Division 21 Fire Suppression
SECTION 21 00 00
FIRE SUPPRESSION AND EXHAUST SYSTEM

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. The Contractor is referred to the Instructions to Bidders and General Conditions, NYCHA Contracts; the Special Notice to Contractors; the Form of Proposal; the Form of Bid Bond; Division 01 - General Requirements of the Contract Specifications; the Contract Drawings and all Amendments and Addenda thereto; all of which govern the Work of this Section.

1.2 SCOPE OF WORK

A. This Section includes fire suppression system capable of protecting all hazard areas associated with commercial grade cooking equipment surfaces shown on contract drawings. The fire-extinguishing system shall include the following:

1. Piping and piping specialties.
2. Tank for wet chemical agent and associated supporting devices.
3. Wet chemical agent.
4. Nozzles, as extinguishing agent discharge devices.
5. Detection and alarm devices
6. Portable Fire extinguisher.
7. Range Hood
8. Ducted Exhaust duct and fan, for exhaust hood
9. Iron work, including related support accessories indicated and specified as required for outdoor, platform mounted Kitchen hood exhaust fan.
10. General space induced ventilation by Kitchen Exhaust fan as scheduled.
11. Detection, and connect to existing Community Center Fire Alarm panel.
12. Disconnect radiators and cap all lines.

B. Related Sections or contract specification items include the following:

1. Division 11 40 00 Food Service Equipment
2. Reference contract drawings for descriptive scope of work for provision of indoor and outdoor ductwork, and related specified accessories.
3. Reference contract drawings descriptive scope of work for provision of steam supply and return modification work as shown for relocation of pipe lengths, pipe fittings required to connect to existing building risers. Where Existing pipe take-offs from Supply and return mains are shown, the existing fittings will be capped, and where new pipe and necessary pipe fittings are shown shall be piped to allow clearance and space to install new products specified.

1.3 DEFINITION

A. R-102: Wet chemical fire suppression system applicable to commercial type kitchens.

1.4 SYSTEM DESCRIPTION

A. Description: Engineered, fixed-type, manually and automatically actuated, Wet Chemical fire-extinguishing system to protect against possible grease related fires due to Kitchen Hazard surfaces. System shall include extinguishing agent tanks and devices as described in NFPA 17A.

B. Systems hall consist of sized closed type fixed nozzles, complying with UL 300 and suitable for discharging the R-102 Wet Chemical extinguishing agent as a specially formulated aqueous solution of organic salts with a low PH designed for flame knockdown and foam sacrament of grease related fires.

1.5 PERFORMANCE REQUIREMENT

A. Design shall be fixed-type, automatically actuated system capable of suppressing fires in the areas associated with cooking equipment such as hood and ventilating equipment, ducts, plenums, and filters, fryers, griddles, range tops, and gas grille.

B. The system shall be engineered type having minimum and maximum guidelines established by the manufacturer and listed by Underwriters Laboratories, UL.

C. Piping and Piping Specialties 175 – psig minimum working pressure, Chrome plated Schedule 40 Black steal pipe.

1.6 SUBMITTALS

A. Product Data: For the following:

1. Pipe and fitting materials and methods of joining for sprinkler piping.
2. Pipe hangers and supports.
3. Mechanical gas Valve.
4. Proportioning tanks and proportioning devices.
5. Discharge devices. Include flow characteristics.
6. Control, Detection and alarm devices. Include electrical data.

1.7 BASE BID

A. The Base bid shall be in accordance with drawings and specifications.

B. The Base bid shall include the disconnection and capping of 2 steam convectors, pipe and fittings as described or shown in contract drawings.

C. The base bid shall include relocation of steam supply and return lines as required for installation of Ansul system.

D. The Base bid shall include installation of all product specified, all intermediary material and labor described and as necessary to allow for new installation of the commercial grade fire suppression system specified.

E. Contractor shall indicate the size of the wet chemical system, the number of nozzles, and the number of fusible links in the base bid.

F. Contractor shall state in his/her proposal any proposed substitution of materials or methods of installation different from that specified. Any alternates shall be listed on the proposal as contractor alternates.

1.8 GUARANTEES

A. Upon completion of this work, the Owner shall be furnished with a written guarantee stating that all the fire protection equipment, materials, and work performed are in full accordance with the approved shop, design drawings, and specifications. The guarantee shall also state that the work and all subsequent Change Orders are fully guaranteed for a minimum of one year from the date of final acceptance, and any equipment, materials, or work which may prove defective within that time will be replaced at no cost to the building Owner.

PART 2 - SHOP DRAWINGS

2.1 INSTRUCTION PROGRAM

A. The Contractor shall provide all necessary product information and shop drawings, showing exact location of all equipment, piping, conduit, number and placement of nozzles.

B. Signed and sealed by a qualified professional engineer. Include design calculations. Include the following for each hazard area, drawn to scale:

   1. Include plans, elevations, sections, details, and attachments to other Work. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

   2. Wiring Diagrams: Power, signal, and control wiring. Contractor to indicate manufacturer-installed and field-installed wiring.

   3. Design Calculations: Indicate amount of wet chemical agent, and nozzle discharge required for each hazard surface.

   4. Plans: Show the following:

      a. Tanks and devices, piping, discharge devices, detector and alarm devices, and accessories.

      b. Method of securing pipes to building structure.

      c. Equipment and furnishings.

C. Permit-Approved Drawings: Working plans, prepared according to NFPA 17A, and provisions on product listing under UL-300 that have been approved by authorities having jurisdiction. Include design calculations.

D. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

E. Maintenance Data: For components to include in maintenance manuals specified in Division 01.

2.2 QUALITY ASSURANCE

A. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Development is located and who is experienced in providing

engineering services of kind indicated. Engineering services are defined as those performed for installations of the system described in this section.

B. Drawings to indicate size, profiles, and dimensional requirements of R-102 fire-extinguishing system to be based on the specific system indicated.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction, and marked for intended use.

2.3 FIRE SUPPRESSION SYSTEM SIGNS

A. Contractor to provide standard metal signs in accordance with ICBO, and all local code requirements.

B. Provide a discharge warning sign at hood. The sign shall read:

CAUTION

This area is protected by a wet chemical extinguishing system.

In case of fire, pull remote pull station for the wet chemical suppression system, and call the local fire department. Leave Area immediately after.

2.4 CLOSEOUT ACTIVITIES

A. Demonstration and Instructions:

1. Demonstrate that components, except discharge assemblies, are functioning properly and in conjunction with controls system.
2. Submit integrated step-by-step test procedure for approval 30 days prior to start of demonstration.
    a. Perform visual inspection and overall review of system installed.
    b. Place minimum of three UL-listed recording analyzers in space.
    c. Provide certification that testing devices have been checked by a recognized testing authority within two weeks of date of demonstration.
    d. When applicable, certify that replacement charge can be provided within 24 hours of demonstration.

B. Training: Train NYCHA's personnel on operation and maintenance of system.

1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
2. Provide minimum of two hours of training for NYCHA personnel to be conducted at site and by manufacturer’s authorized training personnel.

PART 3 - PRODUCTS

3.1 FIRE SUPPRESSION CONTROL SYSTEM

A. Hood Fire Control System:

1. System shall be of the fixed nozzle, wet chemical type, double-tank, each at 3 gallon capacity, designed to extinguish cooking equipment fires adjacent to and under the exhaust hood. System shall be mechanically operated, with operation initiated by a fusible link temperature detector, which on temperature rise causes a tank to puncture, forcing wet chemical through distribution piping and nozzles located in exhaust duct, plenum and over cooking appliances.
2. Provide stainless steel type of housing/enclosure with cover for the regulating release mechanism, the chemical storage agent tank and all other items and accessories. Cover shall be stainless steel and shall contain an opening for visual status indicator.
3. System shall have full NYC BS&A or MEA approvals and be so marked. System shall comply with UL-300 standards. Installation of system shall include a three-year service/inspection contract that will commence as of the Fire Department acceptance testing completion date. All exposed piping shall be stainless steel or chrome plated. Agent storage tank shall be carbon steel, pressurized only when system is activated.
4. Provide system and all necessary items and mechanical cable actuated gas main valve. Gas valve shall be Mechanical, connected to Fire Alarm panel for indicating fire alarm signal as required and indicated on plans, and installed by a licensed plumber.
5. Contractor shall provide two (2) demountable metal frames 8-1/2" by 11" with glass face secured to wall adjacent to kitchen main entrance, approximately 60" above floor. Frames shall contain the following information:
    a. Schematic drawing of hood and duct system in building, showing location in building outline, exhaust fan and duct riser.
    b. A list of operating instructions for exhaust system requirements, with blank spaces for entering of dates of hood cleaning.
6. A three-year inspection contract for hood fire system calling for NYC Building Code required inspection every six (6) months.
7. Provide according to plans, One fire extinguisher with 40BC rating, capacity 10 lbs., and shall be mounted on kitchen wall at a suitable location or as shown on plan at 60” above the floor, fully visible from the hooded area.
8. The Contractor shall file for and procure all NYC approvals required for use of fire control system. The Contractor shall file the kitchen hood fire suppression system under separate application.
9. The Contractor shall provide all documents for the kitchen hood fire suppression system including drawings signed and sealed by a licensed Professional Engineer or Registered Architect retained by the Contractor, filing, inspections, controlled inspections, sign-offs by a Licensed Fire Suppression Installer, etc., as required by the NYC Fire Department and Building Department.
10. Electrically operated gas valves shall be installed in kitchen and interlocked with auxiliary systems and cooking equipment to provide proper control and safe operation as well as emergency features. The interlocks and control schemes shall be as follows:
    a. Main Valve: The main valve shall be capable of shutting off all gas flow to the kitchen in case of emergency. The control station shall contain a key switch to energize the gas valve and a red mushroom push button labeled "Emergency Gas

Shutoff". The system shall function as a manually operated emergency shutoff system and need to be interlocked with auxiliary Fire Alarm Panel.

b. Exhaust Hood Fire Extinguishing System: A main valve shall be provided to shut down gas service to all cooking equipment under the kitchen exhaust hood. The gas valve shall be mechanically operated by a fusible link provided with the foam for extinguishing system. Provision of mechanical gas shutoff valve shall meet manufacturer recommendations and shall be installed where shown on plans. The equipment cannot be turned on unless the fan is running. The hood exhaust fan shall not turn off when the fire extinguishing system is turned on. The exhaust shall continue to operate to aid in the disbursement of the extinguishing agent. The starter for the hood exhaust fan shall be inter-locked with the control circuits of the kitchen equipment under this contract.

11. Provide control to enable space exhaust fan, KEX-1 upon call from thermostat. For manual operation of KEX-1, provide Manual on-off switch. For Automatic control of KEX-1, provide moisture proof wall thermostat T-2.

B. Manufacturer: Subject to compliance with all requirements, provide hood fire control system “Model R-102” as manufactured by Ansul Company, or equal.

1. Ansul, Inc.
2. Kidde, Fire suppression Systems Inc.
3. Pyro-chem, Inc.
4. Or equal.

C. Installation

D. Responsibility for installation, certification, and filing through sing-off shall be by one NYC Fire Department certified fire-suppression system installer.

3.2 PIPES

A. Black-Steel Pipe: Schedule 40. chrome-plated, or stainless steel pipe conforming to ASTM A120, A53, or A106.

3.3 PIPE FITTINGS

A. Install Pipe fittings coordinated with pipe material and size specified. Malleable, Threaded Fittings: ASME B16.3.

3.4 WET CHEMICAL TANKS, AND TANK ENCLOSURE

A. Quantity shown or as required

3.5 DISCHARGE DEVICES

A. Nozzles: Closed, non-air aspirating type complying with UL 300 and suitable for discharging the R-102 Wet Chemical extinguishing agent as a specially formulated aqueous solution of organic salts with a low PH designed for flame knockdown of grease related fires.

B. Each discharge nozzle shall be tested and listed with the R-102 system for the specific application used. Individual nozzle tips orifice shall be protected against cooking grease build-up, using a blow-off cap.

C. Cartridges shall be a sealed.

D. Mechanical type regulated release mechanism shall be spring-loaded and provide the expellant gas supply to two agent tanks. The factory regulator deadest at 100psi with an internal relief of 130 to 150 psi.

3.6 DETECTION DEVICES

A. Detectors shall be the fusible link type designed to separate at a pre-tested temperature

3.7 RANGE HOOD AND DUCTED EXHAUST

A. Exhaust Hood: Stainless steel hood, model per drawing schedule or Model SND-2 BY Captive air with features required for make-up air requirements shown on plans, meeting manufacturer recommended installation and maintenance requirements and as listed below:

1. The dimension of the hood and flues shall be checked at the site prior to fabrication. The hood shall be provided with removable aluminum enclosure panels at the sides and front. The bottom of the hood shall be not less than 6'-6" above the finished floor. Installer may substitute Greenheck or Captive Air model SND-2 with 12” or 18”
2. Hood shall be of all stainless steel construction, not less than 18 gauge, type 304. All exposed surfaces shall be #4 finish, square edges, dimensions as shown on drawings. All angles and flats not of stainless steel shall be painted two coats of rust resistant paint, color to be selected by Architect.
3. Hood shall be high velocity centrifugal grease extractor with air inlet opening parallel to the cooking equipment being ventilated and sized to operate at the air quantities and static pressure shown on the Mechanical Drawings.
4. Hood shall provide a minimum of 280 CFM./lf., or as required by Code.
5. Hood shall contain one or more removable "extractor inserts" with a grease extraction efficiency of 90%. Extractor inserts shall be constructed of stainless steel and shall contain full-length horizontal self-draining baffles. Extractor inserts shall be easily removable for periodic cleaning.
6. Hood shall be equipped with necessary hanging brackets and anchors to securely attach to the overhead duct and structure above.
7. Hood shall be equipped with a minimum of two (2) UL listed vapor proof, grease proof and moisture proof switch-operated fluorescent fixtures prewired to a single connection point.
8. Provide hood with flue flanges as required and connect by means of a flue-connecting piece to the flue outlets. Make final connection to duct roughing provided. Provide all necessary trim of the same material and finish of the hood to finish the unit in a professional manner. Trim shall include all sectional removable panels (30" max. length) between top of hood and finished ceiling on all exposed sides and at ends.
9. Concealed full-length grease trough and cups.
10. Integral supply air balancing.
11. Hood shall be UL Listed and recognized by BOCA, ICBO, NSF and NFPA Standard No. 96 and must meet all local codes.
12. Hood Exhaust Duct shall be 16 gauge of welded construction and insulated according to contract drawing.

13. Hood Exhaust Fan, as specified on drawing shall exhaust the plenum under kitchen hood.

14. Make-up air Fan for supply of tempered air to replace hood exhaust with 5 to 10% positive pressure for replacement of the exhausted air.

B. Manufacturer: AVTEC stainless steel seamless construction, or by Prestige High-Riser Deluxe, Ventmaster, or equal.

3.8 HOOD EXHAUST FAN

A. Fan shall be with tag name KEF-1, up-blast roof mounted fan of belt drive type as required by exhaust fan schedule model CUBE-300XP-50 made by Greenheck or equal.

B. The spun aluminum exhaust fan shall be centrifugal belt-driven. The fan wheel shall be centrifugal backward-inclined, constructed of aluminum. Wheels shall be statically and dynamically balanced.

C. Motor pulleys shall be adjustable for final system balancing. A disconnect switch shall be factory installed and wired from fan motor to a junction box installed within the motor compartment.

D. An “Easy Access Door” in the housing shall be provided. The Access Door shall be code compliant. Silicone gasket shall be rated for 400 deg. F. The fan housing shall also include two threaded drain connections from the motor location to allow for grease and moisture removal. The bearing and drive cover shall be sealed with silicone gasketing. Felt or neoprene shaft seals are not acceptable.

E. The fan housing shall be constructed of heavy-gauge aluminum with ridged internal support structure.

F. The wheel shall be of the non-overloading backward inclined centrifugal type with aluminum construction. Wheel shall be statically and dynamically balanced. The wheel cone and fan inlet cone shall be carefully matched and shall have precise running tolerances for maximum performance and operating efficiency.

G. Turned, precision ground and polished steel shafts shall be sized so the first critical speed is at least 25% over the maximum operating speed for each level of construction.

H. Bearings shall be heavy duty grease lubricated and self-aligning. Bearings shall be selected for a basic rating fatigue life L (10) of 100,000 hours L (50) life of 500,000 hours at maximum operating speed for each level of construction. Extended copper lubrication lines to the external side of the fan housing with special fitting shall be provided.

I. Drives shall be sized for a minimum of 150% of driven horsepower. Pulleys shall be of the cast type centrifugal fans shall bear the AMCA Certified Ratings Seals for both sound and air performance. The fan shall also have a UL 762 label for commercial kitchen hood exhaust systems.

J. The fan shall include the following accessories:

1. Flanged inlet and outlet.

2. Copper lubrication lines with approved fittings on the external housing.

3. Large bolted access door with silicone gasket rated for 400 deg. F.

4. Continuously welded belt tube.

5. Labyrinth shaft seal.
6. UL 762 listed for continuous smoke & grease airstreams up to 300 deg. F.
7. Spring isolators for platform mounting.
8. Two oversized access doors.
9. Set of mounting rails.
10. Manufacturer spring type Vibration isolator accessories.
11. Outdoor mounted, NEMA-3R&NEMA-4 heavy duty disconnect switch.
12. Controls as required.
13. Contractor to reference plans for provision of fan support, specified iron work for floor support and specified mounting of outdoor ductwork.
14. Motor cover.
15. Reference contract drawing for related installation notes, floor support and application requirements.

K. Hood Exhaust Fan model shall be as scheduled on drawings and fan manufacturer shall be Greenheck or equal.

END OF SECTION