe manner.

Responses to incidents of these types require the fire department to notify the County Health Department. The health department requires the restaurant to be shut down and a health inspection conducted. All violations and issues must be corrected and approved by the health department prior to a restaurant being allowed to reopen.

Understanding the hazards and preplanning is the key to handling a situation involving these types of incidents. Fire departments must be aware of the locations that utilize these systems and fire department personnel educated in the use of these systems. Once the training aspect has been handled, operating guidelines and procedures must be implemented to safely and effectively mitigate these hazards.

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Fusible Link



System Nozzles – Fusible Links (In Hood)