SYSTEM DESIGN

The ANSUL® R-102 Restaurant Fire Suppression System may be used on a number of different types of restaurant cooking appliances and hood and duct configurations. The design information listed in this section deals with the limitations and parameters of this pre-engineered system. Those individuals responsible for the design of the R-102 system must be trained and hold a current ANSUL® certificate in an R-102 training program.
The R-102 and the PIRANHA systems use compatible agents and components, therefore, they may be used together for cooking appliance, hood, and duct protection. The primary AUTOMAN Release can be either an R-102 or a PIRANHA AUTOMAN Release and can actuate up to two additional R-102 or PIRANHA Regulated Actuators. Any combination of the maximum number of regulated actuators can be used.

- Both systems must actuate simultaneously.
- Each system must be designed and installed per its appropriate manual.
- Adjacent appliances requiring protection must be protected with the same type of system, either R-102 or PIRANHA, unless the center-to-center spacing between the adjacent R-102 and PIRANHA nozzles is no less than 36 in. (914 mm).
- When appliances are protected with R-102 nozzles, the hood and connecting duct above those appliances cannot be protected with PIRANHA nozzles.
- Mixing systems in a common plenum is not allowed.

One of the key elements for restaurant fire protection is a correct system design. This section is divided into sub-sections:

- Nozzle Placement Requirements
- Tank and Cartridge Requirements
- Actuation and Expellant Gas Line Requirements
- Distribution Piping Requirements
- Detection System Requirements
- Manual Pull Station Requirements
- Mechanical Gas Valve Requirements
- Electrical Gas Valve Requirements
- Alarm Initiating Switch Requirements
- Electrical Switch Requirements

Each of these sections must be completed before attempting any installation. System design sketches should be made of all aspects of design for reference during installation.

NOZZLE PLACEMENT REQUIREMENTS

This section gives guidelines for nozzle type, positioning, and quantity for duct, plenum, and individual appliance protection. This section must be completed before determining tank quantity and piping requirements.

Duct Protection – Single Nozzle

All duct protection is UL Listed without limitation of maximum duct length (unlimited length). This includes all varieties of ductworks both horizontal and vertical including ducts that run at angles to the horizontal and ducts with directional bends.

Note: Ducts from multiple hoods connected to a common ductwork must be protected in compliance with NFPA 17A and all local codes.

The R-102 system uses different duct nozzles depending on the size of duct being protected.

GENERAL INFORMATION

1. Nozzles must be located 2 in. to 8 in. (51 mm to 203 mm) into the center of the duct opening, discharging into the opening. See Figure 4-1.

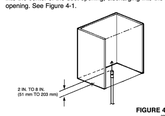

FIGURE 4-1
418078

2. In installations where a UL Listed damper assembly is employed, install the duct nozzle beyond the 8 in. (203 mm) maximum, to a point just beyond the damper assembly that does not interfere with the damper. Exceeding the maximum of 8 in. (203 mm) in this way does not void the UL Listing of the system.
3. Previously listed three flow number and five flow number duct protection detailed in earlier published manual (Part No. 418087-06) can also still be utilized.

DUCT SIZES UP TO 50 IN. (1,270 mm) PERIMETER
16 IN. (406 mm) DIAMETER

- One 1W nozzle = one flow number
- 50 in. (1,270 mm) perimeter maximum
- 16 in. (406 mm) diameter maximum

DUCT SIZES UP TO 100 IN. (2,540 mm) PERIMETER
32 IN. (812 mm) DIAMETER

- One 2W nozzle = two flow numbers
- 100 in. (2,540 mm) perimeter maximum
- 32 in. (812 mm) diameter maximum

NOZZLE PLACEMENT REQUIREMENTS (Continued)

Plenum Protection (Continued)

HORIZONTAL PROTECTION – OPTION 1
1N Nozzle Single Bank Protection
One 1N nozzle protects 10 linear feet (3.0 m) by 4 ft (1.2 m) of single filter bank plenum. Mount the nozzles in the plenum, 2 in. to 4 in. (51 mm to 102 mm) from the face of the filter, centered between the filter height dimension, and aimed down the length. The nozzle must be positioned 0 in. to 6 in. (0 mm to 152 mm) from the end of the plenum to the tip of the nozzle. See Figure 4-9.

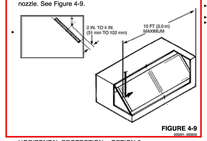

FIGURE 4-9
418083, 418084

HORIZONTAL PROTECTION – OPTION 2
1W Nozzle – "V" Bank Protection
One 1W nozzle protects 6 linear feet (1.8 m) of "V" bank plenum. Mount the nozzle horizontally, positioned at 1/3 the filter height down from the top of the filter. Nozzles can be located at 6 ft (1.8 m) spacings on longer plenums. Position the nozzle 0 in. to 6 in. (0 mm to 152 mm) from the end of the hood to the tip of the nozzle. See Figure 4-10.

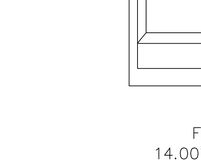

FIGURE 4-10
418084, 418085

Two 1N Nozzles – "V" Bank Protection
Two 1N nozzles protect 10 linear feet (3.0 m) by 4 ft (1.2 m) wide of "V" bank plenum. Mount the nozzles in the plenum, 2 in. to 4 in. (51 mm to 102 mm) from the face of the filter, centered between the filter height dimension, and aimed down the length. Position the nozzle 0 in. to 6 in. (0 mm to 152 mm) from the end of the plenum to the tip of the nozzle. See Figure 4-11.

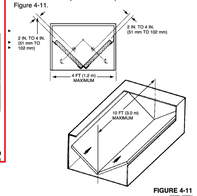

FIGURE 4-11
418085, 418086

For a plenum, either single or "V" bank, with a linear extension longer than 10 ft (3.0 m), each bank may be protected using one 1N nozzle every 10 ft (3.0 m) or less depending on the overall length of the plenum. See Figure 4-12. The nozzles may point in the opposite directions as long as the entire plenum area is protected, and the 10 ft (3.0 m) limitation is not exceeded. See Figure 4-13. The nozzle positioning shown in Figure 4-14 is not an acceptable method of protection because the plenum area directly under the tee is not within the discharge pattern of either nozzle.

FIGURE 4-12
418086

ANSUL

Agent Distribution Hose for Restaurant Fire Suppression Systems

Features

- Tested and listed for use with ANSUL® R-102 and PIRANHA Restaurant Fire Suppression Systems through Underwriters Laboratories (UL/ULC), and LPCB (Loss Prevention Certification Board)
- Hose diameter of 1/2 in. (13 mm) and length of 5 ft (1.5 m)
- Two male NPT swivels assembled to hose ends for easy installation
- Includes 3 ft (0.9 m) long restraining cable
- Includes restraining cable hardware kit for various mounting options
- Offers convenience of rolling out castered appliances for cleaning without disconnecting agent piping

Application

NFPA 17A Standard for Wet Chemical Extinguishing Systems requires that movable cooking equipment shall be provided with a means to ensure that it is correctly repositioned in relation to the appliance discharge nozzle during cooking operations. In many cases, the appliance discharge nozzle is hard piped to the appliance and renders the movement of the appliance difficult, requiring disconnection of the discharge piping.

The Agent Distribution Hose is designed for use with commercial kitchen appliances manufactured with or resting on casters (wheels/rollers) that have hard piped fire suppression systems.

Description

The Agent Distribution Hose is a component of the suppression system that allows the appliance to be moved for cleaning purposes without disconnecting the appliance fire suppression discharge piping and ensures positive positioning of the appliance nozzle.

The hose features 1/2 in. (13 mm) swivel connectors which reduce stress at both ends of the hose connector. An outer coating inhibits growth of bacteria, mould and mildew on the discharge hose.

Underneath the covering, the hose is comprised of heavy-duty, flexible, corrugated 304 stainless steel tubing. A tightly woven stainless steel braid prevents corrugations from stretching as the appliance is moved. The temperature range in which the agent distribution hose will function properly is 32 °F to 130 °F (0 °C to 54 °C). The hose must not be kinked, twisted, or have sharp bends when installed or when equipment is pulled away from the wall. The hose must also not be concealed within or run through any wall, floor, or partition, and must not have any direct exposure to excessive heat or radiant flame from the cooking appliances.

The hose assembly includes a restraining cable kit to limit the appliance movement within the range (length) of the flexible hose. The agent discharge hose can be easily installed at initial installation or as a retrofit to your current fire suppression system.

Ordering Information

Part No.	Description	Shipping Weight
435982	Agent Distribution Hose and Restraining Cable Kit – Consists of a 5 ft (1.5 m) long Agent Discharge Hose, a 3 ft (0.9 m) long Restraining Cable, and a Restraining Cable Hardware Kit	3.5 lb (1.6 kg)

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tyco Fire Protection Products

One Stanton Street / Marinette, WI 54143-2542, USA / +1-715-735-7411 / www.ansul.com

Form No. F-2010214-02

ANSUL

Bulletin

by Tyco Fire Suppression & Building Products
One Stanton Street
Marinette, WI 54143-2542
www.ansul.com

Bulletin No. 5653

DATE: April 29, 2010

TO: All Authorized ANSUL R-102 System Distributors and OEMS's

FROM: Product Management – Restaurant Systems

SUBJECT: Non-UL-Listed Fire Protection for Conveyor Pizza Ovens

The UL300 Standard: *Fire Testing of Fire Extinguishing System for Protection of Commercial Cooking Equipment* does not currently address a test protocol for conveyor pizza oven protection. However, in many jurisdictions, the Authority Having Jurisdiction has required fire protection for conveyor pizza ovens. In the past, appliances not addressed in the UL300 test standard have been protected by following listed protection options for other appliances with similar operating characteristics. Generally, these appliances presented a more severe hazard than the appliance in question. In the case of conveyor pizza ovens, chain broiler protection was utilized.

To confirm recommended protection, we recently conducted a conveyor pizza oven fire test following the chain broiler test protocol outlined in UL 300, substituting fatty hamburgers with a grease coated pizza crust, to emulate the cooking process used by conveyor pizza ovens.

Prior recommendations for conveyor pizza ovens larger than the two 1N horizontal nozzle limitations for a chain broiler, suggested using four 1N nozzles, each positioned at the end corners and aimed diagonally across the chain within the oven. Based on the actual fire testing, we now recommend two 245 nozzles per conveyor: one nozzle is positioned at the inlet and one nozzle is positioned at the outlet of the conveyor pizza oven on the same side of the oven and aimed at the opposite corners. Utilizing two 245 nozzles as recommended is suitable protection for conveyors larger than the limitations for a chain broiler but not exceeding 36 in.(96.5 cm) wide x 70 in (177.8 cm) long.

If you should have questions pertaining to this bulletin, please contact your U.S. District Manager or International Area Manager; or call Technical Services as noted below.

Main Telephone Numbers: 1-800-862-6785 or 1-715-735-7415
Customer Services: Press 2 • Technical Services: Press 4 • Training Services: Press 6 • Quality Assurance: Press 8
Literature Fax Orders: 1-800-543-9822 or 1-715-732-3474

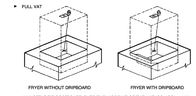
APPLIANCE PROTECTION (Continued)

Fryer – Single Nozzle Protection (Continued)

TABLE 4-2: MAXIMUM AREA DIMENSIONS – SINGLE NOZZLE FRYER PROTECTION (Continued)

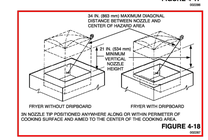
Max. Size Frypot Only	Max. Size Overall With Dripboard	Type of Nozzle	Nozzle Height Above Top of Fryer	Nozzle Location
Full Vat 14 1/2 in. x 16 1/2 in. (368 mm x 419 mm)	Full Vat 14 1/2 in. x 26 1/2 in. (368 mm x 673 mm)	2907	16 in. to 21 in. (406 mm to 533 mm)	See Figure 4-17
Full Vat 19 1/2 in. x 19 in. (495 mm x 482 mm)	Full Vat 19 1/2 in. x 25 3/8 in. (495 mm x 644 mm)	2907	13 in. to 16 in. (330 mm to 406 mm)	See Figure 4-17
Full Vat 19 1/2 in. x 19 in. (495 mm x 482 mm)	Full Vat 19 1/2 in. x 25 3/8 in. (495 mm x 644 mm)	3N	See Figure 4-18	See Figure 4-18
Full Vat 18 in. x 18 in. (457 mm x 457 mm)	Full Vat 18 in. x 27 3/4 in. (457 mm x 704 mm)	3N	25 in. to 36 in. (635 mm to 889 mm)	See Figure 4-19

• FULL VAT



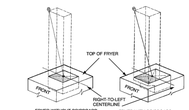
2W NOZZLE TIP POSITIONED OVER THE MIDPOINT OF THE HAZARD AREA 4 3 IN. (76 mm) FROM THE MIDPOINT ALONG THE LONGEST SIDE OF THE HAZARD AND 1 IN. (25 mm) FROM THE MIDPOINT ALONG THE SHORTEST SIDE OF THE HAZARD AND AIMED AT THE MIDPOINT OF THE COOKING AREA.

FIGURE 4-17
418096



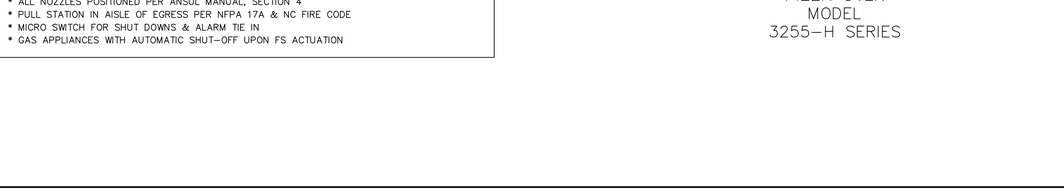
2N NOZZLE TIP POSITIONED ANYWHERE ALONG OR WITHIN PERIMETER OF COOKING SURFACE AND AIMED TO THE CENTER OF THE COOKING AREA.

FIGURE 4-18
418097



NOTE: 3N NOZZLE TIP MUST BE LOCATED WITHIN THE PERIMETER OF THE SURFACE AREA WITHIN THE FRONT HALF OF THE FRY POT AND AIMED AT THE CENTER.

FIGURE 4-19
418098, 418099



ANSUL R–102 DETAILS

- DETECTOR TEMP PER ANSUL MANUAL PAGE 3–13 REV 13
- ALL PIPING 3/8" SCH. 40 BLACK STEEL PER ANSUL MANUAL PAGE 4–79 TO 4–87, REV 13
- ALL FITINGS 3/8" 150# BLACK STEEL PER ANSUL MANUAL PAGE 4–79 TO 4–87, REV 13
- ALL NOZZLES POSITIONED PER ANSUL MANUAL, SECTION 4
- PULL STATION IN AISLE OF EGRESS PER NFPA 17A & NC FIRE CODE
- MICRO SWITCH FOR SHUT DOWNS & ALARM TIE IN
- GAS APPLIANCES WITH AUTOMATIC SHUT–OFF UPON FS ACTUATION

Reviewed for Fire Code Compliance
Harnett County North Carolina
Leslie Jackson
05/14/2025 9:49:58 AM

MARK	DESCRIPTION	BY	DATE

Seal

Pre–engineered
Fire System
Seal Not
Required

SHOP DRAWINGS

BFPE INTERNATIONAL
FIRE, SAFETY & SECURITY CONSULTANTS
1515 NORTH BRIGHT LEAF BOULEVARD
SUITE 105
SMITHFIELD, NORTH CAROLINA 27577
(919) 934-0000
CLAYTON, NORTH CAROLINA 27520
(919) 550 – 2699

DRAWN BY: MWE
CHECKED BY:
SCALE: N.T.S
SHEET NO. 1 OF 1 SHEETS
DATE: May 8, 2025
PROJECT NO: N/A

Sheet Contents:
Two Ansul R–102 Fire Systems

Pizza Hut #2597
185 Mittie Haddock Drive
Cameron, NC 28326

DRAWING NO.:
FS100

BUILDING COMMERCIAL

910-893-7525

www.harnett.org

PERMIT NUMBER
BCOM2502-0009

JOB ADDRESS: 185 MITTIE HADDOCK DR	**PERMIT SUBTYPE:** COMMERCIAL ADD OR ALTER	**PARCEL NO:** 9585-60-1624.000
DESCRIPTION: Upfit of Pizza Hut	**DATE ISSUED:** 5/12/2025	**DATE EXPIRED:**
PLAN NAME:	**ZONING DISTRICT:** COMMERCIAL - 9.46 acres (100.0%)	

APPLICANT: Shahlari Frank 16200 Midland Dr Shawnee, KS 66217	**PHONE:** (913)708-1665 **EMAIL:** frank@lickelarchitecture.com
CONTRACTOR: DunRite Inc - General Cont 714 Fenway Ave Chesapeake, VA 23323	**PHONE:** (757)337-0267 **EMAIL:** matt@dunriteus.com
OWNER: HMS KIDS INC 185 MITTIE HADDOCK DR CAMERON, NC 28326 CAMERON, NC 28326-7681	**PHONE:** **EMAIL:**

REQUIRED INSPECTIONS

INSPECTION TYPE	APPROVAL	DATE	COMMENTS
FM FIRE ALARM			
FM FIXED FIRE SUPPRESSION			
FM SPRINKLER CERT TEST			
FM SPRINKLER FLOW			
FM SPRINKLER FLUSH			
FM SPRINKLER HYDRO			
HOOD SYSTEM			
ROUGH IN			
EH SANITATION FINAL			
FM FINAL			
FINAL**			