



PYE BARKER FIRE & SAFETY

2401-A PLANTATION ROAD
ROANOKE, VA. 24012
PHONE 540-265-0555
FAX 540-265-0554

**SHEETZ
NE CORNER NC 24-87
& SAWYER ROAD SR 2482**

**SCOPE OF WORK:
INSTALL UL-300 FIRE SUPPRESSION
SYSTEM**

**PLAN'S BY:
JAMES HALE**

James Hale

James@greersupply.com

**NICET IV
FIRE PROTECTION ENGINEERING TECHNOLOGY
SPECIAL HAZARDS SUPPRESSION SYSTEMS
CERTIFICATION #113277**



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NOTES:

- 1) APPLIANCES ARE TO BE SHUT DOWN WHEN THE FIRE SUPPRESSION DISCHARGES.**
- 2) HAND PULL TO BE INSTALLED 10' TO 20' FROM THE HOOD.**
- 3) K-CLASS FIRE EXTINGUISHER TO BE INSTALLED.**
- 4) FRESH AIR SHALL SHUT DOWN ON DISCHARGE.**
- 5) NORMAL OPERATING TEMPERATURE SHALL BE MEASURED AT THE FUSIBLE LINK LOCATION ABOVE THE APPLIANCES AND THE APPROPRIATE LINK SHALL BE INSTALLED.**
- 6) HORN/STROBE OR FIRE ALARM IF PRESENT IS TO BE ACTIVATED UPON SYSTEM DISCHARGE.**
- 7) DUCT SENSOR TO BE INSTALLED IN THE EXHAUST.**
- 8) EXHAUST FAN SHALL COME ON AND REMAIN ON WHEN SYSTEM IS ACTIVATED.**



**NATIONAL INSTITUTE FOR CERTIFICATION
IN ENGINEERING TECHNOLOGIES®**

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**BE IT KNOWN THAT
James E. Hale**

**IS HEREBY AWARDED CERTIFICATION AT
Level IV**

IN SPECIAL HAZARDS SYSTEMS

**BASED UPON SUCCESSFUL DEMONSTRATION OF REQUISITE KNOWLEDGE,
EXPERIENCE AND WORK PERFORMANCE AS SET FORTH BY THIS INSTITUTE.**

Certification Valid Through 04/01/2023

CERTIFICATION NUMBER 113277

Curtis A. Beck

CHAIRMAN OF THE NICET BOARD OF GOVERNORS

A DIVISION OF THE NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS



It is hereby certified that

JAMES HALE

GREER'S SUPPLY COMPANY INC. -ROANOKE

Has successfully completed the training course for

**ANSUL R-102 Restaurant Fire Suppression System
Recertification**

Completed this **6/14/2020**

This certificate is considered valid for a period of three years
from completion date and linked to the attendee and the
company mentioned above.

Training Hours: **8**

Katherine A. Adrian
Global Director
Technical and Training Services
Johnson Controls

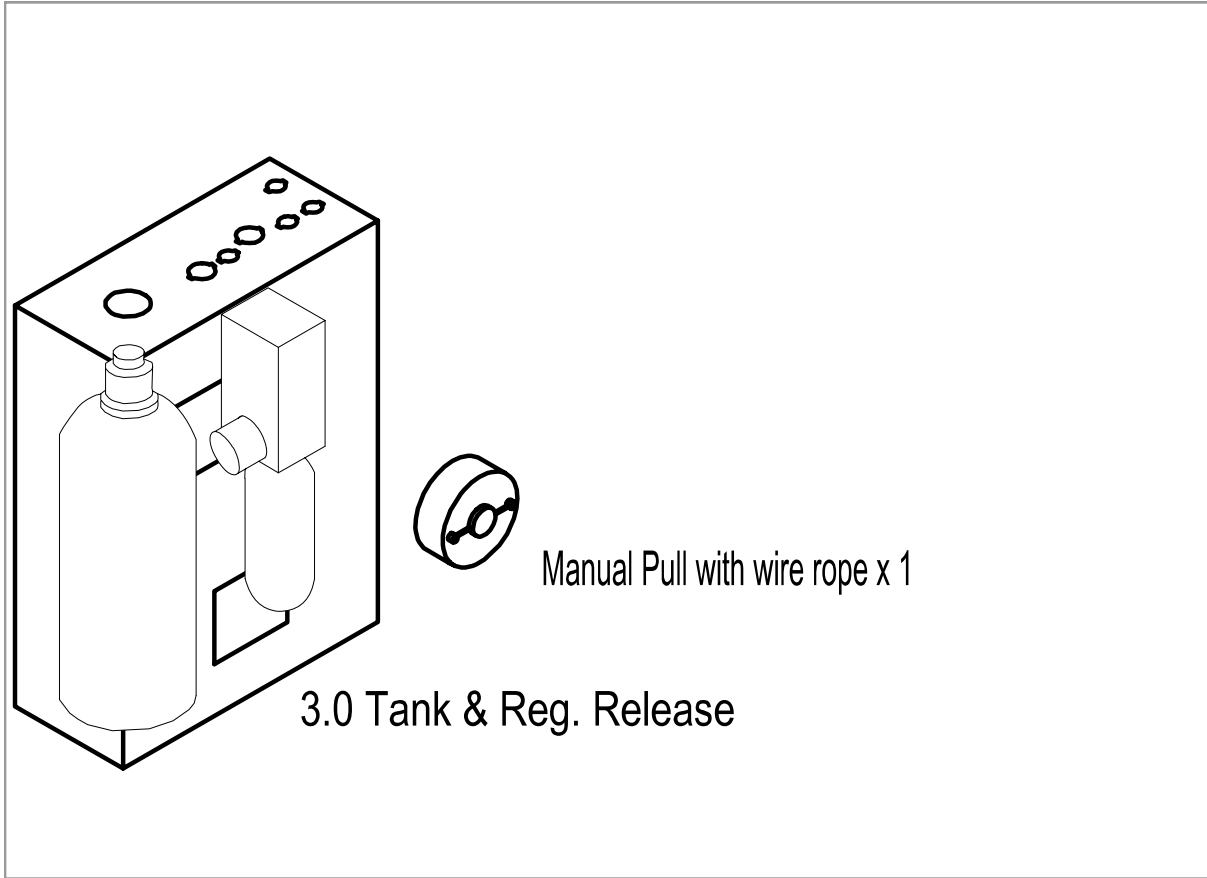




Install Date: SPRING 2021
SHEETZ
NE CORNER NC 24-87 & SAWYER ROAD SR 2482
CAMERON, NC

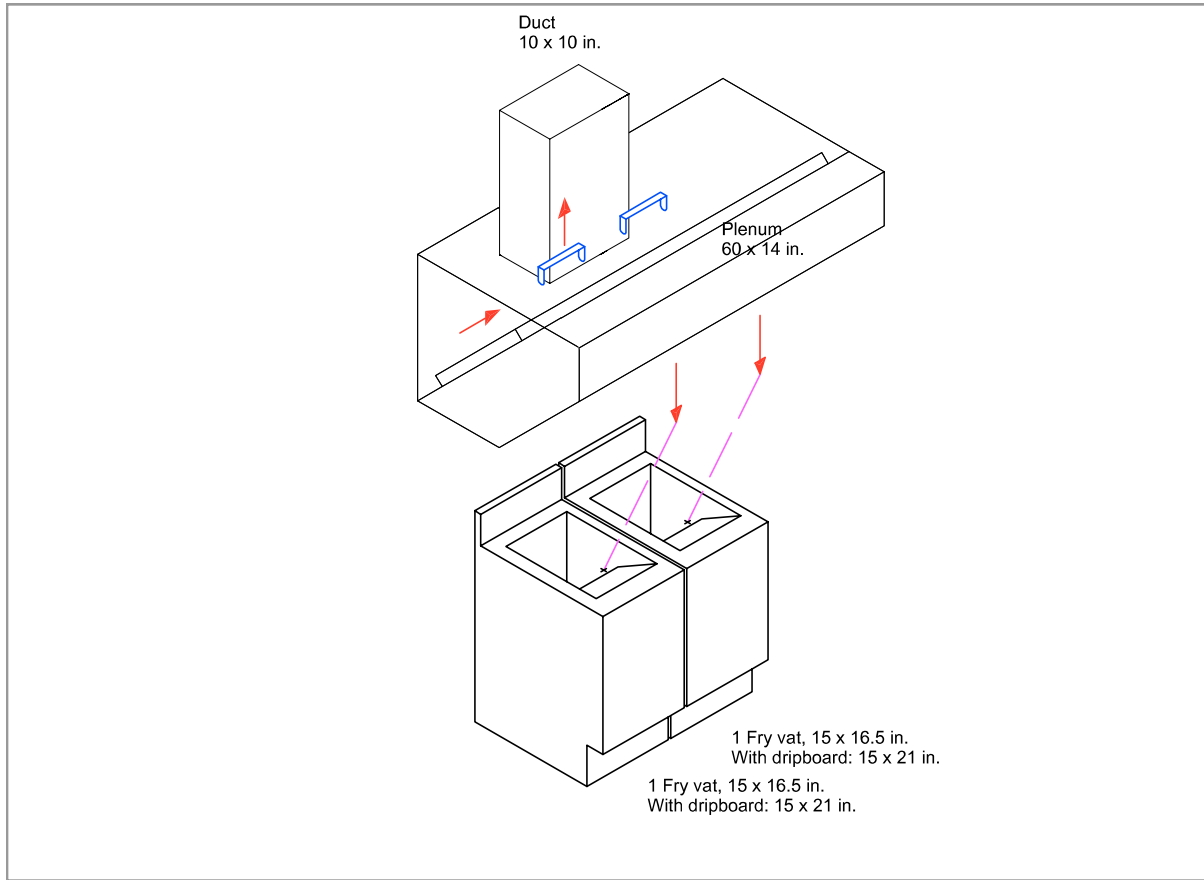
PYE BARKER FIRE
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JAMES HALE
540-265-0555
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2705176378

FRYER HOOD





FRYER HOOD
 Untitled Layout



Flow Summary:

Coverage	Overall Dimensions	Nozzle	Flows	Nozzle Location
Hood: Low-Profile	60 x 24 in.	1N	1	2-4 in. from filter face, center of height dimension, aimed down filter length.
Duct: Square	10 x 10 in.	1W	1	2-8 in. into center of duct opening, aimed up
Fryer: 1 vat, dripboard	15 x 36 in.	3N	3	25-35 in., FRONT HALF of perimeter, aimed at center
Fryer: 1 vat, dripboard	15 x 36 in.	3N	3	25-35 in., FRONT HALF of perimeter, aimed at center
Total Flow Points			8	



Install Date: SPRING 2021
SHEETZ
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CAMERON, NC

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Notes

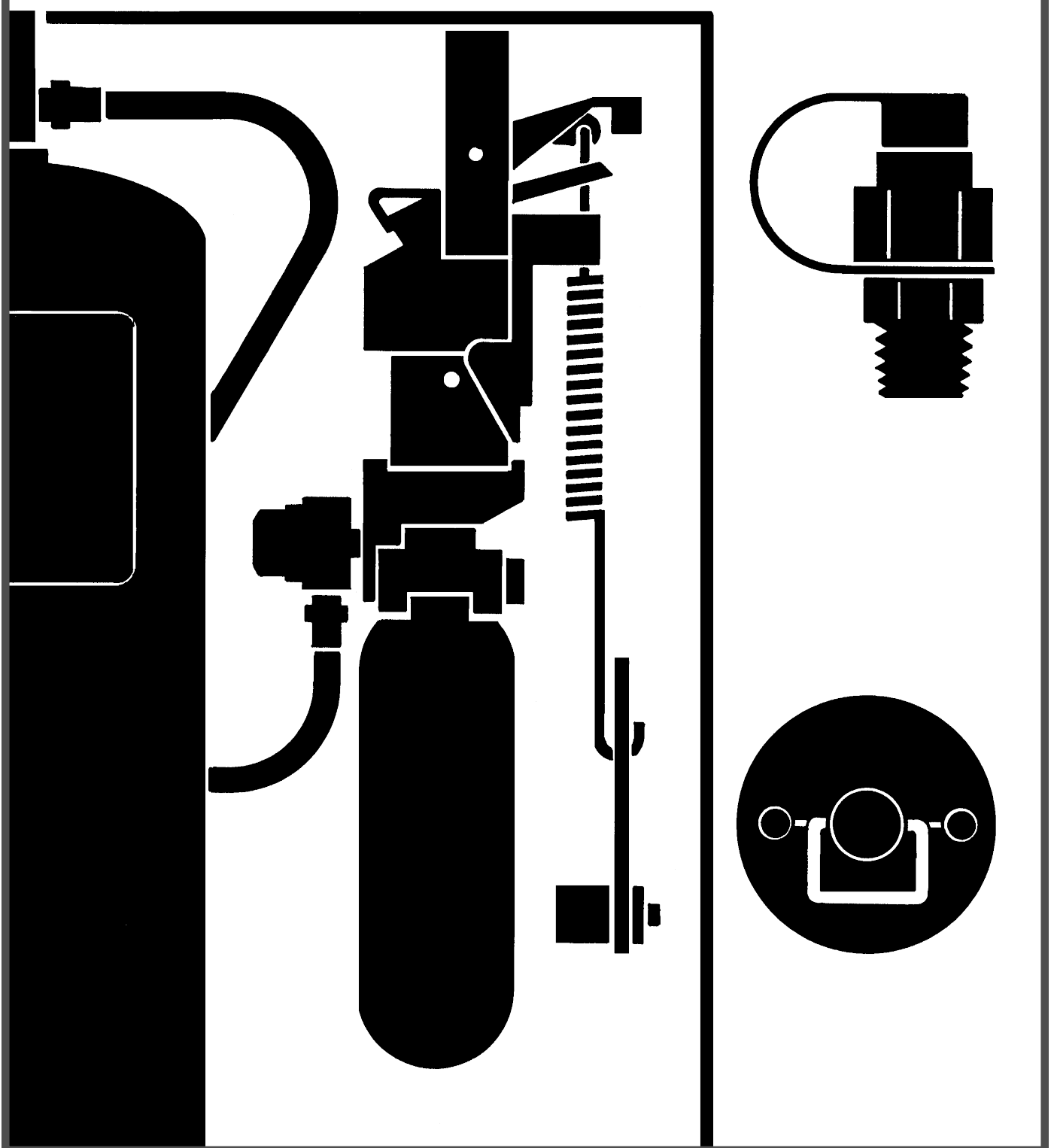
Fusible Links:

=> To determine actual fusible link ratings, temperature readings must be taken during peak cooking time.

R-102 RESTAURANT FIRE SUPPRESSION SYSTEM



DESIGN, INSTALLATION, RECHARGE, AND MAINTENANCE MANUAL



EXTINGUISHING AGENT

ANSULEX Low pH Liquid Fire Suppressant (1.5 gallon – Part No. 79694 or 3.0 gallon – Part No. 79372) is a potassium-based solution designed for fast knock-down and suppression of grease-related fires. The agent is shipped in plastic containers which provide one complete tank charge. (Refer to Section V, Page 5-2.1, for maximum agent fill capacity.) Agent storage life expectancy is twelve years and can be stored at a temperature of -40 °F to 130 °F (-40 °C to 54 °C). **Note: When installing agent in R-102 system, temperature range is 32 °F (0 °C) to 130 °F (54 °C).** The distributor must record the batch numbers and date of shipment receipt to be filed with each installation record.

"ANSULEX" LOW pH LIQUID FIRE SUPPRESSANT

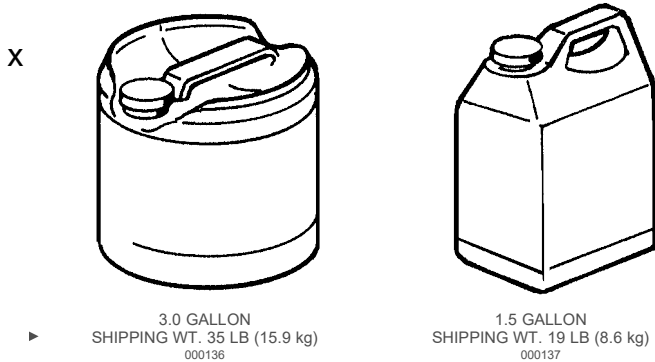


FIGURE 3-1

REGULATED RELEASE ASSEMBLY (MECHANICAL)

The AUTOMAN Regulated Mechanical Release Assembly (Part No. 429853) contains the regulated release mechanism, expellant gas hose for agent tank hookup, and enclosure knockouts to facilitate installing actuation piping; expellant piping; detection system; and additional equipment. This regulated release assembly is used in single, double, and multiple-tank systems and must be mounted to a rigid surface. The release mechanism can be used to interconnect both the actuation and expellant gas lines as required per system design. The regulator is designed to allow a constant flow of gas into the tank at 110 psi (7.6 bar) when the system is actuated. The agent tank must be ordered separately.

In single, double, and multiple-tank systems, the provided expellant gas hose connects the agent tank to the bottom outlet of the regulator. In double and multiple-tank system configurations, the back outlet of the regulator is used as an expellant gas feed for one additional tank-enclosure or tank-bracket hookup. The enclosure contains the required knockouts to facilitate this connection. If a pressure switch is to be attached to the regulator, additional fittings are required.

The tank is mounted within the enclosure. The tank contains an adaptor/tube assembly with a burst disc union. The burst disc helps prevent siphoning of the agent up the pipe due to significant temperature fluctuations in the area where the tank is located. The tank is stainless steel and, under normal conditions, requires hydrostatic testing every twelve years.

The detection and additional equipment required per system design are connected to the release mechanism. The enclosure contains knockouts to facilitate detection and additional hookups.

The system can be actuated automatically or manually.

Automatic actuation occurs when a fusible link within the detection system separates in a fire condition. Manual actuation of the system occurs when personnel pull on the remote manual pull station pull ring.

AUTOMAN REGULATED RELEASE ASSEMBLY (MECHANICAL)

NOTE: AGENT TANK MUST BE ORDERED SEPARATELY (SEE PAGE 3-3)

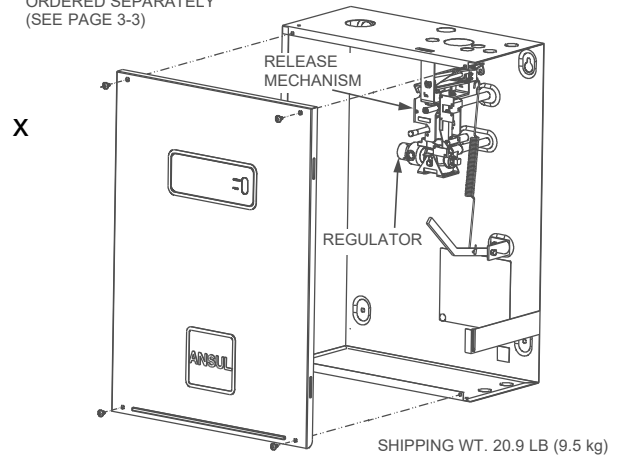


FIGURE 3-2
009454

REGULATED RELEASE ASSEMBLY (ELECTRICAL)

The AUTOMAN Regulated Electrical Release Assembly (Part No. 429856) is identical to the mechanical version except it also contains a factory installed 120 VAC solenoid and electrical switch.

The solenoid is used to provide electrical actuation of the release mechanism. The electric switch is used to protect the solenoid by opening the circuit to the solenoid once the system is fired. Additional electrical switches can be added as required for automatic equipment and gas shut-off accessories, as well as initiating audible and visual alarms.

AUTOMAN REGULATED RELEASE ASSEMBLY (ELECTRICAL)*

NOTE: AGENT TANK MUST BE ORDERED SEPARATELY (SEE PAGE 3-3)

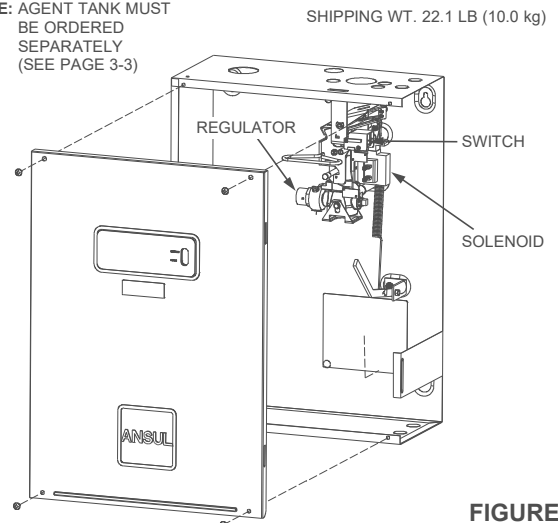


FIGURE 3-3
009455

* **Note:** AUTOMAN Regulated Electrical Release (Part No. 429856) is not intended to be used with electric detection.

REGULATED ACTUATOR ASSEMBLY

The Regulated Actuator Assembly (Part No. 429850) contains the regulator, pneumatic actuator, expellant gas hose for agent tank hookup, and enclosure knockouts to facilitate installing expellant piping. This assembly is used in multiple-tank systems and must be mounted to a rigid surface.

The regulator contains two outlets 135° apart. One outlet is used to interconnect the expellant gas hose to the enclosed agent tank. The other outlet connects an expellant gas line to an additional enclosure or bracket assembly. The regulator is designed to allow a constant flow of expellant gas into each agent tank at 110 psi (7.6 bar).

The pneumatic actuator is designed to puncture the expellant gas cartridge seal upon receiving pressure from the regulated release assembly actuation piping. The enclosure contains a knockout to facilitate distribution piping hookup.

REGULATED ACTUATOR ASSEMBLY

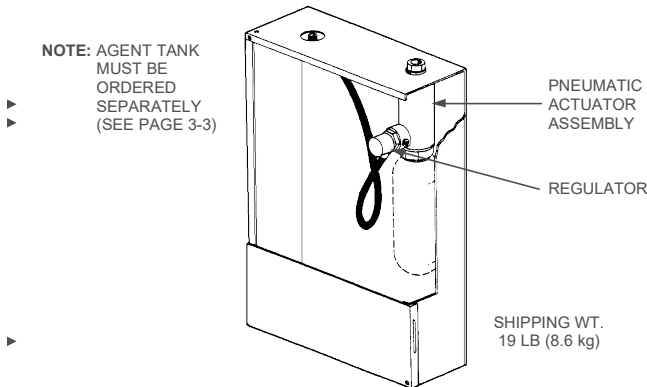


FIGURE 3-7
000143

AGENT TANK ASSEMBLY

The agent tank shipping assembly (3 Gallon (Part No. 429862) and 1.5 Gallon (Part No. 429864)) consists of a stainless steel tank and an adaptor/tube assembly. The adaptor/tube assembly contains a burst disc. The burst disc prevents agent leakage due to significant temperature fluctuations in the area where the tank is located. Under normal conditions, the tank requires hydrostatic testing every twelve years. The date of manufacture is stamped on the tank nameplate.

The tank is shipped uncharged and must be filled with only ANSULEX Low pH Liquid Fire Suppressant during installation.

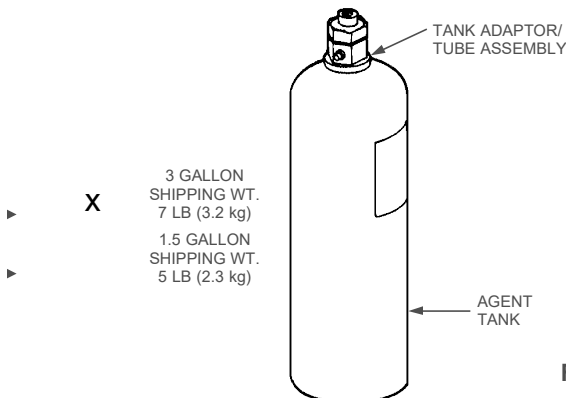


FIGURE 3-8
000140

OEM RELEASE/BRACKET ASSEMBLY (FOR OEM IN-CABINET USE ONLY)

The OEM Regulated Mechanical Release/Bracket Assembly (Part No. 79493) contains the same regulated release mechanism as the standard AUTOMAN Regulated Release Assembly. The OEM Regulated Electrical Release/Bracket Assembly (Part No. 437324*), is identical to the mechanical version except that it contains a factory installed 120 VAC solenoid and electrical switch. These release/bracket assemblies must be installed in a suitable equipment enclosure either horizontally or vertically. They contain all the necessary mounting and conduit holes needed to fully install the assembly. The agent tank is installed separately and need not be bracketed once it is piped and filled. **Note:** OEM Release/Bracket Assembly must be installed high enough in cabinet so that there is sufficient room to install and remove cartridge.

*Note: OEM Regulated Electrical Release/Bracket Assembly (Part No. 437324) is not intended to be used with electric detection.

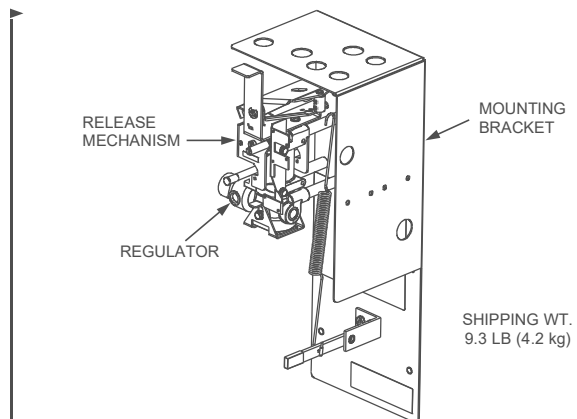


FIGURE 3-9
009457

OEM REGULATED ACTUATOR ASSEMBLY

The OEM Regulated Actuator Assembly (Part No. 418691) includes the regulator, pneumatic actuator, expellant gas hose and OEM bracket. Also available is an OEM Regulated Actuator Assembly with all the above mentioned components except for the bracket. This assembly is Part No. 418522.

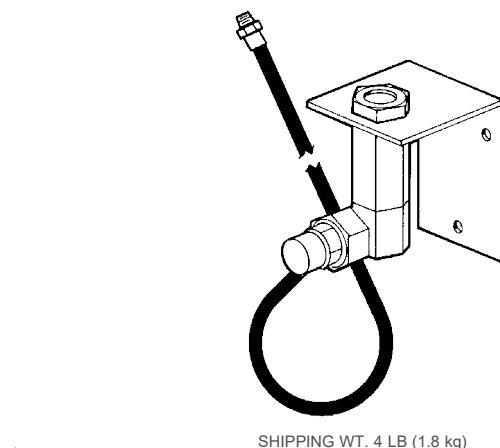


FIGURE 3-10
002225

GAS CARTRIDGES

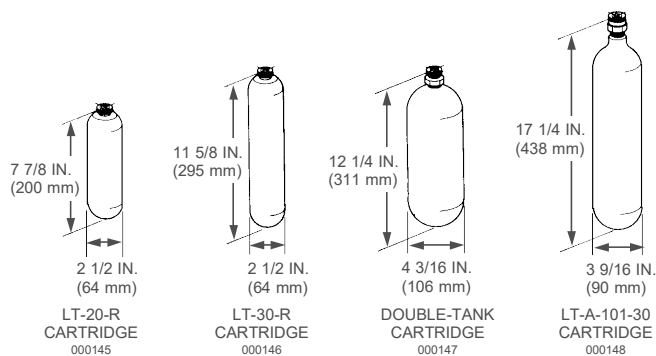
The R-102 system uses gas cartridges to store nitrogen or carbon dioxide expellant gases under pressure until the system is actuated, at which time the cartridge seal is punctured and the released gas expels liquid agent from one or more tanks through the discharge piping and out the discharge nozzles.

Four nitrogen gas cartridges and three carbon dioxide gas cartridges are available as shown in Figure 13.

Cartridges noted as TC/DOT are both Transport Canada (TC) and Department of Transportation (DOT) approved. Cartridges noted as DOT are Department of Transportation approved only.

Cartridge selection options are provided in Section 4 under Tank and Cartridge Requirements.

NITROGEN GAS CARTRIDGES



CARBON DIOXIDE CARTRIDGES

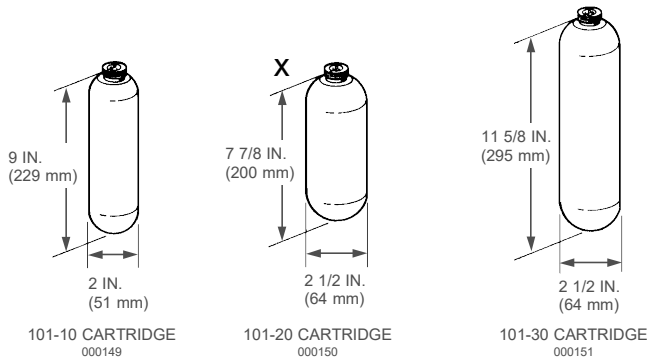


FIGURE 3-13

Additional cartridge shipping assemblies are available for European and Australian requirements.

Cartridge Description	European Part No.	Australian Part No.	TC/DOT Part No.
LT-20-R	428440	428948	423429
LT-30-R	428441	426553	423435
Double Tank	428446	426563	423493
LT-A-101-30	428442	426555	423491
101-10 – CO2	428443	N/A	423439
101-20 – CO2	428445	N/A	423441
101-30 – CO2	428444	N/A	423443

Note: For 101-10 cartridge, Part No. 15850 is DOT only.

NOZZLES

There are 11 types of discharge nozzles each designed to distribute the liquid agent in a uniform pattern throughout the hazard area:

1. 1/2N Nozzle
2. 1F Nozzle
3. 1W Nozzle
4. 1N Nozzle
5. 2W Nozzle
6. 230 Nozzle
7. 245 Nozzle
8. 260 Nozzle
9. 290 Nozzle
10. 2120 Nozzle
11. 3N Nozzle

Although these nozzles are similar in appearance and have certain common parts, the tip of each nozzle is designed for a specific application and must only be used in those areas. See Nozzle Application Chart in Section 4 – System Design, for individual nozzle usage. Nozzles are shipped with metal blow-off caps included.

▶ A 25 pack of Nozzle O-rings (Part No. 439848) is also available.

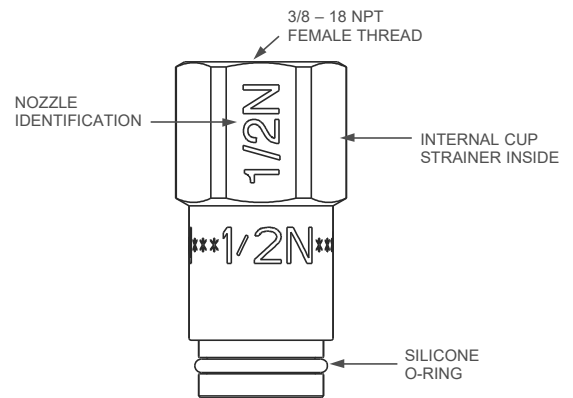


FIGURE 3-14
009474

Nozzle Identification Chart

Nozzle Type	Nozzle Part No.	Package Quantity	Nozzle Flow No.	Nozzle Material
1/2N Nozzle	439837	9	1/2	Chrome-Plated Body
1F Nozzle	439836	9	1	Chrome-Plated Body
1W Nozzle*	439839	25	1	Chrome-Plated Body
1N Nozzle*	439838	25	1	Chrome-Plated Body
2W Nozzle	439840	25	2	Chrome-Plated Body
230 Nozzle	439842	25	2	Chrome-Plated Body
245 Nozzle	439843	25	2	Chrome-Plated Body
260 Nozzle	439844	9	2	Chrome-Plated Body
290 Nozzle	439845	9	2	Chrome-Plated Body
2120 Nozzle	439846	9	2	Chrome-Plated Body
3N Nozzle	439841	9	3	Chrome-Plated Body

*Stainless steel versions are available in the 1W nozzle (Part No. 439864) and the 1N nozzle (Part No. 439865).

SILICONE LUBRICANT

Dow Corning Compound 111 (Part No. 78112) is available in a 5.3-ounce tube. Compound has excellent qualities for sealing and lubricating system components.

SECTION 3 – SYSTEM COMPONENTS

UL EX3470 ULC EX3470
 PAGE 3-6 REV. 11 2014-SEP-01

SWIVEL ADAPTOR

The Swivel Adaptor Assembly consists of a swivel nut, swivel body and swivel ball. All are chrome-plated. The swivel adaptor allows any nozzle to be rotated approximately 30° in all directions. Swivel Adaptors must be ordered as a Swivel Adaptor Shipping Assembly (Part No. 423572) which contains 25 Swivel Adaptors or Part No. 419385, which contains 9 Swivel Adaptors.

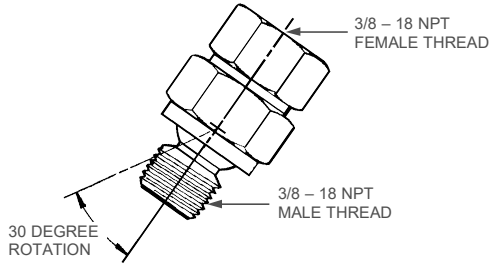


FIGURE 3-15
000003

METAL BLOW-OFF CAP

The Metal Blow-Off Cap helps keep the orifice of the nozzle free of grease or other substances that could interfere with agent distribution.

- ▶ The Metal Blow-Off Cap Package (Part No. 439861) contains 10 blow-off caps.
- ▶ Also available is a 10 pack of Stainless Steel Blow-Off Caps (Part No. 439866).

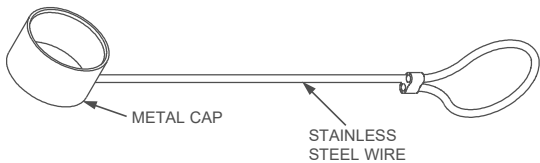


FIGURE 3-16
009475

REDUCING COUPLING

The reducing coupling (Part No. 436228) is made of stainless steel material with 3/8 in. x 1/2 in. NPT inlet threads. If necessary, the reducing coupling can be utilized when installing the Agent Distribution Hose Line Kit (Part No. 435982). Two couplings are required per Agent Distribution Hose.

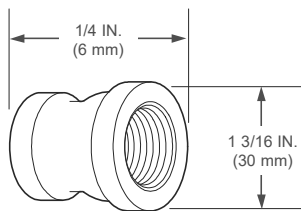


FIGURE 3-17

CONDUIT OFFSET ASSEMBLY

The conduit offset assembly (Part No. 435961) is used to change direction of the wire rope on detection, mechanical gas valve, and remote pull station lines. The conduit offset assembly can only be used in the area where the conduit attaches to the regulated release assembly. When using the conduit offset assembly, the maximum number of pulley elbows allowed is ▶ 16. The Conduit Offset Shipping Assembly (Part No. 436063) consists of 6 conduit offsets.

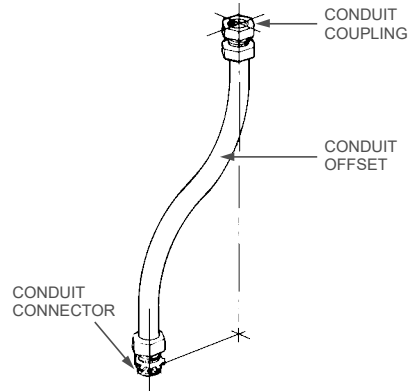


FIGURE 3-18
000153

“QUIK-SEAL” ADAPTOR

The “Quik-Seal” adaptor is a listed mechanical bulkhead fitting that produces a liquid-tight seal around both distribution piping and detection conduit which runs through restaurant hoods and ducts. The “Quik-Seal” adaptor accepts threaded pipe or conduit. The adaptor is available for 1/4 in. (Part No. 78196), 3/8 in. (Part No. 77285), 1/2 in. (Part No. 77287), or 3/4 in. (Part No. 77289) pipe or conduit sizes. When using with EMT conduit, a conduit connector must be installed in each end of the adaptor. The “Quik-Seal” Adaptor Shipping Assembly must be ordered as stated below:

Size	Shipping Assembly Part No.	Qty.	Hole Size Required
1/4 in.	78196	24	3/4 in.
3/8 in.	77285	24	1 1/8 in.
1/2 in.	77287	24	1 1/8 in.
3/4 in.	77289	24	1 3/8 in.

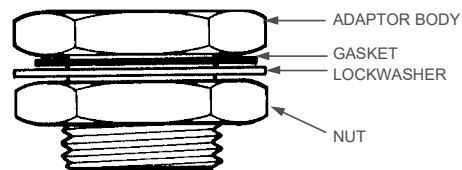


FIGURE 3-19
000154

“COMPRESSION-SEAL” ADAPTOR

This adaptor is a mechanical bulkhead fitting that produces a liquid-tight seal around pipe and conduit when installing distribution piping and detection conduit through restaurant hoods and ducts. The “Compression-Seal” adaptor is a straight-through design requiring no cutting or threading of conduit or pipe. The adaptor is available for pipe sizes of 1/4 in. (Part No. 79149), 3/8 in. (Part No. 79151), 1/2 in. (Part No. 79147), and EMT conduit size of 1/2 in. (Part No. 79153). Each “Compression-Seal” Adaptor Shipping Assembly must be ordered as stated below:

Size	Shipping Assembly Part No.	Qty.	Hole Size Required
1/4 in. Pipe / 1/2 in. tube	79149	24	3/4 in.
3/8 in. Pipe / 5/8 in. tube	79151	24	1 1/8 in.
1/2 in. Pipe	79147	24	1 1/8 in.
1/2 in. EMT Conduit	79153	24	1 1/8 in.

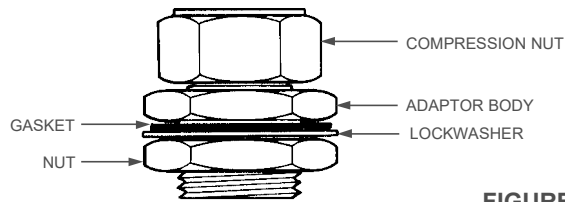
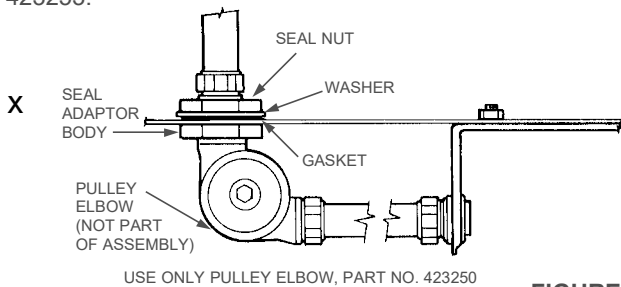


FIGURE 3-20
000155

“HOOD SEAL” ADAPTOR ASSEMBLY

This adaptor is a mechanical bulkhead fitting that produces a liquid-tight seal around 1/2 in. EMT conduit when installing the detection line through restaurant hoods and duct. The adaptor accepts a high temperature pulley elbow and, when used, correctly positions the elbow or conduit in line with the conduit adaptor hole in the detector bracket. The “Hood Seal” eliminates the need for multiple elbows when penetrating the top of a hood when installing the detection line. “Hood Seal” Adaptors are available in quantities of six as Shipping Assembly Part No. 423253.



USE ONLY PULLEY ELBOW, PART NO. 423250

FIGURE 3-21
000156

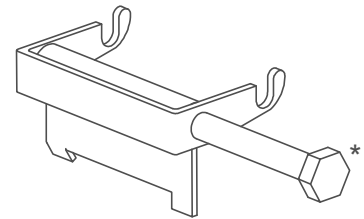
▶ COCKING LEVER/LOCK PIN

The cocking lever is a component required to cock (arm) both the mechanical/electrical AUTOMAN release and the mechanical gas valve. After the AUTOMAN is cocked (armed), the lock pin must be inserted to eliminate the accidental firing of the release mechanism. These components are available as either an individual shipping assembly or a shipping assembly containing both. Listed below are the various shipping assembly part numbers.

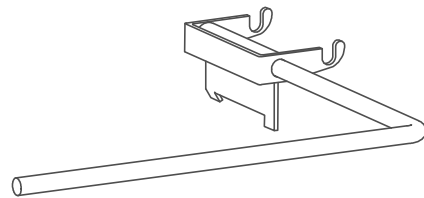
Part No.	Description
▶ 441042	Short Handle Cocking Lever with Lock Pin (Mechanical/Electrical AUTOMAN)
▶ 441041	Long Handle Cocking Lever with Lock Pin (Mechanical/Electrical AUTOMAN)
▶ 26310	Cocking Lever only (AUTOMAN II-C)
416018	Cocking Lever only (Mechanical Gas Valve)
▶ 438031	Lock Pin

Short Handle Cocking Lever

*Requires a crescent wrench or open end/box wrench



Long Handle Cocking Lever



▶ Lock Pin

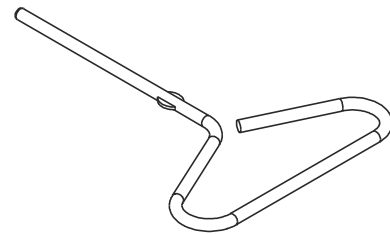


FIGURE 3-22
008325

SECTION 3 – SYSTEM COMPONENTS

UL EX3470 ULC EX3470

PAGE 3-8 REV. 11 2014-SEP-01

DETECTORS

The detector consists of three basic components: the bracket, linkage, and fusible link. (Fusible links are not included and must be ordered separately.) The bracket holds the entire assembly to the mounting surface. The linkage is used to support the fusible link. The fusible link is designed to separate at a specific temperature and release the wire rope, thereby actuating the regulated release mechanism.

The scissor style detector allows the wire rope to be strung completely through the detection system conduit and brackets first and the detector linkage assemblies are then clipped on later.

The detector consists of two types of assemblies:

The Terminal Detector (Part No. 435546) includes a test link and is placed last in a series of detectors. This detector is sometimes referred to as the end-of-line detector and is thus named because it is at the point at which the wire rope “terminates,” or is anchored at the detector bracket. Only one terminal detector is required per detection system.

The Series Detector (Part No. 435547) is any detector located in-line between the regulated release assembly and the terminal detector.

When using Part No. 435546 and 435547 detectors, a total of 15 detectors can be in one detection system: 14 series detectors (Part No. 435547) and 1 terminal detector (Part No. 435546).

Note 1: Series Detector (Part No. 435547) is also available as Part No. 435548, 25/Pkg.

► **Note 2:** Scissor-style linkage is also available in a 10-Pack (Part No. 439515).

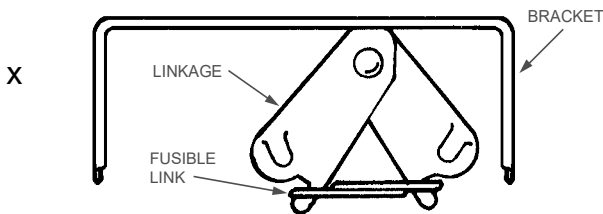


FIGURE 3-23
000159

PULLEY ELBOWS

There are two types of pulley elbows used to change the direction of the wire rope by 90°. ANSUL recommends for temperatures not in excess of 700 °F (371 °C). Part No. 415670 has socket ends with set screws for 1/2 in. conduit, and Part No. 423250 has compression ring ends also for 1/2 in. conduit. Pulley elbows must be ordered in quantities of 50 as Shipping Assembly Part No. 415671 (socket end type) and Part No. 423251 (compression end type).

PART NO. 415670

PART NO. 423250

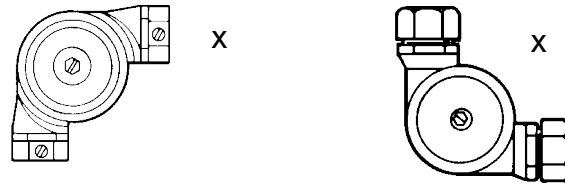


FIGURE 3-24
000160/000161

PULLEY TEE

The Pulley Tee (Part No. 427929) is used to change the direction of two wire ropes by 90°. It must be used in areas where the temperatures are within the range of 32 °F to 130 °F (0 °C to 54 °C). Pulley tees can be used in mechanical gas valve actuation lines and remote manual pull station lines. Pulley tees cannot be used within a detection line.

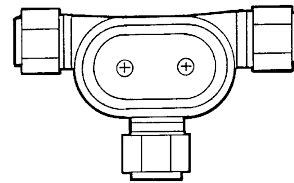


FIGURE 3-25
000447

► ANSUL STAINLESS STEEL CABLE

The 1/16 in. stainless steel cable is run from the terminal detector, through conduit, all series detectors and pulley elbows, and into the regulated release mechanism trip lever. When any fusible link separates, the tension on the cable is relaxed, and the trip lever actuates the regulated release mechanism. The cable can also be used for mechanical gas valves and remote manual pull stations. The cable is available in 50 ft (15.2 m) (Part No. 15821) and 500 ft (152.4 m) (Part No. 79653) lengths.

► The ANSUL stainless steel cable contains a blue tracer cable.

REMOTE MANUAL PULL STATION

The remote manual pull station (Part No. 434618 or 435960) is made out of a molded red composite material. The red color makes the pull station more readily identifiable as the manual means for fire suppression system operation. The pull station is compatible with the ANSUL Flexible Conduit. The molded manual pull station should be mounted at a point of egress and positioned at a height determined by the authority having jurisdiction. Trim Rings (Part No. 427074) (pack of 10), are available.

Part No. 434618 (Without Wire Rope)
Part No. 435960 (With 50 ft (15.2 m) of Wire Rope)

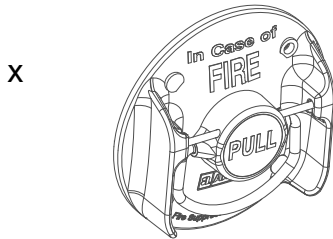


FIGURE 3-26
008326

FLEXIBLE CONDUIT

Flexible conduit allows for quicker installations and the convenience of being able to route the cable over, under and around obstacles. Flexible conduit can be used as a substitute for standard EMT conduit or can be used with EMT conduit. Flexible conduit can be used only with the Molded Manual Pull Station (Part No. 434618) and mechanical gas valve installations. The Flexible Conduit comes in a 500 ft (152.4 m) length (Part No. 434525) or together with 500 ft (152.4 m) of wire rope (Part No. 435959).

- ▶ A 50 ft (15.2 m) Flexible Conduit pre-fed with wire rope (Part No. 439104) is available.

Also available is a Flexible Conduit Strain Relief (50-pack) (Part No. 435979).

- ▶ A 50-pack of Flexible Conduit Inserts (Part No. 434347) and a 50-pack of P-Clips (Part No. 436150) are also available.

▶ **Note 1: Flexible conduit is intended for indoor use ONLY.**

▶ **Note 2: Flexible conduit cannot be used in detection systems.**

MECHANICAL GAS VALVES

The mechanical gas valves are designed to shut off the flow of gas to the appliances upon actuation of the regulated release assembly. The valves are available in sizes of 3/4 in., 1 in., 1 1/4 in., 1 1/2 in., and 2 in. ANSUL style; and 2 1/2 in. and 3 in. ASCO style. The valves are rated for natural and LP gas. Both styles are UL Listed and includes the air cylinder, tubing, and fittings (Part No. 15733) for connection to the release mechanism.

Part No.	Description	Maximum Operating Pressure
55598	3/4 in. Gas Valve (ANSUL)	10 psi (0.69 bar)
55601	1 in. Gas Valve (ANSUL)	10 psi (0.69 bar)
55604	1 1/4 in. Gas Valve (ANSUL)	10 psi (0.69 bar)
55607	1 1/2 in. Gas Valve (ANSUL)	10 psi (0.69 bar)
55610	2 in. Gas Valve (ANSUL)	10 psi (0.69 bar)
25937	2 1/2 in. Gas Valve (ASCO)	5 psi (0.35 bar)
25938	3 in. Gas Valve (ASCO)	5 psi (0.35 bar)

Pipe Size (inches)	Flow Capacity (CFH) P.D. 1 in. WC 0.64 SP GR	BTU/HR, at 1 in. P.D. 0.64 SP GR 1000 BTU/ft ³ Natural Gas
3/4	751	751,000
1	1288	1,288,000
1 1/4	1718	1,718,000
1 1/2	2630	2,630,000
2	4616	4,616,000
2 1/2	5700	5,800,000
3	7100	7,300,000

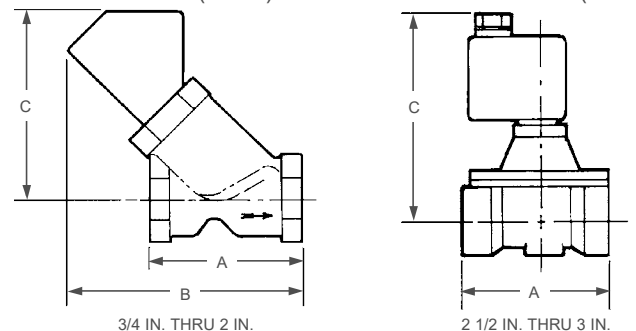
To calculate gas flow for other than 1 inch p.d.:

$$\text{New cfh} = (\text{cfh at 1 inch}) \times \sqrt{\text{new p.d.}}$$

To calculate gas flow for other than 0.64 SP GR:

$$\text{New cfh} = (\text{cfh at 0.64}) \times \sqrt{\frac{0.64}{\text{New SP GR}}}$$

Valve Size	A in. (mm)	B in. (mm)	C in. (mm)
3/4 in.	3 3/4 (95.3)	6 3/8 (161.9)	5 1/2 (139.7)
1 in.	3 3/4 (95.3)	6 3/8 (161.9)	5 1/2 (139.7)
1 1/4 in.	4 7/8 (123.8)	7 3/8 (187.3)	6 3/8 (161.9)
1 1/2 in.	4 7/8 (123.8)	7 3/8 (187.3)	6 3/8 (161.9)
2 in.	5 7/8 (149.2)	7 7/8 (200.0)	6 11/16 (169.9)
2 1/2 in.	7 13/16 (198.4)	-----	9 1/16 (230.2)
3 in.	7 25/32 (197.6)	-----	9 1/16 (230.2)



3/4 IN. THRU 2 IN.

2 1/2 IN. THRU 3 IN.

004208

004209

FIGURE 3-27

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. In systems utilizing a 101 remote release, 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 10 sub-sections: Nozzle Placement Requirements, Tank Quantity 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, Electrical Switch Requirements, and Pressure 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 96 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 2-8 in. (51-203 mm) into the center of the duct opening, discharging up. See Figure 4-1.

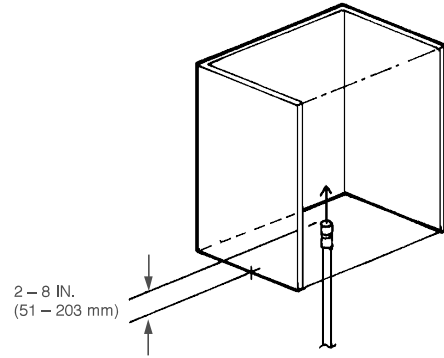


FIGURE 4-1
000173

2. In installations where a UL listed damper assembly is employed, the duct nozzle can be installed beyond the 8 in. (203 mm) maximum, to a point just beyond the damper assembly that will not interfere with the damper. Exceeding the maximum of 8 in. (203 mm) in this way will 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. (1270 mm)
 PERIMETER/ 16 IN. (406 mm) DIAMETER

- One 1W nozzle = one flow number
- 50 in. (1270 mm) perimeter maximum
- 16 in. (406 mm) diameter maximum

DUCT SIZES UP TO 100 IN. (2540 mm)
 PERIMETER/ 32 IN. (812 mm) DIAMETER

- One 2W nozzle = two flow numbers
- 100 in. (2540 mm) perimeter maximum
- 32 in. (812 mm) diameter maximum

The chart below shows the maximum protection available from each duct nozzle.

Description	3.0 Gallon System	1.5 Gallon System
2W Nozzle	Maximum 100 in. (2540 mm) Perimeter	Maximum 100 in. (2540 mm) Perimeter
1W Nozzle	Maximum 50 in. (1270 mm) Perimeter	Maximum 50 in. (1270 mm) Perimeter

X

Plenum Protection

The R-102 system uses the 1W nozzle or the 1N nozzle for plenum protection. The 1W nozzle is stamped with 1W and the 1N nozzle is stamped with 1N, indicating they are one-flow nozzles and must be counted as one flow number each. When protecting a plenum chamber, the entire chamber must be protected regardless of filter length.

VERTICAL PROTECTION – GENERAL

1W NOZZLE – SINGLE AND “V” BANK PROTECTION

One 1W nozzle will protect 4 linear feet (1.2 m) of plenum. The maximum distance from the end of the hood to the first and last nozzle must be no more than 2 ft (0.6 m). After the first nozzle, any additional nozzles must be positioned at a maximum of 4 ft (1.2 m) apart down the entire length of the plenum. The plenum width must not exceed 4 ft (1.2 m). (The 1W nozzle can be used on single or V-bank filter arrangements.) See Figure 4-6.

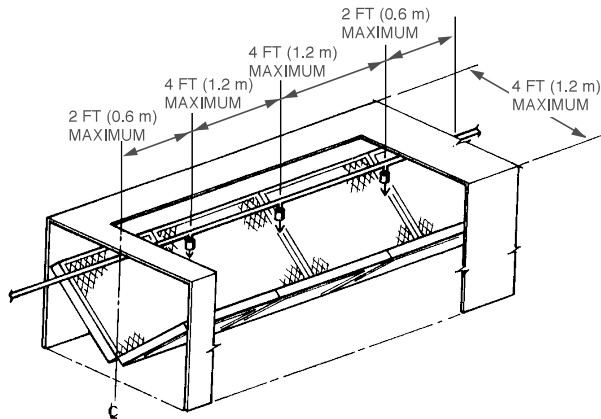


FIGURE 4-6
000197

When protecting plenums with the 1W nozzle, two options of coverage are available:

Option 1: The 1W nozzle must be on the center line of the single or “V” bank filter and positioned within 1-20 in. (26-508 mm) above the top edge of the filter. See Figure 4-7.

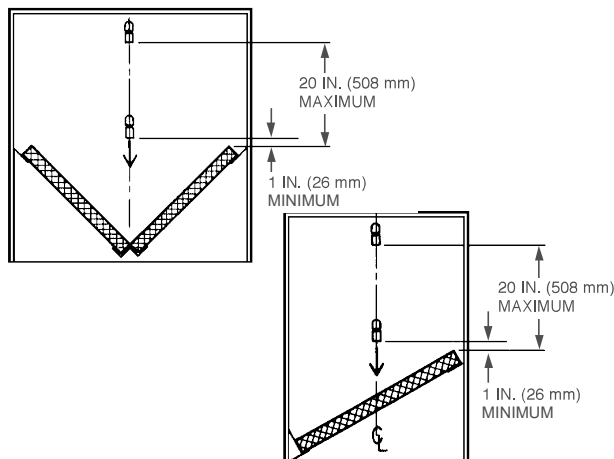


FIGURE 4-7
000199

Option 2: The 1W nozzle must be placed perpendicular, 8-12 in. (203-304 mm) from the face of the filter and angled to the center of the filter. The nozzle tip must be within 2 in. (50 mm) from the perpendicular center line of the filter. See Figure 4-8.

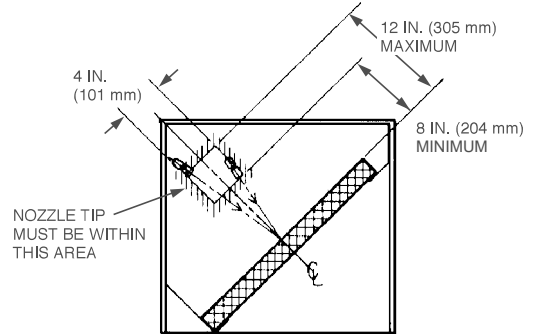


FIGURE 4-8
000200

HORIZONTAL PROTECTION – OPTION 1
1N NOZZLE SINGLE BANK PROTECTION

One 1N nozzle will protect 10 linear feet (3.0 m) of single filter bank plenum. The nozzle(s) must be mounted in the plenum, 2 to 4 in. (50 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 0-6 in. (0-152 mm) from the end of the hood to the tip of the nozzle. See Figure 4-9.

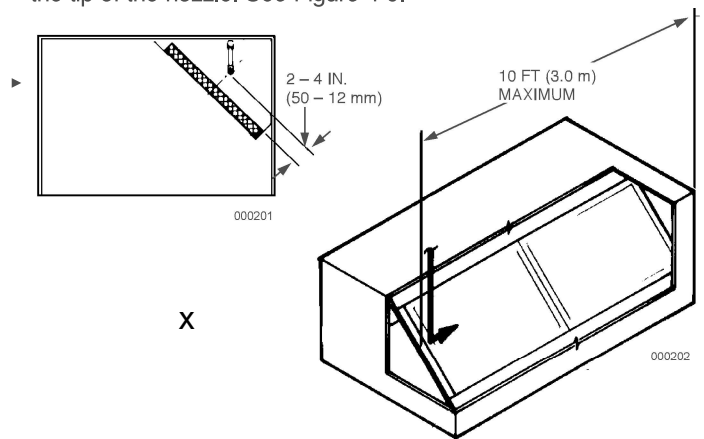


FIGURE 4-9

DISTRIBUTION PIPING REQUIREMENTS (Continued)

Distribution Piping Requirements – 3.0 Gallon System

1. The maximum length between the start of the first branch line and the start of the last branch line must not exceed 24 ft (7.3 m). When the supply line is split, the **combined total** of both legs of the supply line (from the start of the first branch line to the start of the last branch line) must not exceed 24 ft (7.3 m). See Figure 4-134.
2. The total length of all branch lines must not exceed 36 ft (10.9 m). See Figure 4-134.
3. Use a 3/8 in. union to connect the tank adaptor to the 3/8 in. supply line.
4. A maximum of two nozzles are allowed per duct branch line.
5. The requirements of the following table must not be exceeded:

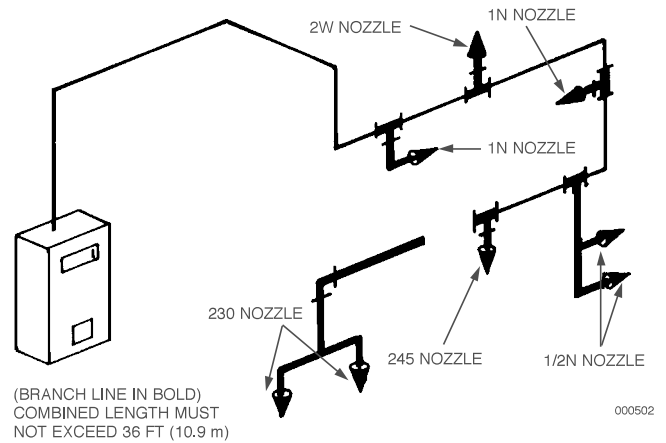
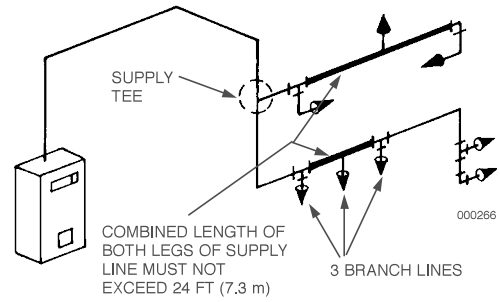


FIGURE 4-134

► 3.0 GALLON SYSTEM

<u>Requirements</u>	<u>Supply Line</u>	<u>Duct Branch Line</u>	<u>Plenum Branch Line</u>	<u>Appliance Branch Line</u>
Pipe Size	3/8 in.	3/8 in.	3/8 in.	3/8 in.
Maximum Length	40 ft (12.1 m)	8 ft (2.4 m)	4 ft (1.2 m)	12 ft (3.6 m)
Maximum Rise	6 ft (1.8 m)	4 ft (1.2 m)	2 ft (0.6 m)	2 ft (0.6 m)
Maximum 90° Elbows	9	4	4	6
Maximum Tees	1	2	2	4
Maximum Flow Numbers	11*	4	2	4

***Exceptions:**

1. Twelve flow numbers are allowed in any one tank for duct and plenum protection only.
2. Twelve flow numbers are allowed with any one tank using only two-flow appliance nozzles.
3. Twelve flow numbers are allowed with any one tank using only three-flow appliance nozzles.

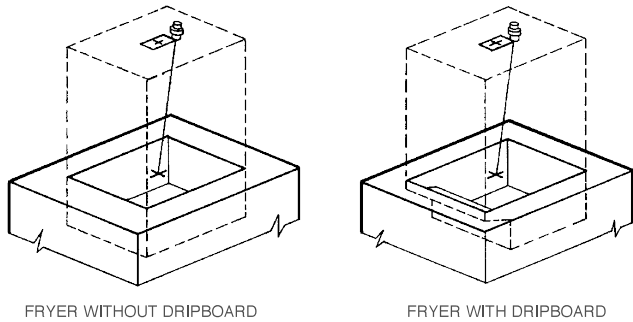
Special Instructions:

1. Twelve flow numbers are allowed when four Dean Industries GTI Gas Fryers are protected at low proximity as shown in Figure 4-66 on Page 4-32. The discharge piping must be as shown in Figure 4-67 on Page 4-32.
2. For certain McDonald's applications, 11.5 flow numbers are allowed when using a combination of one 2W duct nozzle, one 1/2N electrostatic precipitator nozzle, one 1N plenum nozzle, and four two-flow appliance nozzles. Contact the Applications Engineering Department for additional information.

Fryer – Single Nozzle Protection (Continued)

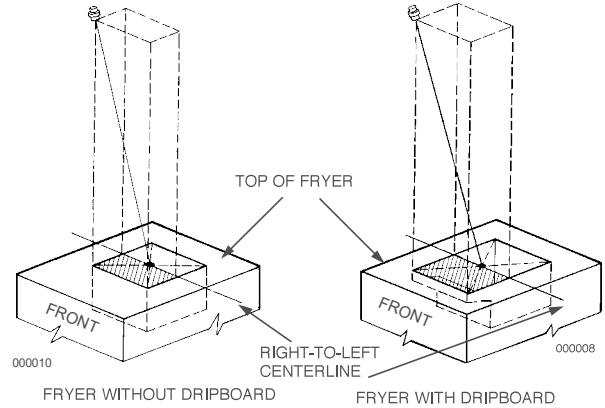
Maximum Area Dimensions – Single Nozzle Fryer Protection (Continued)

Max. Size Frypot Only	Max. Size Overall With Dripboard	Type of Nozzle	Nozzle Height Above Top of Fryer	Nozzle Location
▶ 14.5 in. x 16.5 in. ▶ (368 mm x 419 mm)	14.5 in. x 26.5 in. (368 mm x 673 mm)	290	16 in. to 21 in. (406 to 533 mm)	See Figure 4-17
19.5 in. x 19 in. ▶ (495 mm x 482 mm)	19.5 in. x 25 3/8 in. (495 mm x 644 mm)	290	13 in. to 16 in. (330 to 406 mm)	See Figure 4-17
19.5 in. x 19 in. ▶ (495 mm x 482 mm)	19.5 in. x 25 3/8 in. (495 mm x 644 mm)	3N	See Figure 4-18	See Figure 4-18
X 18 in. x 18 in. ▶ (457 mm x 457 mm)	18 in. x 27 3/4 in. (457 mm x 704 mm)	3N	25 in. to 35 in. (635 mm to 889 mm)	See Figure 4-19



290 NOZZLE TIP POSITIONED OVER THE MIDPOINT OF THE HAZARD AREA ± 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.

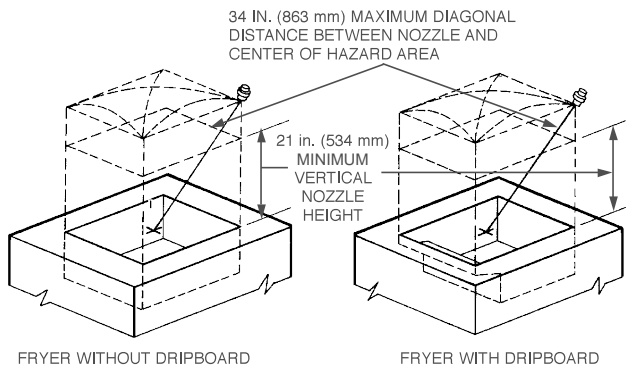
FIGURE 4-17
002286



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

FRYER COVERAGE



3N NOZZLE TIP POSITIONED ANYWHERE ALONG OR WITHIN PERIMETER OF COOKING SURFACE AND AIMED TO THE CENTER OF THE COOKING AREA.

FIGURE 4-18
002287

K-GUARD Kitchen Hand Portable Extinguisher

Features

- Meets or exceeds requirements of UL Standard 8 and Standard 711
- Meets requirements of ULC Standard S554
- Meets requirements of NFPA 10
- Simple operation and maintenance
- Wide angle, soft discharge spray pattern
- Stainless steel bourdon tube gauge
- Bilingual nameplate with barcode
- Rechargeable
- Sold and serviced through a network of independent distributors in every state and most foreign countries
- UL/ULC rated 2-A:K
- Factory filled and pressurized
- Stainless steel pick-up tube and strainer
- Contains 1.6 Gallons (6 L) ANSULEX Low pH agent

Applications

The K-GUARD liquid agent fire extinguisher is specifically designed for use on fires that involve combustible cooking vegetable or animal fats in commercial cooking equipment. Typical appliances include: fryers; griddles and range tops; upright, natural charcoal, or chain-type broilers; electric, lava rock, mesquite, or gas-radiant char-broilers; and woks.

Newer, more efficient cooking appliances, plus the use of non-saturated cooking oils, require a fire extinguishing agent which will not only smother a fire but provide a cooling effect.

The extinguisher is ideally suitable for use in restaurants, hospitals, nursing homes, hotels, schools, airports, and other similar facilities.

It is used as a backup to an automatic fire suppression system.

The energy source to the cooking equipment shall be shut off by the automatic fire suppression system to assist in the suppression process and permit the cooking media to cool below its auto-ignition temperature.

Description

The K-GUARD extinguisher is an attractive, easy to use and maintain, stainless steel extinguisher.

The ANSULEX Low pH fire suppressant agent used in the extinguisher is a specially-formulated aqueous solution. It has been developed to help provide rapid flame knockdown and securement of hot fuels such as cooking shortenings.



009101

Codes

Meets new Class K (Combustible Cooking Media) fire requirements of NFPA 10.

Specifications

■ Model No.	K01-3
■ UL/ULC Rating	2-A:K
■ Capacity	1.6 gal (6 L) of ANSULEX Low pH Agent
■ Extinguisher Height	21.25 in. (540 mm)
■ Width	9.5 in. (241 mm)
■ Depth (Diameter)	7 in. (178 mm)
■ Shipping Weight	25 lb (11.3 kg)
■ Range	8-10 ft (2.4-3.1 m)
■ Discharge Time	Approximately 45 seconds
■ Temperature Range	-20 °F to 120 °F (-29 °C to 49 °C)
■ Bracket	Wall Mount

Ordering Information

<u>Description</u>	<u>Part No.</u>
K-GUARD Model K01-3	434909 (UL)
Liquid Agent Fire Extinguisher	439654 (ULC)
3 Gallon (11.36 L) Container	79372
ANSULEX Low pH Liquid Agent	

Note: The converted metric values in this document are provided for dimensional reference only and do not reflect an actual measurement.

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