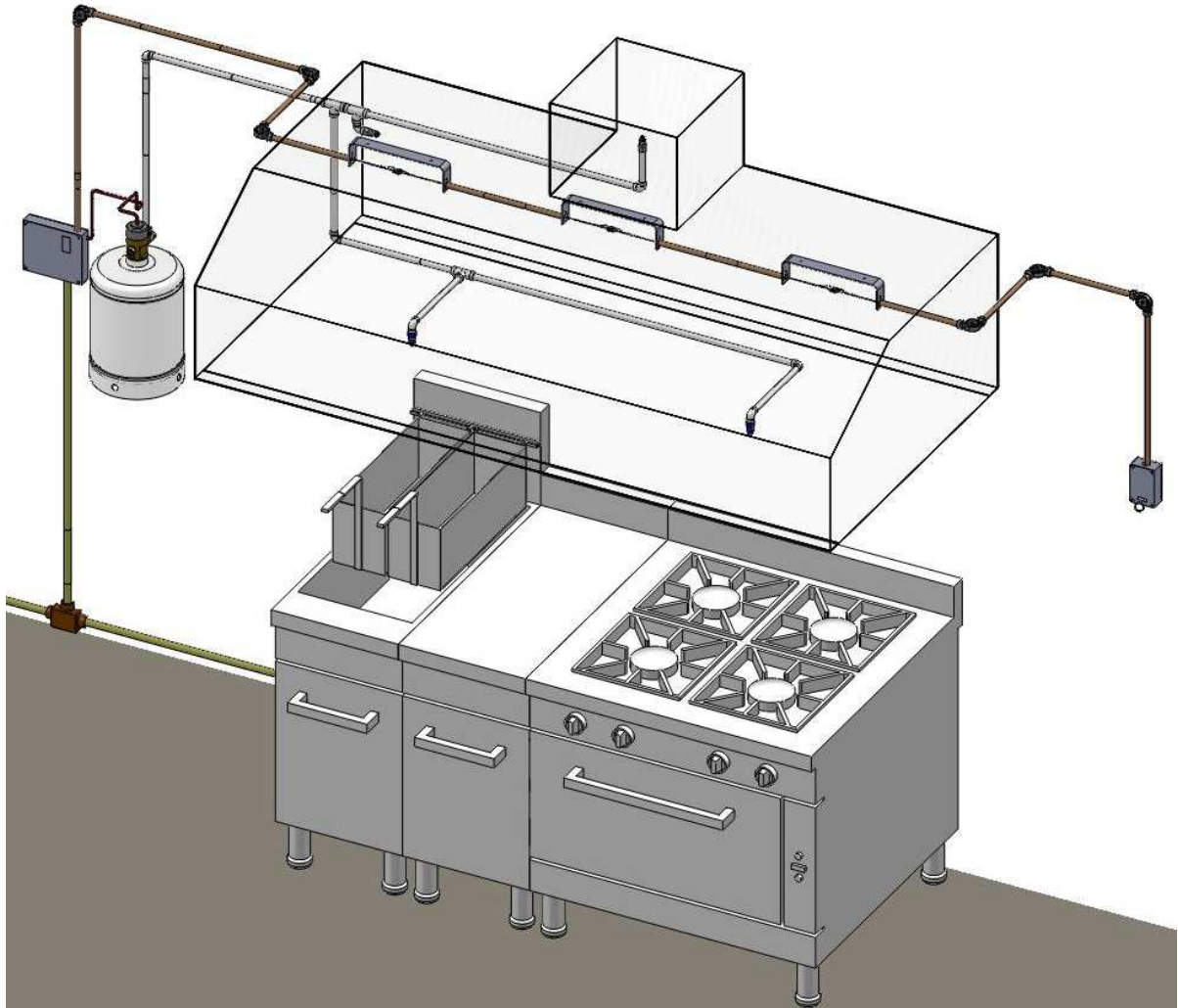


D Defender®

Kitchen Cooking Appliances and Range Hood Extinguishing Systems



**DEFENDER KITCHEN COOKING APPLIANCES
AND RANGE HOOD EXTINGUISHING SYSTEM**

MECHANICAL ACTIVATION



LPS 12.23 Approved

TECHNICAL MANUAL

GENERAL DESCRIPTION

Fires involving cooking materials, such as grease, fats and oils, have long been the cause of property loss, injury and death. These fires are unlike others due to the unique way in which they develop. This fact has been recognised for many years by the various standards institutions, including the National Fire Protection Association (NFPA) in the USA, the UK's LPS. As a result of the special nature of these fires these institutions have each developed new standards, which define a new classification for cooking oil fires. Tests carried out by the standard agencies around the world have provided new insight into this unique fire hazard.

Unlike more traditional flammable liquids such as gasoline, lubricating oil, paint thinners and solvents, the auto-ignition temperature for cooking oils used for frying can vary immensely. Auto-ignition can occur anywhere from 285°C to 385°C. For auto-ignition to occur, the entire mass of oil, whether in a small pot or in a commercial deep fat fryer, must have been heated to beyond the auto-ignition temperature. However, once ablaze the oil changes composition slightly resulting in a new auto-ignition temperature, which may be as much as 30°C lower than its original auto-ignition temperature. This results in the fire being self-sustaining unless the entire mass of oil is cooled below this new auto-ignition temperature.

In the mid-1960's it was discovered that by applying sodium or potassium bicarbonate powder to burning cooking oil, a unique phenomenon called saponification would occur. All cooking oils, greases and fats contain saturated fats in the form of free fatty acids. When an alkaline extinguishing medium (such as sodium bicarbonate powder) is added, the free fatty acids react with the sodium bicarbonate to form a soapy foam on the surface of the oil - the process of saponification. This foam acts like traditional firefighting foam. It secures the vapours, generates steam and extinguishes the fire.

Automatic systems which utilise specially designed nozzles, have been tested on real deep fat fryer fires by LPCB to LPS1223 Requirements and testing procedures for approval of fixed fire extinguishing systems for catering equipment and have proved extremely effective. The system can be discharged either manually or automatically in response to a fire in the cooking hood. Automatic actuation is by thermal link detectors located behind the grease plenums.

In commercial cooking operations, fryers and other appliances are often turned on early in order to have them heated and ready for cooking when needed. It is not uncommon for kitchen employees to leave the area and perform other tasks while the appliances warm up. Similarly, a cooking facility may be shut down without turning an appliance off or a fryer maybe left unattended. Fires can and, according to incident reports, do occur when fryers are left unattended and no-one is present to use extinguishers. Automatic systems do not rely on personnel being present in order to operate. Automatic suppression is equally applicable to vapour exhaust systems. Fires within these structures can occur unseen and are difficult to detect in their early stages. These particular fires are also difficult to extinguish without a fixed system since accessibility is a problem when using hand held extinguishers.

FOREWORD

This Manual is to be used by qualified and factory-trained personnel, knowledgeable of NFPA and LPS standards, and any other applicable standards in effect. This manual is intended to describe the design, installation, operation and maintenance of Wet Chemical Fire Suppression Systems.

Saglam Fire and Security assumes no responsibility for the application of any systems other than those addressed in this manual. The technical data contained herein is limited strictly for informational purposes only. Saglam Fire and Security believes this data to be accurate, but it is published and presented without any guarantee or warranty whatsoever.

Saglam Fire and Security disclaims any liability for any use that may be made of the data and information contained herein by any and all other parties.

Safety Summary

Definitions

Note: Notes are used to call out information that requires extra attention.

Caution: Cautions are placed throughout the manual in areas where the possibility of property/equipment damage. The general cautions in the Safety Summary should be adhered to at all times when working with a Defender Wet Chemical System.

Warning: Warnings are placed throughout the manual in areas where the possibility of severe property/equipment damage, system failure, personal injury, and in some cases, death could occur.

General Warnings

Protective eye wear must always be worn when working with pressurized cylinders. Death, serious injury or property damage could occur.

Under no circumstances while performing cylinder recharge should a charged cylinder be allowed to “free stand” without either the charging apparatus attached or the anti-recoil plate installed. Whenever these devices are not installed, a charged cylinder must be securely clamped to a rigid structure capable of withstanding the full thrust that would result should the valve inadvertently open.

Do not use oxygen to blow out piping. The use of oxygen is very dangerous as the possible presence of even a minute quantity of oil may cause an explosion, thereby causing death, serious injury and/or property damage.

The system uses high pressure. Safety goggles or glasses must be worn. Loosen the fitting slowly and carefully. Never dispose of a pressurized cartridge. Cartridges must be discharged before discarding. Filled gas cartridges may be dangerous if not handled properly. Do not heat cartridges above 49°C. Death, serious injury and/or property damage could occur. Pressurized cartridges that become overheated can explode, and thereby cause property damage, severe personal injury, and possibly death

Pressurized Cylinders

Defender fire suppression systems use pressurized equipment; therefore, personnel responsible for fire suppression systems must be aware of the dangers associated with the improper handling, installation or maintenance of this equipment.

Fire suppression system service personnel must be thoroughly trained in the proper handling, installation and service of Defender equipment and follow the instructions used in this manual and on the cylinder nameplate.

WARNING

Pressurized (charged) cylinders are extremely hazardous and if not handled properly are capable of violent discharge. This may result in death, serious personal injury, and/or property damage.

READ, UNDERSTAND and ALWAYS FOLLOW the operation and maintenance manuals, owners manuals, service manuals, etc., that are provided with the individual systems.

Moving Cylinders: Cylinders must be shipped compactly in the upright position, and properly secured in place. Containers must not be rolled, dragged or slid, nor allowed to be slid from tailgates of vehicles. A suitable hand truck, fork truck, roll platform or similar device must be used.

Rough Handling: Cylinders must not be dropped or permitted to strike violently against each other or other surfaces.

Storage: Cylinders must be stored standing upright where they are not likely to be knocked over, or the cylinders must be secured.

1. System description
 - 1.1 Fire class description
 - 1.2 Operation temperature limits
 - 1.3 Standards and approvals
 - 1.4 Manufacturer's warranty terms and conditions
- 2 Working principles
 - 2.1 Basic configuration
 - 2.2 Activation chart
- 3 System components
 - 3.1 System cylinders
 - 3.2 System cylinder pressure
 - 3.2.1 Cylinder mounting apparatus
 - 3.2.2 Cylinder mounting
 - 3.3 Fusible link detectors and mounting kit
 - 3.3.1 Fusible link detectors
 - 3.3.2 Detector mounting kit
 - 3.4 Corner pulleys
 - 3.5 Activation valve p/n:1100
 - 3.5.1 Siphons
 - 3.6 Manual activation button p/n: 1300
 - 3.7 Activation mechanism p/n: 1200
 - 3.7.1 Co2 propellant gas cartridge p/n:9015
 - 3.7.2 Detector line tension adjustment apparatus
 - 3.7.3 Micro switch
 - 3.8 Nozzles
 - 3.8.1 Type A nozzle
 - 3.8.2 Type F nozzle
 - 3.8.3 Type R nozzle
 - 3.9 Refilling drums
 - 4 External components
 - 4.1 Mechanic gas cut off valve
 - 4.2 Electrical gas cut off valve
 - 5 System design
 - 5.1 Single cylinder systems
 - 5.2 Multi cylinder systems
 - 5.3 Cooking appliances protection design
 - 5.3.1 Descriptions related to nozzle placement
 - 5.3.2 Single vat deep fat fryer
 - 5.3.2.1 Type F nozzle mounting criteria
 - 5.3.2.2 Type A nozzle usage with low approach
 - 5.3.3 Double vat deep dryer
 - 5.3.4 Nozzle mounting criteria for gas range cooker protection
 - 5.3.5 Plate (with flat cooking surface) grill protection
 - 5.3.6 Nozzle mounting criteria for Chinese range cooker (wok) protection
 - 5.3.7 Nozzle mounting criteria for Lava stone, ceramic, rock grills
 - 5.3.8 Nozzle mounting criteria for coal barbecue protection
 - 5.3.9 Nozzle mounting criteria for electrical barbecue protection
 - 5.3.10 Nozzle mounting criteria for gas barbecue protection
 - 5.3.11 Mounting criteria for wood barbecue protection
 - 5.3.12 Nozzle mounting criteria for tilting pan protection
 - 5.3.13 Nozzle mounting criteria for "Döner" cooker protection
 - 5.3.14 Nozzle mounting criteria for chimney protection
 - 5.3.15 Nozzle mounting criteria for filter protection
 - 5.4 Nozzle mounting criteria table for cooking appliances protection
 - 5.5 Electricity, gas cut off, fan turning off and alarm system connection
 - 6 Discharge pipes design, pipe diameters and total pipe limits (hydraulic calculations)
 - 6.1 Discharge pipe and fittings equipment
 - 6.2 Discharge pipes limits
 - 6.3 Height limits between discharge lines
 - 6.4 Equivalent pipe length
 - 6.5 Minimum pipe requirements (deep fat fryer oil splash safety)

7. Detection line and detectors
8. Extinguishing liquid
9. System setups and limits
 - 9.1. D8 system (8 flow system)
 - 9.2. D12 system (12 flow system)
 - 9.3. D18 system (18 flow system)
10. Labels
 - 10.1. System cylinder labels
 - 10.2. Activation mechanism labels
 - 10.3. Activation button label
11. Test and commissioning
12. Training
13. Periodical maintenance
 - 13.1. Detectors and detector line periodical maintenance
 - 13.2. Activation button periodical maintenance
 - 13.3. Activation mechanism periodical maintenance
 - 13.4. Activation valve periodical maintenance
 - 13.5. Nozzle periodical maintenance
 - 13.6. System cylinder periodical maintenance
 - 13.7. Discharge pipes periodical maintenance
 - 13.8. Label and marking
14. Security declarations
15. Applications And Limitations Of Wet Chemicals
 - 15.1. Extinguishing Properties
 - 15.2. Clean-Up
16. System main components
17. System Replacement Parts
18. List of System Components
19. Figure index

1. System Description

It is quite difficult to extinguish fires due to ignition of oils accumulating within the range hoods, filters or chimney if the range hoods that are used in industrial kitchens are used for extended periods of time without being cleaned. Furthermore, the risk of fire in cooking appliances in the kitchen is very high. Kitchen range hood and cooking appliances extinguishing system is the most convenient and efficient solution for extinguishing such fires.

1.1 Fire Class Description

Vegetable and animal liquid oil originated fires are described as Class "K" fires in the United States of America while they are described as Class F fires in European Countries (EN Norm). This product has been designed and tested for classes K and F fires. The relevant standards in European norms are given in EN3-7/A2.

1.2. Operation Temperature Limits

System operation temperature is between -20°C and $+49^{\circ}\text{C}$. The environment should be ventilated or cooled down under higher ambient temperatures. In temperatures exceeding $+49^{\circ}\text{C}$, unexpected activations may occur in system cylinder or CO₂ cartridges in activation mechanism.

1.3. Standards and Approvals

The manufacturer company has ISO-9001/2008 (Certificate 71 100 K473) quality certificate.

(System is LPS 12.23 approved.)

Design of the system meets the requirements of NFPA 17A and NFPA 96.

System partially meets the requirements of TSE-ISO15371 standards.

System has been certified with the certificate number CE-PED-B-DLC 002-10-TUR.

The manufacturer company has Warranty certificate of the Ministry of Industry numbered 30.04.2010-82306.

The manufacturer company has TSE 14.31.07/HYB 665 Service Place qualification certificate.

The manufacturer company has After-Sale Service Qualification certificate numbered 03-05-2011/31631 according to TSE 13345 standard.

1.4. Manufacturer's Warranty Terms and Conditions

The product is under 2 years unconditional warranty against production flaws. Warranty period starts as of the date of sales invoice and expires at the end of two years. In cases of production flaws, faulty product/part shall be replaced within 30 days starting from the date on which it has been returned to the manufacturer.

"This system consists of units that have been tested within the limitations as declared in detailed installation and maintenance manual. When changes are planned for the system or its protection area, system designer should be consulted at any time. After the system has been discharged, authorized installer or system designer should be consulted."

2. Working Principles

System operates in two ways; either automatically or to be activated by the user. In automatic operation, the fusible metal detectors that are heat sensitive and placed specially inside the range hood system melt down and break apart due to increase in temperature and thus system is activated.

When the system is to be manually operated, system should be activated by pulling the ring on activation mechanism or the ring on the activation button that is optional in the system.

After the system has been activated, Fire Eraser® chemical extinguishing liquid within the cylinders is sprayed on the cooking appliances, within the range hood filter and chimney by means of nozzles and consequently ignited oils are extinguished.

Technically, the system is operated based on the principle that the fusible link detectors within the system melt down and break apart or activation valve is triggered by means of the activation mechanism by user's manually pulling the activation rings.

2.1 Basic Configuration

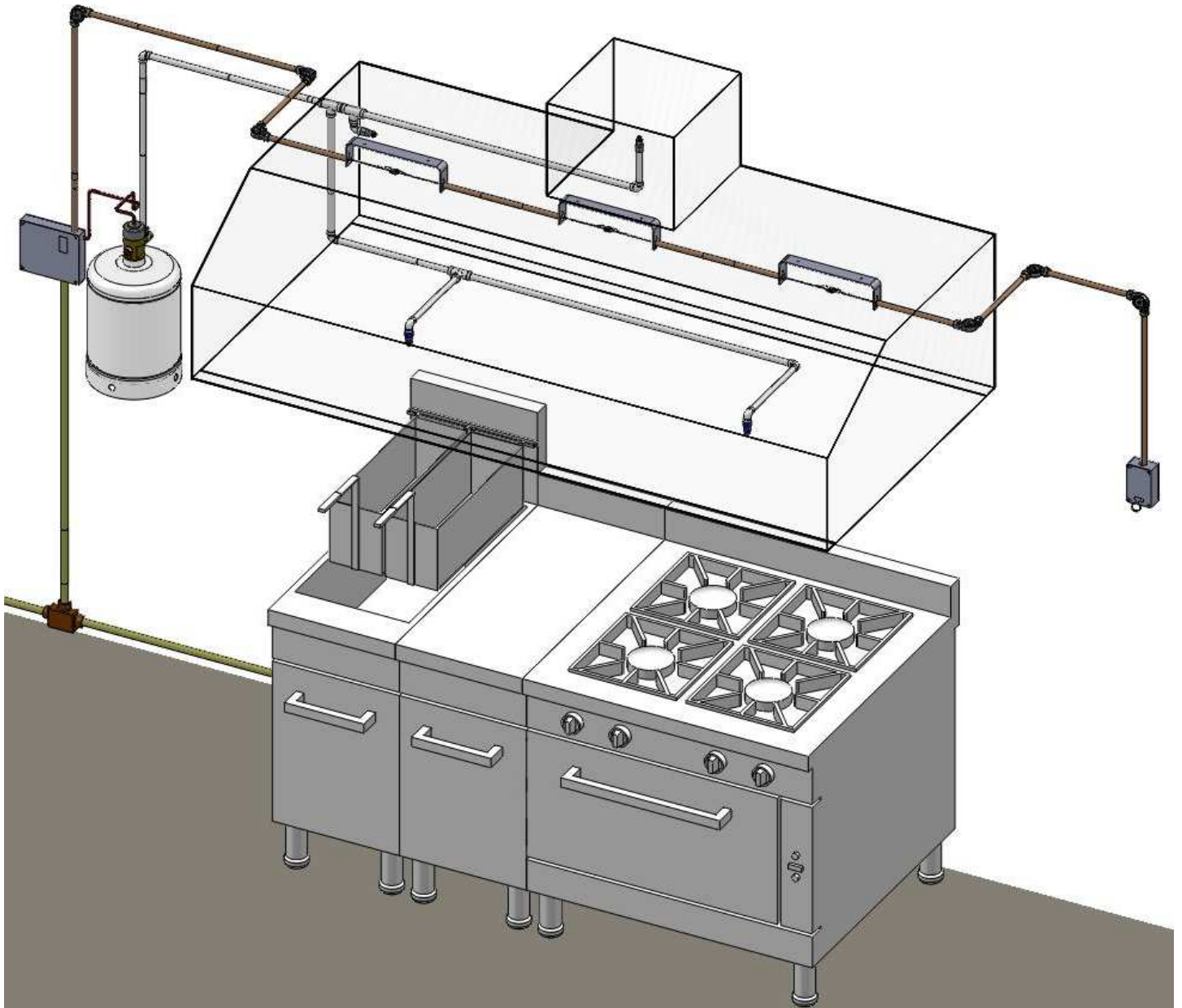


Figure 1: An example application figure for a basic kitchen configuration.

2.2 Activation

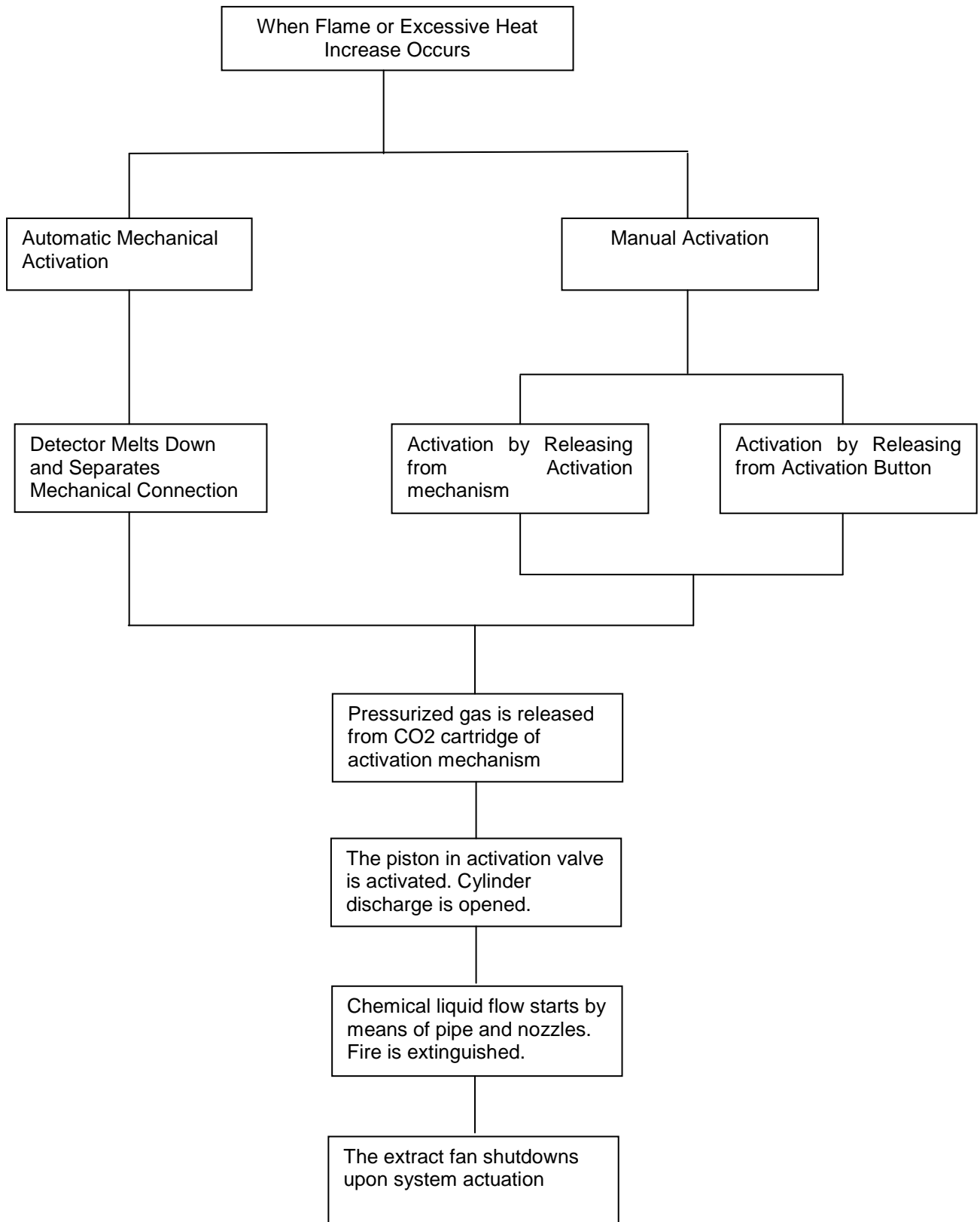


Figure 2: Activation Chart

3. SYSTEM COMPONENTS

System components consist of 2 main groups.

- a. Active Components
 - System Cylinder
 - Activation Valve
 - Activation Mechanism
 - Activation Button
 - Nozzles
 - Detectors
- b. Passive Components
 - Discharge Pipes and Fittings Equipment

3.1. System Cylinders

System cylinders come with three different capacities.

- D8 - 8 Flow 9,5 Liters (2,5 Gallons) P/N 1400
- D12 - 12 Flow 15 Liters (4 Gallons) P/N 1500
- D18 - 18 Flow 22,7 Liters (6 Gallons) P/N 1600

System cylinders come with 1 flat surface mounting apparatus, 1 meter strip clamp and clamp fixing screw.



P/N: 1400
Type: D8
Capacity: 9,5 Liters
Diameter: 260 mm
Height: 394 mm

Figure 3: D8 System Cylinder



P/N: 1500
Type: D12
Capacity: 15 Liters
Diameter: 260 mm
Height: 564 mm

Figure 4: D12 System Cylinder



P/N: 1600
Type: D18
Capacity: 22,7 Liters
Diameter: 260 mm
Height: 804 mm

Figure 5: D18 System Cylinder

Note: Activation valve is not included in the dimensions given. 10 cm activation valve length should be added to system cylinder height.

3.2. System Cylinder Pressure

System cylinders are pressurized with 12 bar (175 psig-1205 kPa) nitrogen gas (N₂ – nitrogen) at 21°C under ambient temperature. It is known that system cylinder pressure shall increase or decrease according to ambient temperature.

Its pressure levels shall change according to temperature changes;

- 11 bars at 0 C°
- 12 bars at 21 C°
- 13,5 bars at 49 C°

It is known that manometer green area starting point is 11 bars and end point is 18.5 bars.



Manometer P/N: 9005
Figure 6: Manometer

3.2.1. Cylinder Mounting Apparatus

There are two types of cylinder mounting apparatus in the system. Type-1 is for flat surface (such as wall) mounting. Type-2, on the other hand, is for horizontal surface mounting.



Figure 7:
Type 1 mounting
apparatus



Figure 8:
Type 2
mounting
apparatus

D8 Mounting bracket: P/N: 9042

D8 Flat Surface Mounting Apparatus: P/N: 9101

D12 Mounting bracket: P/N: 9046

D12 Flat Surface Mounting Apparatus: P/N: 9101

D18 Mounting bracket: P/N: 9051

D18 Flat Surface Mounting Apparatus: P/N: 9101

3.2.2. Cylinder Mounting

Mounting bracket should be fixed on the hard surface (wall, steel construction, etc.) by means of at least 4 mounting screws. There is a distance adjustment set on the bottom of the mounting bracket. Cylinder should be placed in the front side of this set. In cases that cylinder can not be mounted on the wall, there is also additional mounting apparatus for mounting it on range hood or flat surface. Floor mounting can be performed by fixing the main mounting bracket and floor mounting apparatus to each other by 4 nut screws. The cylinder should be parallel to wall or 90 degrees vertical to floor.

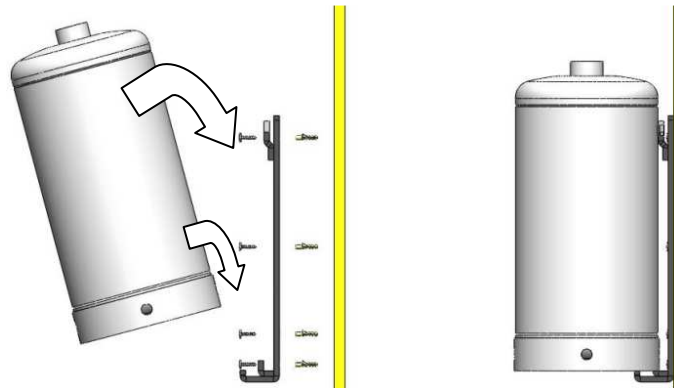


Figure 9: Cylinder Wall Mounting

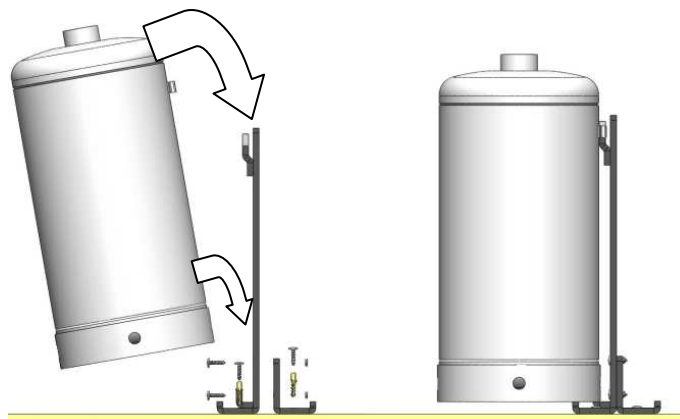


Figure 10: Cylinder Floor Mounting

3.3. Fusible link detectors and Mounting Kit

3.3.1. Fusible link detectors

There are detectors that are activated under three different temperatures as defined in the system. These can be defined as 130°C, 182°C and 260°C. Detectors are activated with tolerances of +/- 10% for the specified temperatures.



Figure 11: 130 °C Detector



Figure 12: 182 °C Detector



Figure 13: 260 °C Detector

| Detector Type | Part No: | Usage Area | Cooking Appliances | Protection Area |
|---------------|-----------|--------------------|--|--|
| 130 °C | P/N: 2100 | Low Temperature | Gas/Electrical range cookers on floor or desk Plate, Wok | 1 cylinder is positioned at each chimney entry. Protection area is 137 cm. |
| 182 °C | P/N: 2200 | Medium Temperature | Appliances without open flame | |
| 260 °C | P/N: 2300 | High Temperature | Barbecue, grill, oven featuring open flame | |

Detectors and Usage Areas

3.3.2. Detector Mounting Kit P/N: 9061

Detectors should be mounted as shown in the following figures. 1/16" (7x7x1,5 mm 304L) steel ropes should be used for connection with detector. Mounting kit ends should be completed with 1/2" EMT unions. Detectors are connected by means of S hook from line head for easy mounting-dismounting to steel rope.



Figure 14: Detector mounting base



Figure 15: Detector mounting kit installation

3.4. Corner pulleys P/N: 9070

These should be used in all returns in detection line installation. Maximum 20 corner pulleys can be used in a detection line.

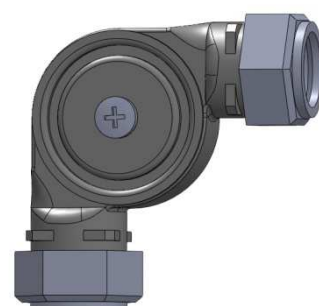


Figure 16: Corner pulley

3.5. Activation Valve P/N:1100

There is one activation valve that is used in the system. When activation mechanism is triggered, the pressurized CO2 gas that comes out of CO2 cartridge inside the mechanism enters through the connection point on the valve by means of 6x1 mm copper pipe and activates valve piston by pushing the activation pin forward. Fire Eraser extinguishing liquid is forwarded to discharge pipes by the movement of the piston. Cylinder pressure can be monitored from the manometer on the activation valve. At the same time, heat safety valve on the valve melts down at 100 °C temperature and discharges the pressure inside the cylinder safely.

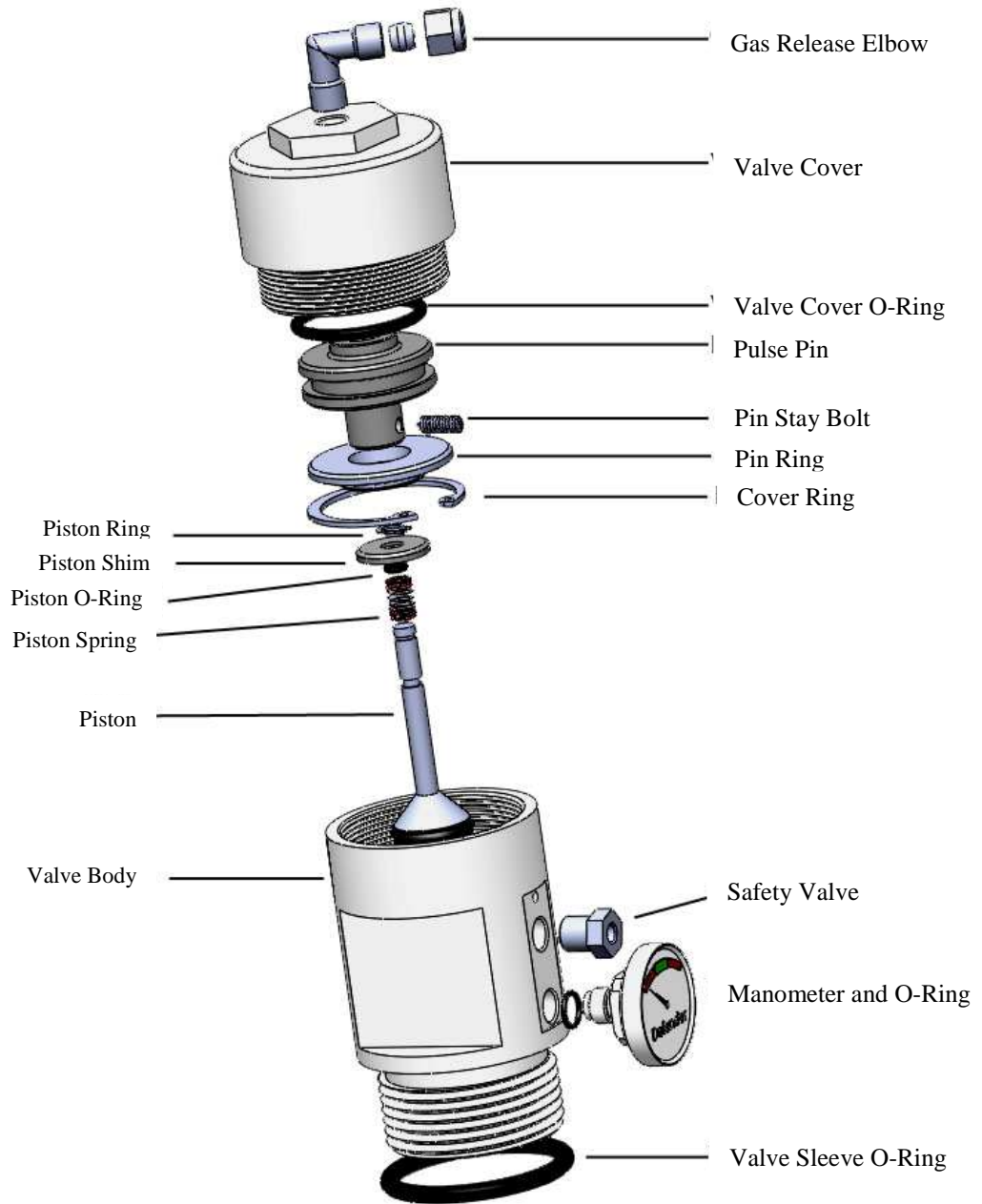


Figure 17: Activation Valve Details

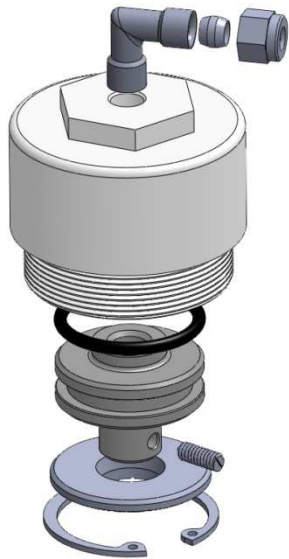


Figure 18: Activation Valve Cover

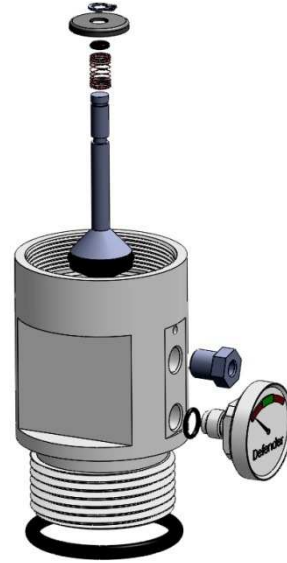


Figure 19: Activation Valve Body

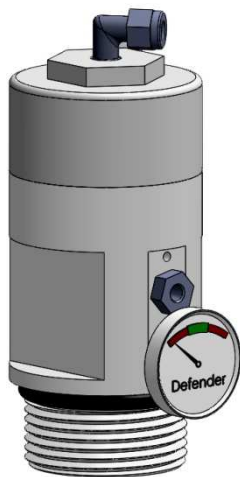


Figure 20: Activation Valve Front View

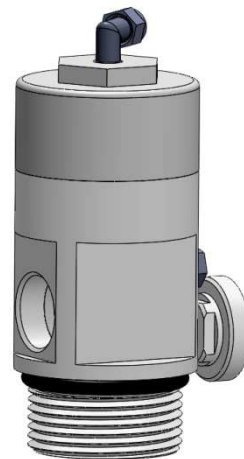


Figure 21: Activation Valve Rear View

3.5.1. Siphons

There are 32 mm diameter PN20 PVC siphons under the activation valves in order to discharge the extinguishing chemical liquid within the cylinders. There are different sizes of siphons for each system cylinder.

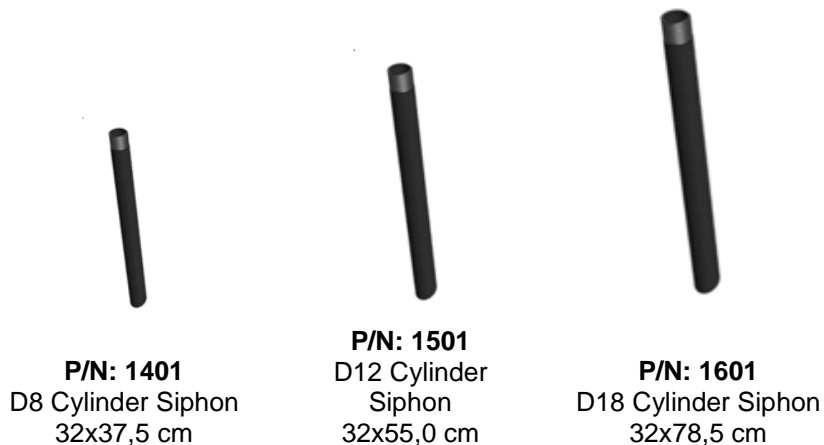


Figure 22: System Cylinder Siphons

3.6. Manual Activation Button P/N: 1300

There is an activation button in order to manually activate the system. Button box should be mounted to a solid ground at shoulder level (160 cm from floor) by means of 4 screws. Button shouldn't move. Detection line inlet should face upwards definitely. After system installation, safety ring should be mounted (it should be fixed) and sealed according to standards.

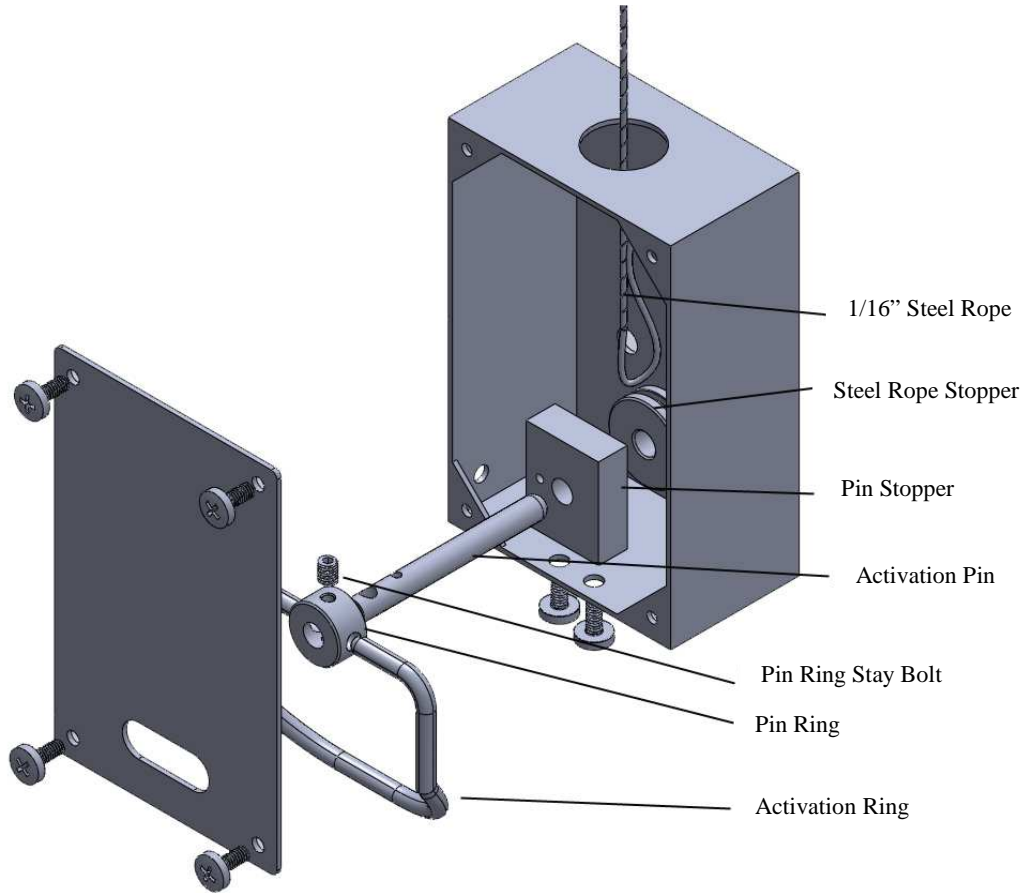


Figure 23: Activation Button

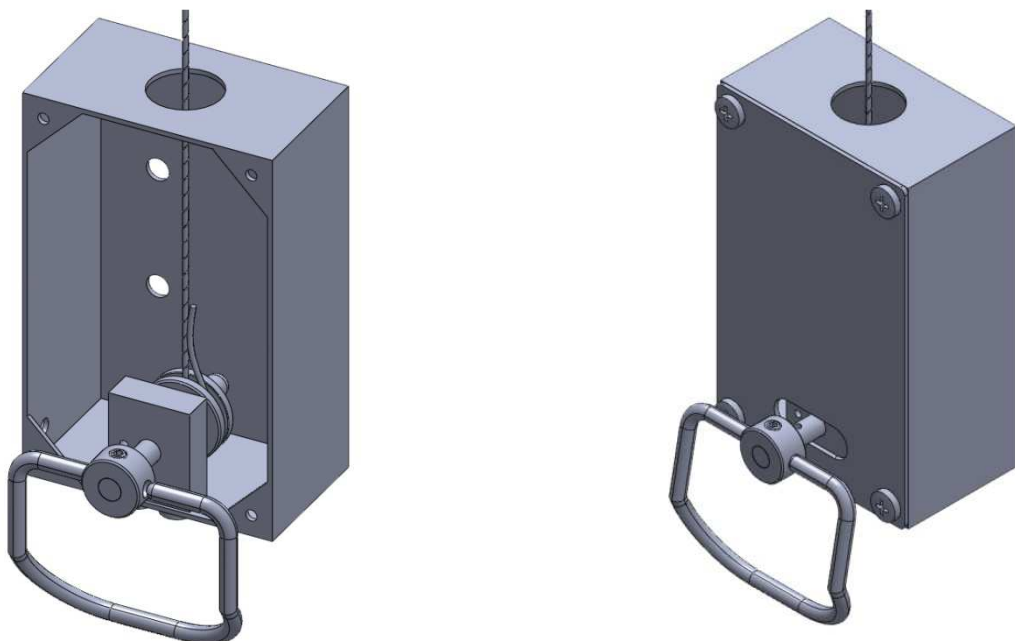


Figure 24: Activation Button Detail

3.7. Activation Mechanism P/N: 1200

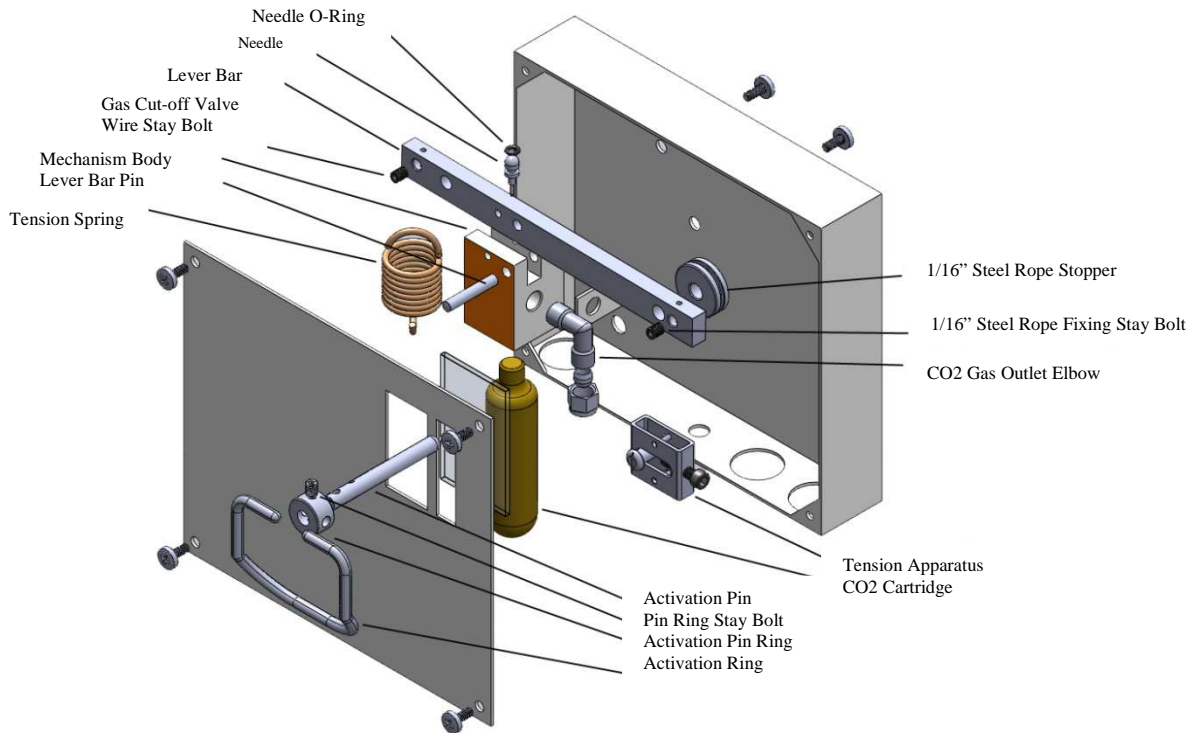


Figure 25: Activation Mechanism Details

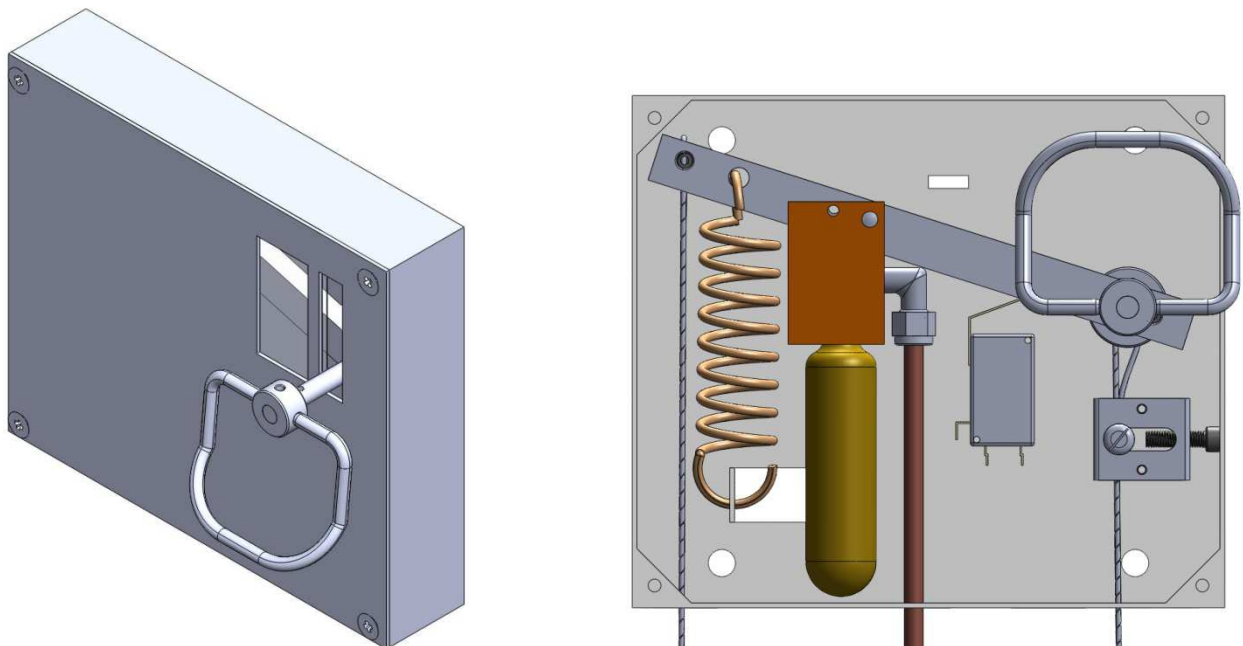


Figure 26: Activation Mechanism Installation

This is a mechanism consisting of spring attached to main body, lever bar, gas outlet elbow, CO2 propeller gas cartridge, detonator needle and guy wire tension apparatus. Micro switch can be placed with the purpose of turning off the ventilation fan and cutting off gas or energy upon request. The needle detonates the CO2 propeller gas cartridge by the release of lever bar tensioned by spring and forwards high pressure CO2 gas to activation valve through 6x1 mm copper pipe. There are warning labels on activation mechanism. Furthermore, mechanical gas cut off valve can be controlled by means of 1/16" steel rope that can be fixed to lever bar.

3.7.1. CO2 propellant gas cartridge P/N:9015

This is used for the activation of automatic discharge valve and pressurized by 12 gr CO2 gas. It is disposable. The thread at the tip of cartridge is R1/8". Full weight of CO2 cartridge is 43 grams while empty weight is 31 grams. CO2 cartridges should be replaced every year.

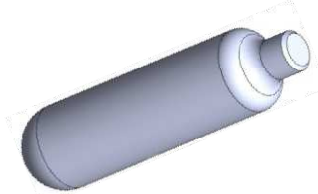


Figure 27: CO2 Carbon dioxide propellant cartridge

3.7.2. Detector line tension adjustment apparatus P/N: 1205

This is added to the system in order to take up the 3/16" 7x7 304 stainless steel guy wire that is used in the detector line. After detector line has been positioned, sufficient tension should be provided in the rope by means of a screw.

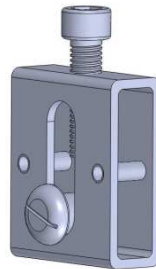


Figure 28: Tension Apparatus

3.7.3. Micro Switch P/N:9021

Activation mechanism micro switch is available in the system as an option. There are one closed contact and one open contact in the micro switch. Contacts change status when system is activated and desired command output is obtained. Contact outputs support 220 Volts 1 ampere. Optionally available fan, Gas, Electricity or siren appliances can be turned on or off by means of contact outputs. This switch can also send warning command to fire alarm system. Mounting apparatus and screws that are necessary for the mounting of the micro switch are provided with the switch.

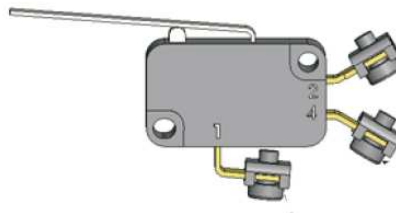


Figure 29: Micro Switch

3.8. Nozzles

There are 3 types of spray nozzles used in the system.

- D-A Nozzle (P/N: 1700)
- D-F Nozzle (P/N: 1800)
- D-R Nozzle (P/N: 1900)

These come with different flow rates, spraying angles and flow numbers. All nozzle types should be placed in such a way to correspond to cooking area center. There is an internal part that enables pulverization in the structure of the nozzle. There is also a filter at the nozzle opening for foreign particles that can block the nozzle and this filter is fixed by means of a ring. There are foiled oil covers at the tip of nozzles in order to prevent oily food steams from blocking the nozzle outlets. Oil covers should be tightened not to be dismantled manually. There should be aluminum oil protection folios below the covers. Nozzle types can be distinguished by 1, 2 and 3 descriptive lines and printed type letters. Nozzles should be fixed during mounting and users shouldn't dismount the nozzles or change their directions.

3.8.1. Type A Nozzle P/N:1700

There is Type A nozzle in the system. It has one flow coefficient.

Usage areas;
Chimney
Filter
Plate

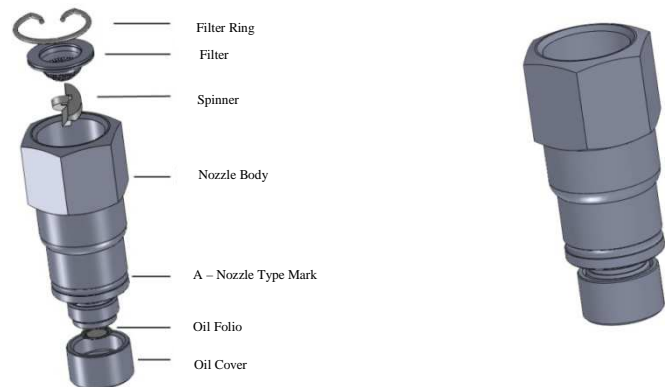


Figure 30: Type A Nozzle

3.8.2. Type F Nozzle P/N:1800

There is Type F nozzle in the system. It has two flow coefficients.

Usage areas;
Deep fat fryer
Tilting Pan

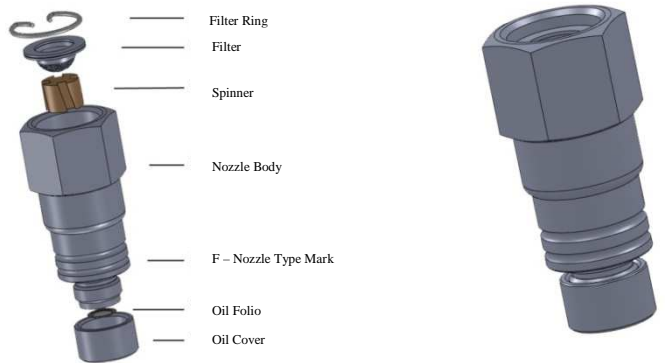


Figure 31: Type F Nozzle

3.8.3. Type R Nozzle P/N:1900

There is Type R nozzle in the system. It has one flow coefficient.

Usage areas;
Ranger cookers with 4 rings
Single or double floor cookers

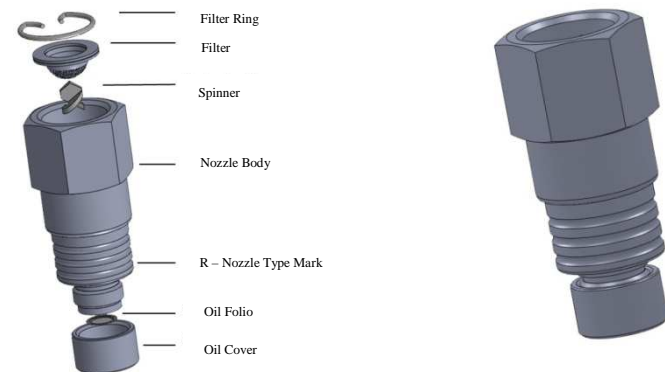


Figure 32: Type R Nozzle

3.9. Refilling Drums

There are 3 different types of refilling drums to be used for the refilling of activated systems. Drums are filled in the manufacturing site and covered with disposable covers. Opened drums shouldn't be used.



9,5 Liters Fire Eraser Refilling Drum
P/N: 3100
Min. Weight:13,5 Kg



15 Liters Fire Eraser Refilling Drum
P/N: 3200
Min. Weight: 22,5 Kg



22,7 Liters Fire Eraser Refilling Drum
P/N: 3300
Min. Weight:33,0 Kg

Figure 33: Refilling Drums

4. External Components

4.1.1. Mechanical Gas Cut Off Valve

This is not available as standard. However, it may be mandatory to be used in certain areas. It is used when main gas pipe is passing right below the activation mechanism. Valve can be checked with 1/16" stainless steel rope that is connected to activation mechanism. 1/6" steel rope length can not exceed 2 meters.

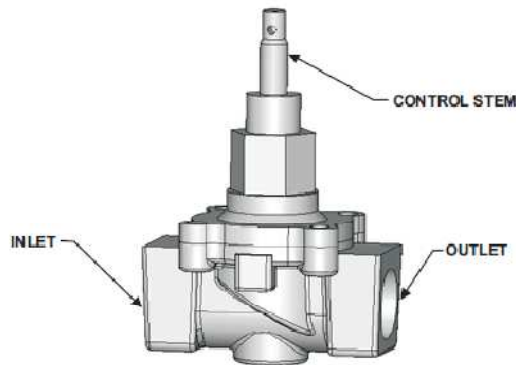


Figure 34: Mechanical Gas Cut Off Valve

4.1.2. Electrical Gas Cut Off Valve

This is not available as standard. However, it may be mandatory to be used in certain areas. If the main gas pipes that feed the area are passing 2 meters far or passing outside the area, electrical gas cut off valves are used. This valve can be controlled by means of micro switch contacts within activation mechanism.

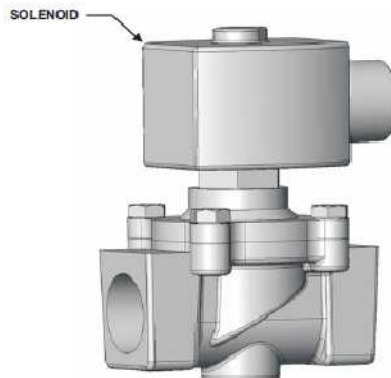


Figure 35: Electrical Gas Cut Off Valve

5. SYSTEM DESIGN

Different combinations of systems can be designed although there are three different capacities of systems. Nozzle and detector placement, cylinder capacity, discharge pipe limits and range hood system placement criteria are the determining criteria in system design.

5.1. Single Cylinder Systems

These are the systems with one system cylinder and discharge line per need.

System should feature as minimum;

One activation mechanism

One automatic discharge valve

One system cylinder

Sufficient amount of fusible link detectors

Sufficient amount of nozzles at appropriate type

And activation button per request (optional)



Figure 36: System example with two discharge lines



Figure 37: System example with three discharge lines

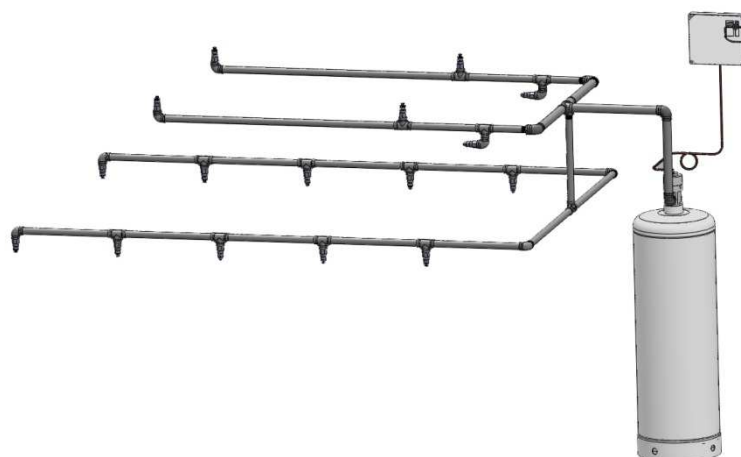


Figure 38: System example with four discharge lines

5.2. Multi Cylinder Systems

Multi cylinder systems can be combined with maximum 3 system cylinders. Discharge line of each cylinder should be separate. Cylinders can not be used by combination in a single discharge line. There should be one activation mechanism in system design. Activation button can be integrated to the system upon request. Cylinder can come with different capacities per need in multi cylinder systems.

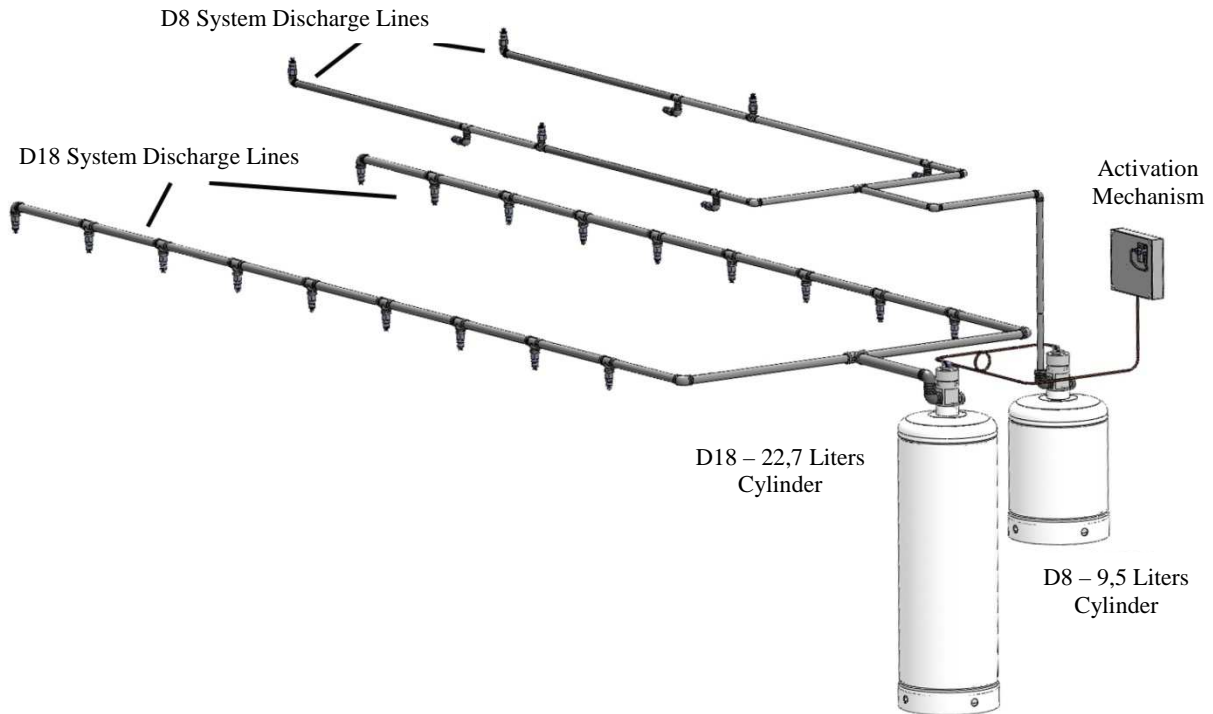


Figure 39: A Configuration with Two Cylinders

Multi cylinder systems are triggered by one activation mechanism. Activation button can be added to the system.

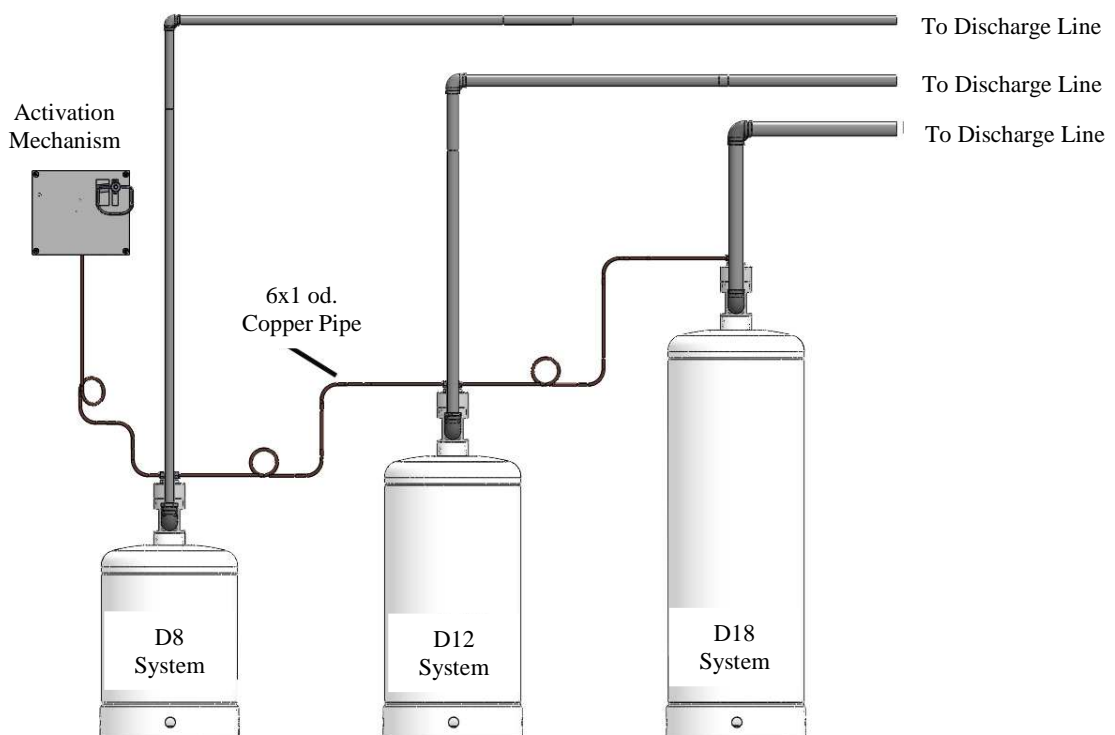


Figure 40: A Configuration with Three Cylinders

5.3. Cooking Appliances Protection Design

In Defender range hood extinguishing system, flow number has been taken into account in the whole design. Nozzle has been designed for each cooking appliance type group and flow numbers and spraying angles are different. There are nozzle types and locations according to cooking appliance magnitudes and places.

Type F Nozzle (Fryer) features 2 flow coefficients and used in appliances to which fuel directly reaches. It is used with single or double vat deep fat fryer and Lava stone grills.

Type R Nozzle (Range) features 1 flow coefficient and used in cooking appliances with 4 gas burners (Burner).

Type A Nozzle (Appliance) features 1 flow coefficient and used in small grills, flat grill (plate), chimney and filters.

Nozzle placement designs are different and should be located according to certain definitions and rules.

5.3.1. Descriptions related to nozzle placement

Nozzle Height

This term stands for the minimum or maximum distance between nozzle and cooking surface of the appliance.

Nozzle Center

This term stands for the positioning of nozzle end towards the center of cooking appliance by a directional line.

Cooking Area (Danger area)

This term stands for the total of area with fire hazard in cooking appliance (open flame, oil or food, etc.)

Cooking Appliance Area

This term stands for the overall physical measure of cooking appliances as a module.

5.3.2. Single Vat Deep fat fryer

5.3.2.1 Type F Nozzle Mounting Criteria

Deep fat fryers are the most dangerous appliances within a cooking appliance group. The cooking oils that they contain are quite suitable for fire. Consequently, nozzles should be placed cautiously.

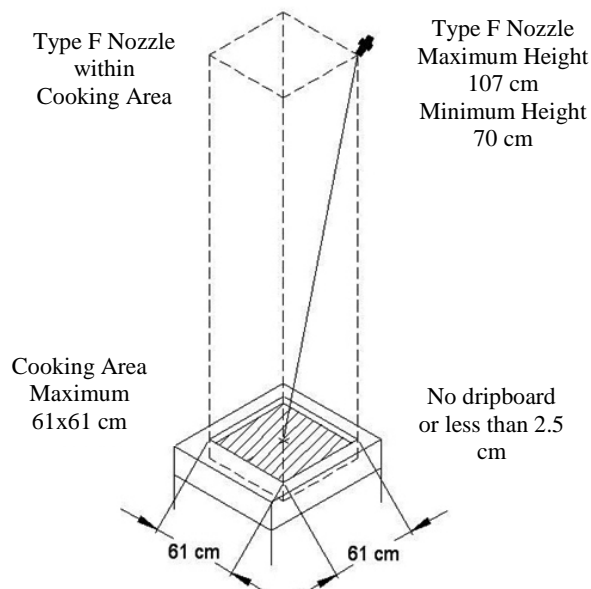


Figure 41: Type F Nozzle placement in single vat deep fat fryer

Nozzle is positioned according to deep fat fryer oil volume surface. The dripboard that might be next to the deep fat fryer should be included within coverage of the nozzle. Maximum height of nozzle should be 117 cm and minimum height should be 70 cm.

If any side measure of fryer vat is more than 61 cm, there should be two type F Nozzles.

5.3.2.2 Type A nozzle usage with low approach

If deep fat fryer cooking surface is small, type A nozzle can be used. However, nozzle height should be maximum 80 cm and minimum 70 cm. This technique is called LOW APPROACH.

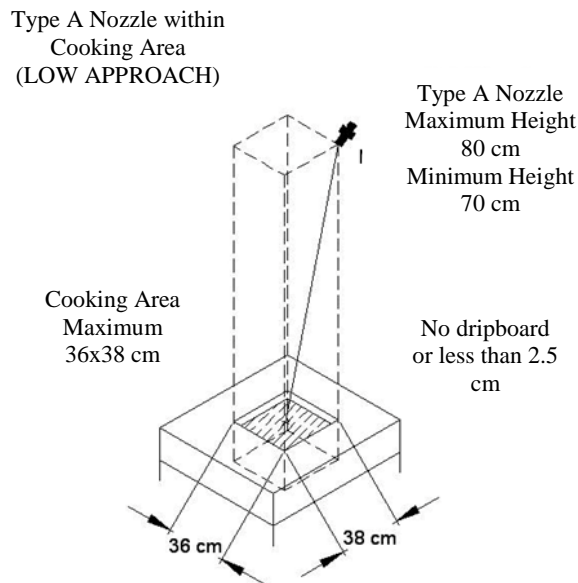


Figure 42: Type A Nozzle placement in small scale deep fat fryers with low approach

5.3.3. Double Vat Deep fat fryer

There are heat sources in deep dryers that can be controlled separately and protected differently compared to single vat deep fat fryers. The dimensions for each vat in double vat deep fat fryers can be maximum 25 cm x 42 cm. The neutral area between vats shouldn't exceed 4 cm. This kind of deep fat fryers should be protected by Type F nozzle. Maximum height of nozzle should be 114 cm and minimum height should be 70 cm.

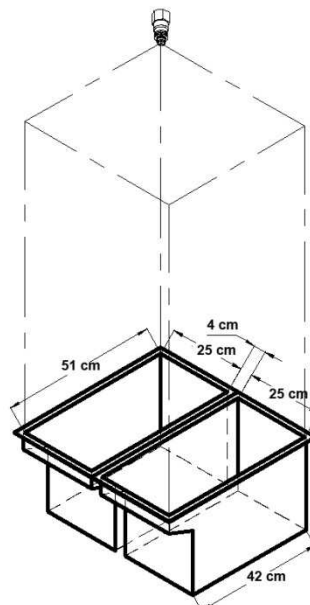


Figure 43: Type F Nozzle Placement in Double Vat Deep fat fryers

PLEASE NOTE: Nozzle height level should be definitely obeyed against the risk of splashing considering the fact that there is liquid oil in deep fat fryers and extinguishing liquid is sprayed in case of fire. In all nozzle types, nozzles should be placed in such a way to face cooking surface.

5.3.4. Nozzle Mounting Criteria for Gas Range Cooker Protection Type R Nozzle Mounting Criteria

LPG or LNG Gas Range Cookers come with 2, 4 or 6 rings. In such cookers, Type R nozzles are used. Nozzles should be placed according to cooker diameter and cooking area. If cooking area width or length is more than 71 cm, then 2 Type R nozzles should be used.

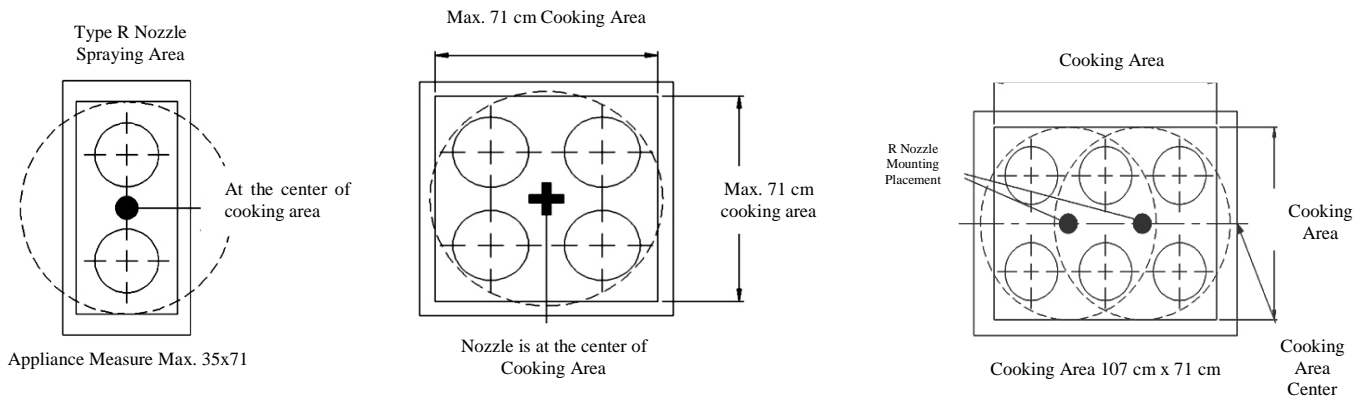


Figure 44: Type R Nozzle Placement in Gas Range Cookers

Nozzles should be placed vertical to cooking surface. However, when necessary, it can be also placed with an angled approach. In angled approach, nozzles can be deviated from cooking surface center by 23 cm at most.

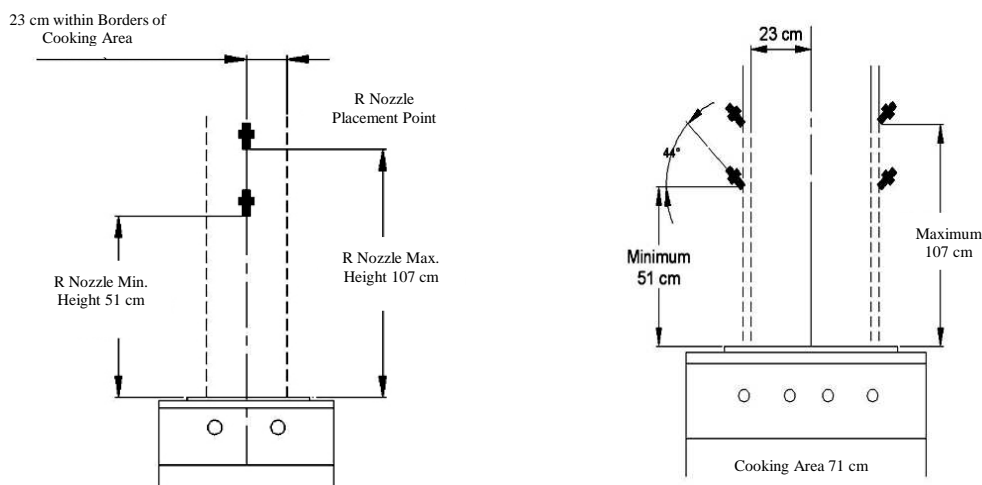


Figure 45: Type R Nozzle Placement Limits in Gas Range Cookers

5.3.5. Plate (Flat Cooking Surface) Grill Protection Type A Nozzle Mounting Criteria

In grill/plate type cooking appliances, type A nozzle is used. Nozzles are placed at the center of cooking surface. 2 nozzles should be used in cooking surfaces larger than 76 cm x 107 cm.

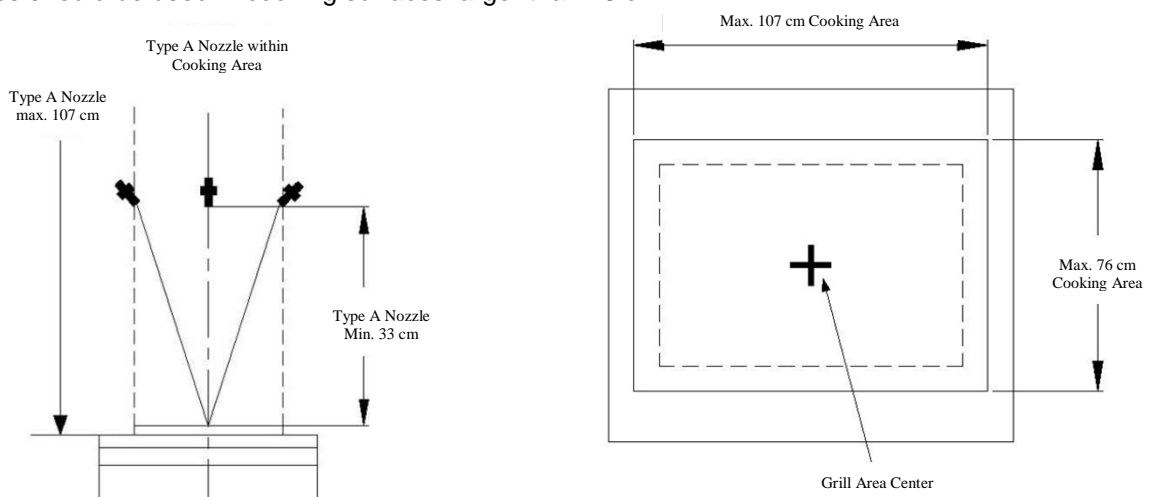


Figure 46: Type A Nozzle Placement and Limits in Grill/Plate

**5.3.6. Nozzle Mounting Criteria for Chinese Range Cooker (WOK) Protection
Type A Nozzle Mounting Criteria**

Nozzle should be placed inside the cooking area and focused at the center.

Caution: Nozzle height should be calculated starting from the bottom surface of wok.

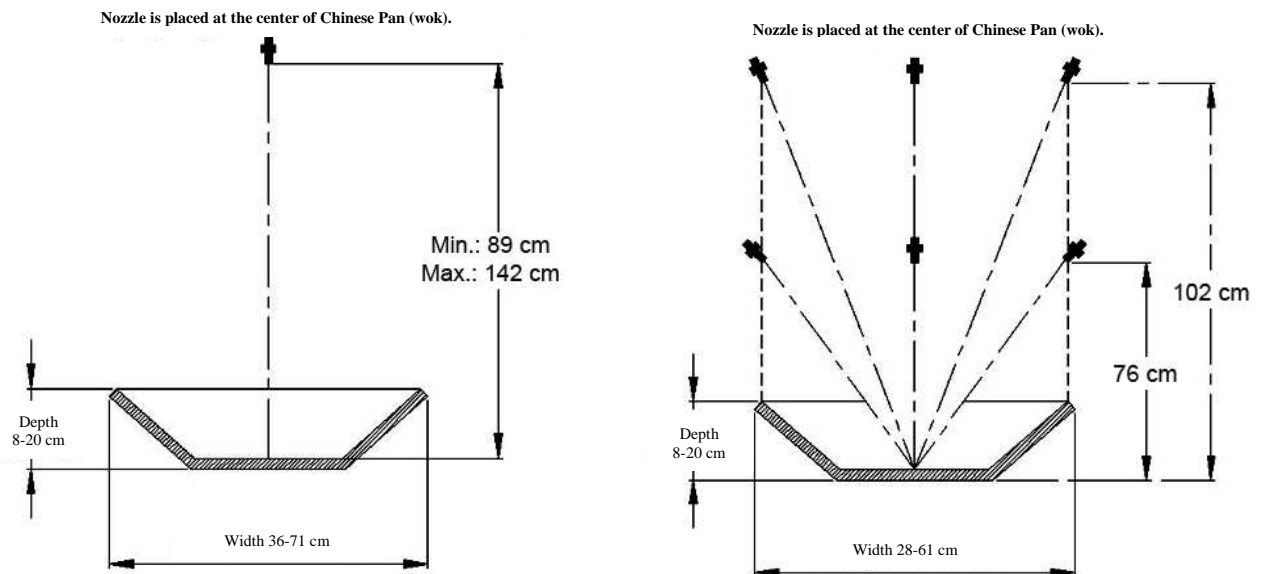


Figure 47: Type A Nozzle Placement and Limits in Chinese (WOK) Range Cookers

**5.3.7. Mounting Criteria for Lava Stone, Ceramic, Rock Grills
Type F Nozzle Mounting Criteria (Electricity or Gas fuel)**

There is NO flat metal cooking surface between heat source and food. Type F nozzles are placed inside the cooking area in this kind of range cookers. In a standard grill, nozzle height should be minimum 61 cm and maximum 122 cm. Nozzles should be placed at the center of cooking surface.

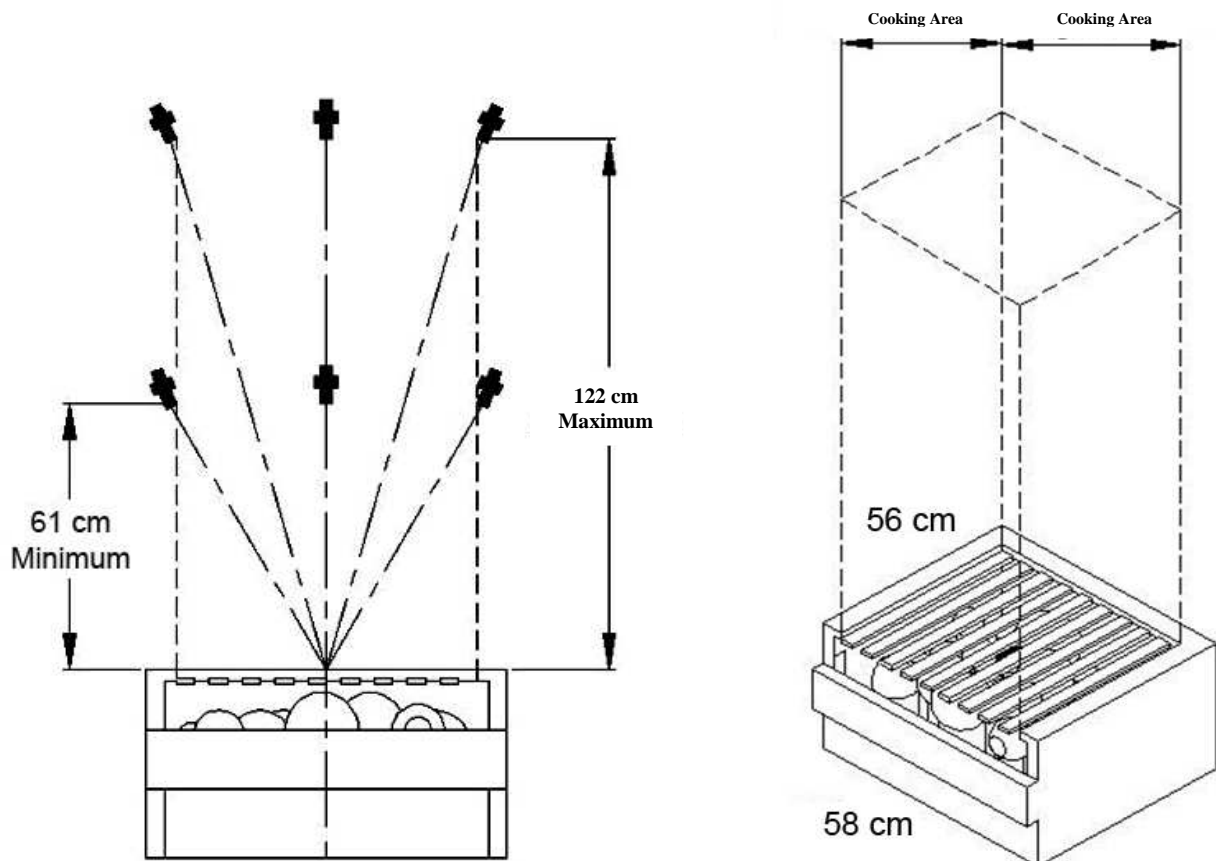


Figure 48: Type F Nozzle Placement and Limits in Lava Stone, Ceramic etc. Grills

**5.3.8. Mounting Criteria for Coal Barbecue Protection
Type A Nozzle Mounting Criteria**

There is NO flat metal cooking surface between heat source and food. Fuel input can not be stopped in case of fire in this kind of appliances unlike other cooking appliances. Another factor is that the fuel vat is around 16 cm and it is extremely hot. Nozzles should be focused within the borders of cooking area and at the center of cooking area.

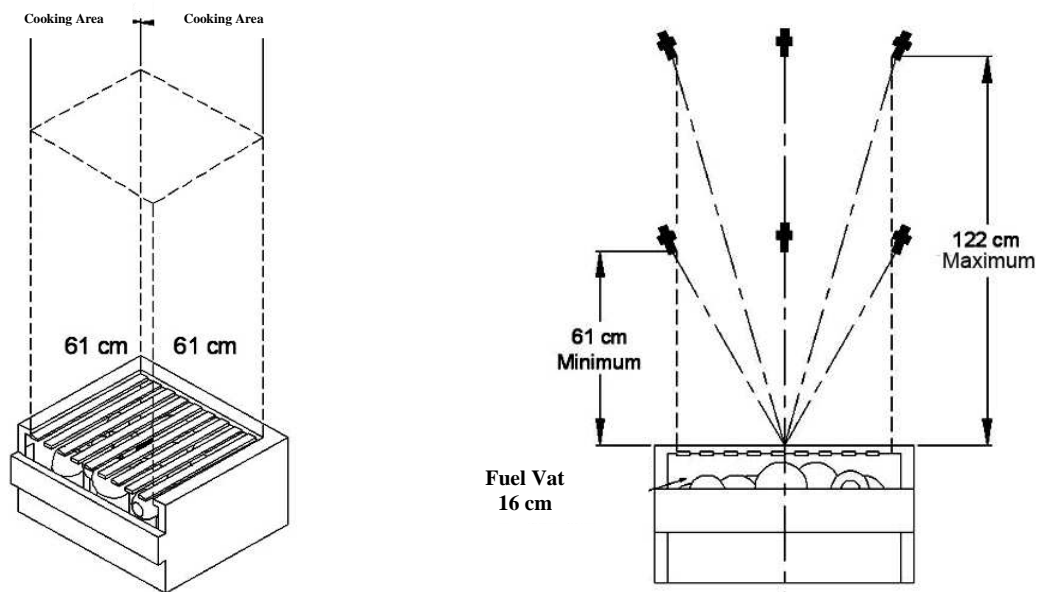


Figure 49: Type A Nozzle Placement and Limits in Coal Barbecues

**5.3.9. Mounting Criteria for Electrical Barbecue Protection
Type A Nozzle Mounting Criteria**

There is flat metal cooking surface between heat source and food. Two nozzles are used for cooking surfaces larger than 61x61 cm. Nozzle should be placed vertical to cooking surface and focused at the center. When necessary, nozzle can be placed between minimum 61 cm and maximum 122 cm in such a way that its angle doesn't exceed 45 degrees. As it can be seen in below pictures, nozzle can be positioned at a certain place in the shaded or grey colored area.

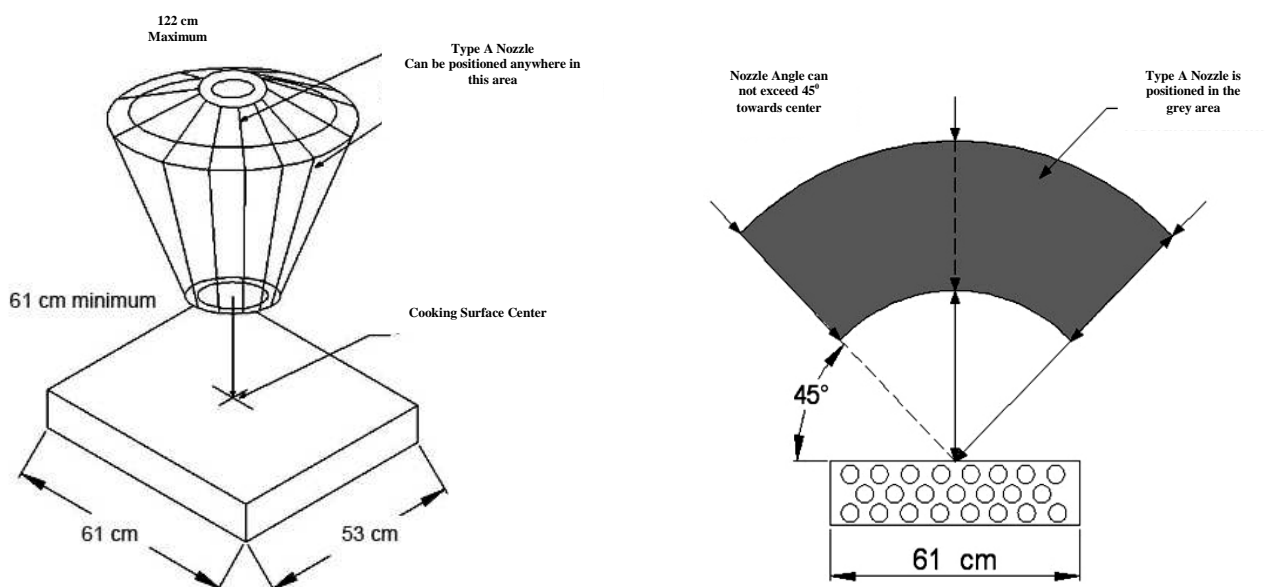


Figure 50: Type A Nozzle Placement and Limits in Electrical Barbecues

**5.3.10. Mounting Criteria for Gas Barbecue Protection
Type A Nozzle Mounting Criteria**

There is **NO flat metal cooking surface between heat source and food**. Since gas is also ignitable in addition to oils in LPG and LNG grills, type F nozzles with 2 flow coefficient should be used. As it can be seen in the following figures, nozzle can be positioned anywhere in shaded or grey colored area.

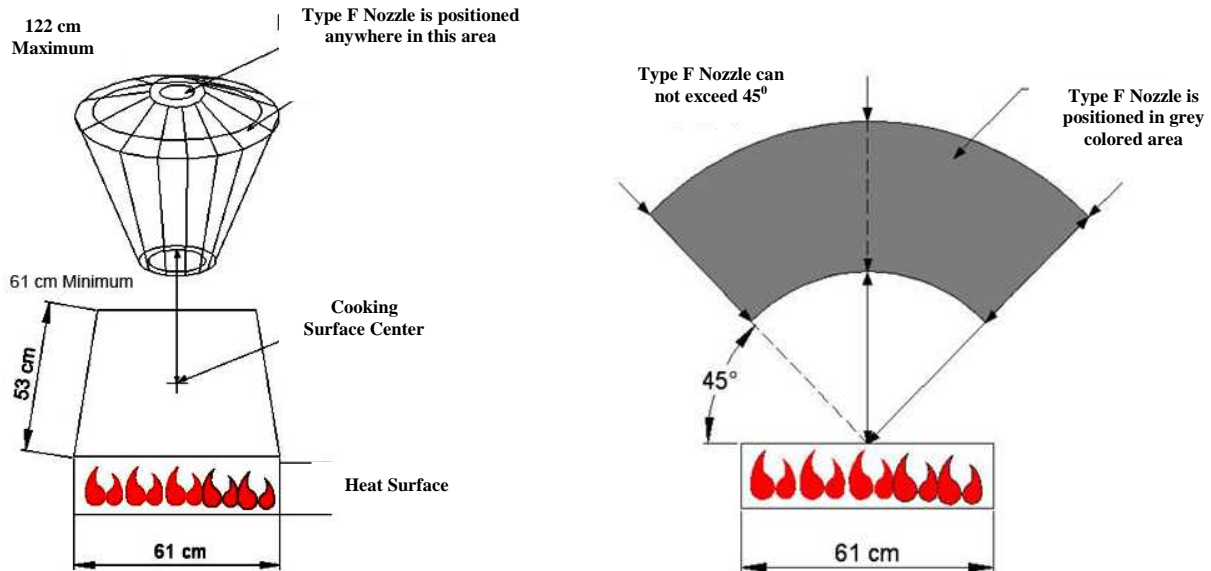


Figure 51: Type A Nozzle Placement and Limits in Gas Barbecues

**5.3.11. Mounting Criteria for Wood Barbecue Protection
Type F Nozzle Mounting Criteria**

There is **NO flat metal cooking surface between heat source and food**. Since the material of the appliance is also ignitable in addition to the oils in grills where natural wood or derivatives are used as fuel, type F nozzles with 2 flow coefficient should be used. As it can be seen from the following figure, nozzle can be placed anywhere in the shaded or grey colored area.

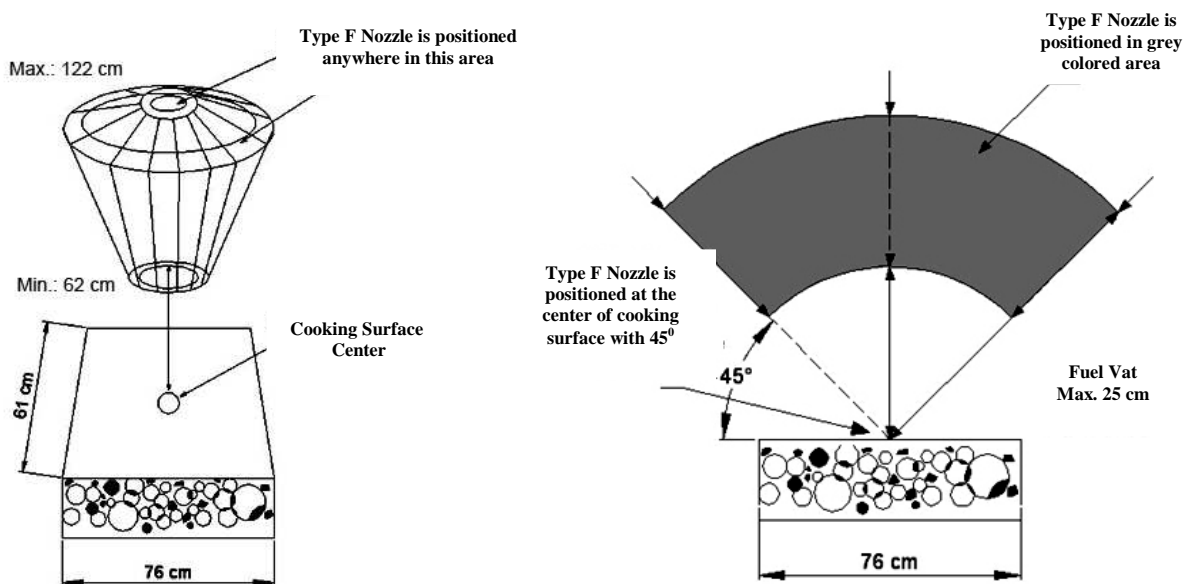


Figure 52: Type F Nozzle Placement and Limits in Wood Barbecues

**5.3.12. Mounting Criteria for Tilting Pan Protection
Type F Nozzle Mounting Criteria**

The most important thing that should be taken into account in tilting pans is the positioning of the nozzle in such a way that its spraying angle faces inside the pan when the cover of the pan is lifted. Pan cover or movement of the pan shouldn't be outside the spraying angle of the nozzle.

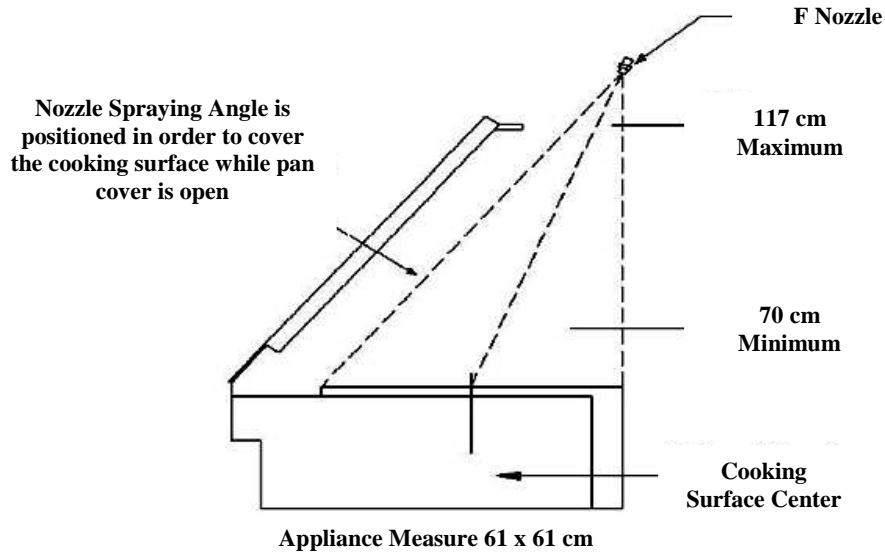


Figure 53: Type F Nozzle Placement and Limits in Tilting Pans

**5.3.13. Mounting Criteria for “Döner” Cooker Protection
Type F Nozzle Mounting Criteria (Gas, Electrical, Wood or Coal)**

Since fuel, heat source and food are exposed at the same time in this type of appliances, risk is quite high. There is intense oil since meat is cooked. For this reason, type F nozzle with 2 flow coefficient should be used. Nozzle should be positioned at the center of cooking surface in such a way to cover the whole cooking surface.

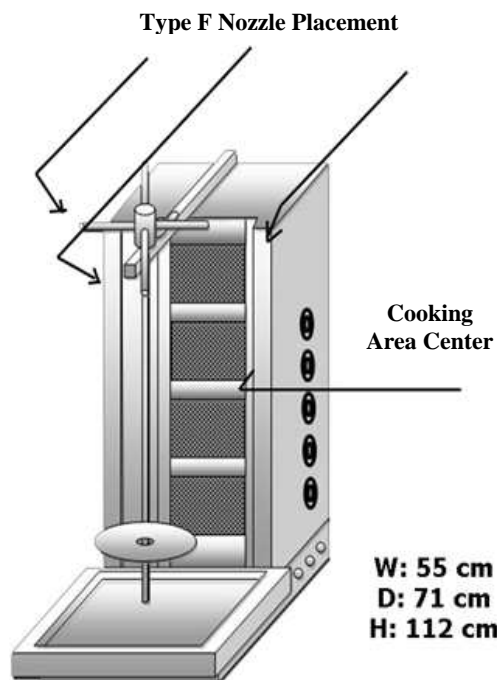


Figure 54: Type F Nozzle Placement and Limits in Doner Cookers

5.3.14. Nozzle Mounting Criteria for Chimney Protection
Type A Nozzle Mounting Criteria

| Appliance Type | Cornered Chimney Periphery | Circular Chimney Diameter | Nozzle Type | Nozzle Number |
|----------------|----------------------------|---------------------------|-------------|---------------|
| CHIMNEY | 160 | 40 | Type A | 1 |
| CHIMNEY | 240 | 60 | Type A | 2 |

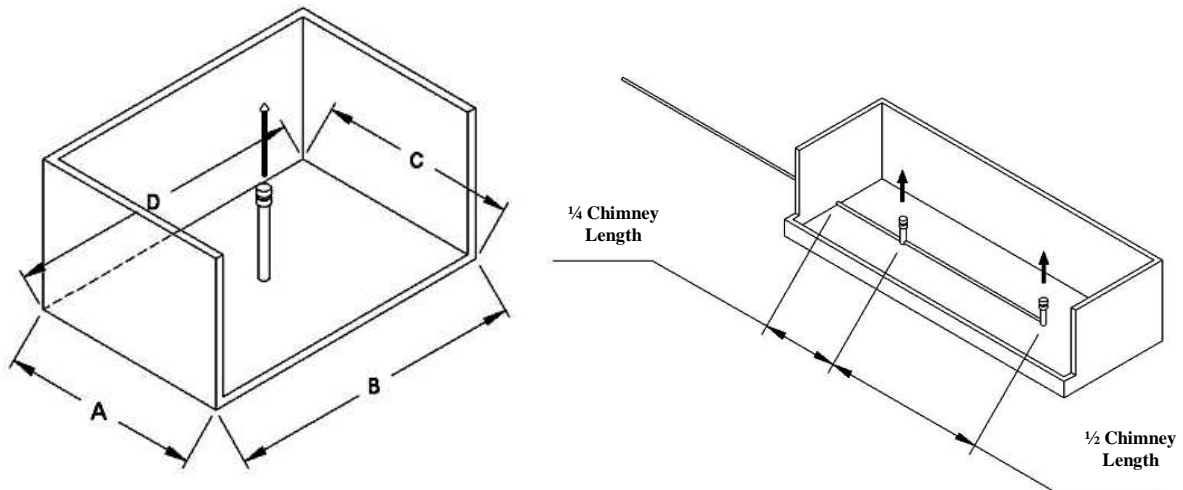


Figure 55: Type A Nozzle Placement and Limits in Range Hood Chimneys

Square type chimneys should be positioned so that nozzle faces the center exactly. In chimneys with a perimeter larger than 160 cm, 2 units of type A nozzles should be used and positioned according to the predetermined criteria as stated above within the chimney. The length of nozzle inside the chimney shouldn't exceed 3 cm. If there is more than one chimney in the system, there should be separate type A nozzles for each chimney.

Exception

If chimney inlet and channel upper point is less than 50 cm, type A nozzle should be placed within the channel and in the direction of channel air suction.

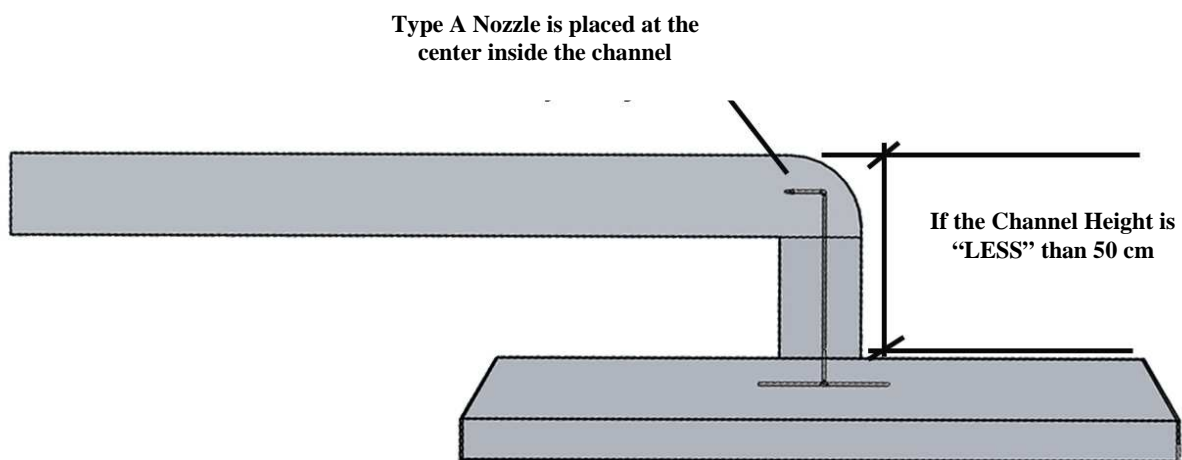


Figure 56: Type A Nozzle Placement and Limits in chimneys whose channel connection length is less than 50 cm

**5.3.15. Nozzle Mounting Criteria for Filter Protection
Type A Nozzle Mounting Criteria**

| Appliance Type | Max. Length | Max. Width | Filter Type | Nozzle Type | Flow Number |
|----------------|-------------|------------|------------------|-------------|-------------|
| FILTER | 300 | 90 | Double or Single | Type A | 1 |

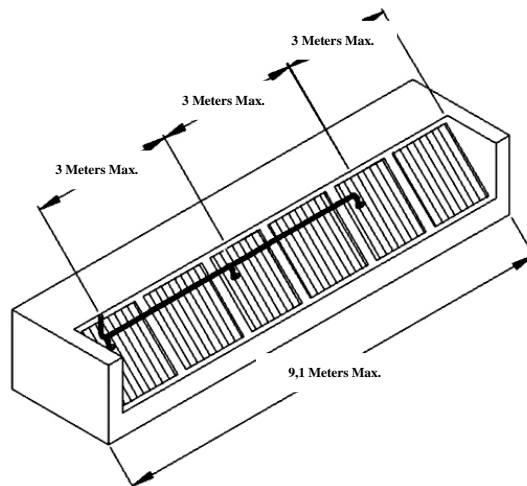
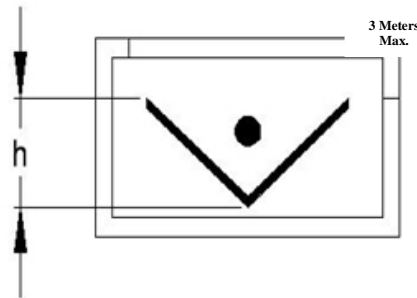


Figure 57: Type A Nozzle Placement and Limits in Range Hood Chimneys

The nozzles that are used for filter protection should be placed behind the filter. It should reach the center of the gap in the shape of “V” behind. If protection is to be provided with more than one nozzle, nozzles should be placed in such a way not to leave any idle spot. Both nozzles should be positioned in such a way to cover the surface of both filters.

Please Note.!!: Filter protection line and nozzle can not be used in range hoods without filter.

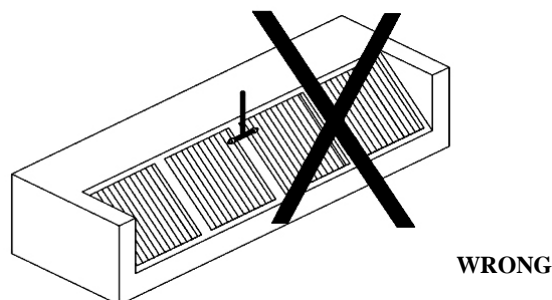


Figure 58: Wrong mounting that shouldn't be performed in filter protection nozzle

This type of nozzle shouldn't be used in filter protection. Extinguishing will not take place in the area where nozzles are placed due to the nozzle spraying distance.

5.4. Nozzle Mounting Criteria Table for Cooking Appliances Protection

| Appliance Type | MEASURE | Nozzle (H) Min. | Nozzle (H) Max. | Nozzle Angle | Nozzle Type | Flow Number |
|---|-----------------------------------|-----------------|-----------------|--|-------------|-------------|
| Cooker with 4 Rings (Gas) | 71X71 | 51 | 107 | 23 cm deviation from center tolerated | R | 1 |
| Grill Plate (Flat Cooking Surface) | 76x107 | 33 | 120 | 8 cm deviation from center tolerated | A | 1 |
| Deep fat fryer Single Vat | 61x61 | 70 | 107 | Within Cooking Area Frame | F | 2 |
| Deep fat fryer Single Vat <i>(Low Approach when necessary)</i> | 36x38 | 70 | 80 | Within frame | A | 1 |
| Deep fat fryer Double Vat | 2x(25x42) | 70 | 114 | Within Cooking Area Frame | F | 2 |
| Wok (Chinese Pan) | Dia.: 36 -71 cm Depth: 8-20 cm | 89 | 142 | 5 cm deviation from center tolerated. <i>Height to be calculated from bottom of pan.</i> | A | 1 |
| Sponge, Lava, Ceramic Stone Barbecue | 56x58 | 70 | 120 | Between 45° and 90° | F | 2 |
| Wood Coal Barbecue | 61x61 | 70 | 120 | Between 45° and 90° (at 16 Cm depth) | A | 1 |
| Electrical Barbecue (open grill slices) | 61x53 | 70 | 120 | Between 45° and 90° | A | 1 |
| Gas Barbecue | 61x53 | 70 | 120 | Between 45° and 90° | A | 1 |
| Wood Frill (Mesquit) | 76x61 | 70 | 120 | Between 45° and 90° (Fuel depth up to 25cm) | F | 2 |
| Tilting Pan | 61x61 | 70 | 120 | | F | 2 |
| Döner Cooker | 55x71x112 | 115 | 125 | Between 45° and 90° | F | 2 |

5.5. Electricity, Gas Cut Off, Fan Turning Off and Alarm System Connection

If too many appliances are to be controlled, micro switch contacts are used in order to operate an appropriate relay however relay is not included in the system. Contact outputs may trigger a fire alarm system or run an alarm siren.

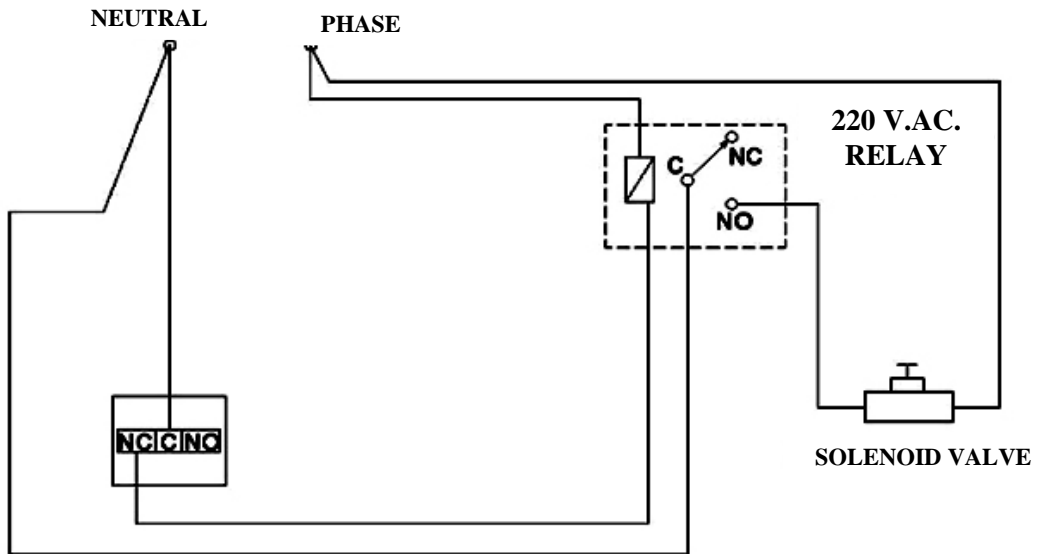
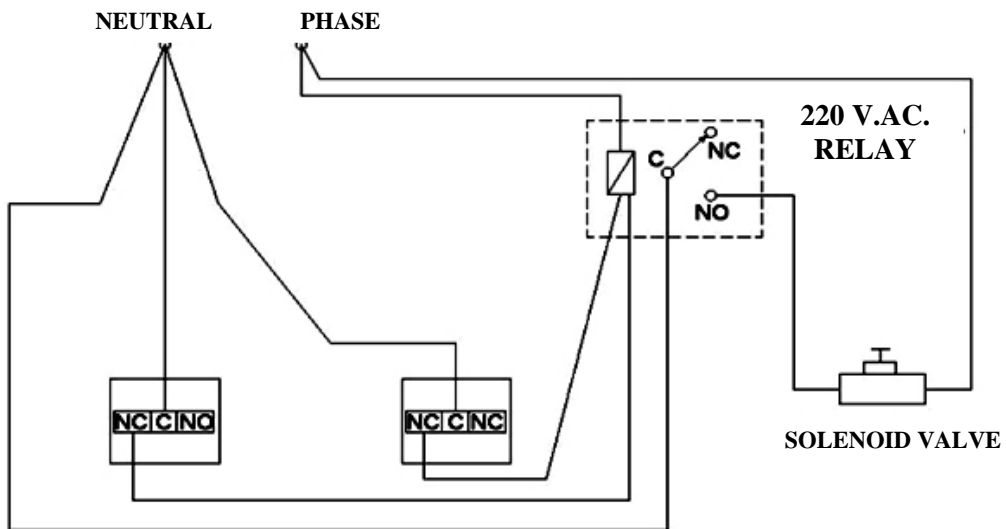


Figure 59: Solenoid valve control with one activation mechanism



Solenoid valve control with two activation mechanisms

Figure 60: Gas Cut Off System with Micro Switch

6. Discharge Pipes Design, Pipe Diameters and Total Pipe Limits (hydraulic calculations)

6.1. Discharge Pipe and Fittings

All pipes and fittings to be used in the system should be made of 304L quality stainless steel chrome steel (SCH40). Wall thickness of materials shouldn't be less than 2.30 mm. This wall thickness is necessary since threads are to be opened at the end of pipes. Different diameters of pipes are used in each system and pipe diameters and lengths are determined according to hydraulic calculation. Although it is recommended to use AISI 304L SS stainless steel pipes, metric untempered copper pipe can also be used. In installations with copper pipe, copper fittings can be used too.

Please Note

Following points should be taken into consideration during the mounting of discharge pipe line within range hood.

- 1- Galvanized pipe can not be used in the system.
- 2- Galvanized fittings can not be used in the system.
- 3- Pipes shouldn't be bent while installing pipes, outer surface shouldn't be damaged.
- 4- Synthetic liquid seal should be used at pipe joints and Teflon tape, etc. shouldn't be used.
- 5- Pipes should be fixed to range hood body by means of clamps at appropriate diameters.
- 6- All fittings in joints should be rigid.
- 7- Chrome pipes should never be painted.
- 8- While fixing pipe installation to range hood, oil-tightness should be ensured.
- 9- Pipes should be supported with rods considering the possibility of sagging in time.

6.2. Discharge Pipes Limits

All nozzles should spray expected amount of cylinder liquid under necessary pressure so that system can perform at maximum level. A fine hydraulic calculation is needed. The diameters of pipes and fittings that are used in systems have been limited in order to fulfill such conditions. Accordingly, total of flow numbers on each discharge line are given below.

Minimum Pipe Diameter Limits According to Flow Number

| Flow Number | Pipe Diameter |
|-------------|---------------|
| 1-8 | 3/8" |
| 1-12 | 1/2" |
| 13-24 | 3/4" |

Please Note

Pipes with diameters less or greater than the ones given in this table are not used.

Cylinder + maximum pipe lengths between the furthest nozzle and two furthest nozzles

| System Type | Maximum Pipe Length from Cylinder to the Furthest Nozzle (Equivalent Pipe Length) | Maximum Pipe Length between Two Furthest Nozzles (Equivalent Pipe Length) |
|-----------------------|---|---|
| D8 System (8 Flows) | 14 Meters | 13 Meters |
| D12 System (12 Flows) | 40 Meters | 29 Meters |
| D18 System (18 Flows) | 23 Meters | 24 Meters |

Pipe lengths that are stated in this table are maximum values. Pipe lengths should be shortened according to the values in 6.4 article for each fitting to be used.

6.3. Height Limits between Discharge Lines

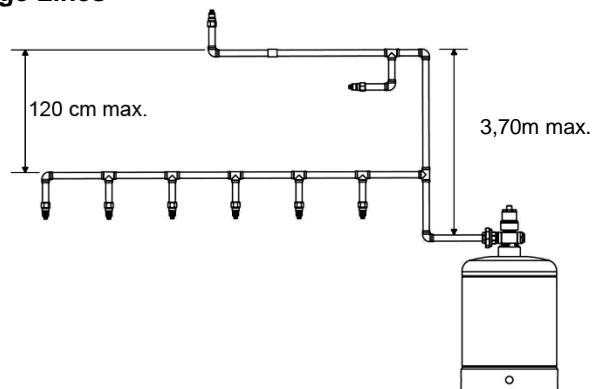


Figure 61: Limits between Discharge Pipes

Maximum height of all discharge lines to filter-chimney discharge line is 3,70 m.
Maximum height of cooking appliances discharge line and filter-chimney discharge line is 1,20 m.

6.4. Equivalent Pipe Length

Hydraulic calculations of standard systems have been completed and given in the following table. The values stated in these tables shouldn't be exceeded. However, when range hood dimensions, cooking appliance type, number and dimensions are determined by special applications, certain special practices can be permitted by "performance of appropriate hydraulic calculations by the manufacturer". The equivalent pipe length (EDBU) table of pipes and fittings used in the systems are basically given in the following tables. Total pipe length may be shortened or extended for each fitting used or not used. Flat pipe length is taken as 1. PS: EDBU lengths are given in cm.

| Diameter | Material | Amount | EDBU |
|----------|-----------------|--------|------|
| 3/4" | 90° elbow | 1 | 0,64 |
| | Bull T | 1 | 1,37 |
| | Run T | 1 | 0,43 |
| | Red. 1 to 3/4 | 1 | 0,15 |
| 1/2" | 90° elbow | 1 | 0,46 |
| | Bull T | 1 | 1,07 |
| | Run T | 1 | 0,34 |
| | Red. 3/4 to 1/2 | 1 | 0,12 |
| 3/8" | 90° elbow | 1 | 0,40 |
| | Bull T | 1 | 0,82 |
| | Run T | 1 | 0,24 |
| | Red. 1/2 to 3/8 | 1 | 0,09 |

Please Note!!

In T additional parts that are used in flow direction, if direction flow has a turn by 90°, then this is a "Bull T".

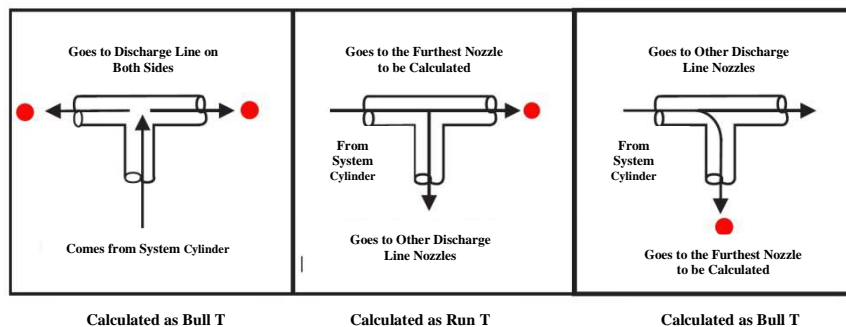


Figure 62: Run T and Bull T concepts in hydraulic calculations

6.5. Minimum Pipe Requirement (Deep fat fryer Oil Splash Safety)

D8 System Minimum Pipe Limit

- When a pipe with different diameter than feeding line is used, the longer the length from the cylinder to the first T, the shorter the pipe lengths after the first T should be.
- If the first nozzle after the cylinder is deep fat fryer nozzle, there should be at least 2,65 meters 3/8" pipe from cylinder to first cooking appliance and at least 1 elbow, or
- When 3/8" or 1/2" pipe is used, Cylinder + First nozzle pipe distance can not be shortened by using elbow or Tee.
- If there is 1-8 flow on the line, pipe should be 3/8".

D12 System Minimum Pipe Limit

- When a pipe with different diameter than feeding line is used, the longer the length from the cylinder to the first T, the shorter the pipe lengths after the first T should be.
- If the first nozzle after the cylinder is deep fat fryer nozzle, there should be at least 2,05 meters 1/2" pipe from cylinder to first cooking appliance and at least 2 elbows.
- If the first nozzle after the cylinder is deep fat fryer nozzle; Cylinder + First nozzle pipe distance can not be shortened by using elbow or T in 1/2" pipe usage.
- If there is 1-12 flow on the line, pipe should be 1/2".

D18 System Minimum Pipe Limit

- The longer the length from the cylinder to the first T, the shorter the pipe lengths after the first T should be.
- If there is 1-12 flow on the line, pipe should be 1/2". If there is 13-24 flow on the line, pipe should be 3/4".

| System Type | Allowable minimum pipe size |
|-------------|---|
| D8 | 2,65 m 3/8" pipe+ 2 pcs 3/8" elbow |
| D12 | 2,05 m 1/2" pipe + 2 pcs 1/2" elbow |
| D18 | 0,7 m 3/4" pipe + 1,35 m 1/2" pipe+ 1 pcs 3/4" elbow + 1 pcs 1/2" elbow |

Warning

The item 6.5 is very important for splash Safety and must take care during the system installation. The detailed information is given on item 9 "system set up and limitation". The maximum and minimum limitations are restricted by 4 different configurations.

7. Detection Line and Detectors

Detector line placement

Steel rope in the detector line should be carried to activation mechanism by means of 18x2 mm aluminum pipes. It should be fixed to detector mounting kit by EMT rings. Aluminum pipes should be clamped and fixed at every 150 cm until activation mechanism both inside and outside the range hood. Corner pulleys should be used at corners. As a result of the positioning of the detector line, it should be moved very easily by means of 1/16" (7x7+1) AISI 304 stainless steel rope. There should be no joint on the steel rope.

Detector placement and limitations

- The detection line maximum total length is 40 m
- The detection line maximum total elbow amount is 30 m
- Each detector detects fire in 137 cm length.
- Each exhaust duct should have one detector. If the hood/plenum length more than 137cm the another detector should be placed in each 137 cm after exhaust duct detector
- If the exhaust duct diameter is less than 125mm the detectors can be placed in every 137cm without placing a detector only for exhaust duct.
- The detectors used for cooking appliances must be located above the surface and within the perimeter of the cooking appliance or the air stream of the cooking fumes for quick fire detection. They must be positioned toward the exhaust duct side of the appliance and high enough to prevent accidental actuation of the system.
- The detectors triggering/actuation temperature should be above of the ambient or working temperature

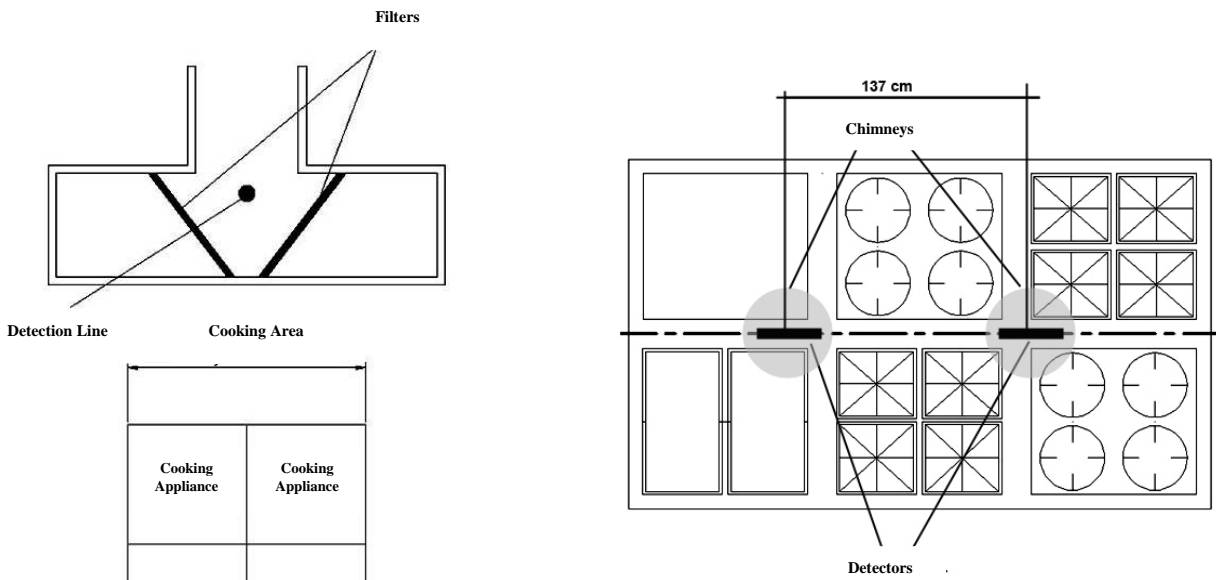


Figure 63: Detector Line Placement behind the Range Hood Filter

8. Extinguishing Liquid

Fire Eraser ® (FE) chemical extinguishing liquid is used in the system. No other liquid can be used in the system.

Filling amounts (+/-%5) ;

9,5 Liters in D-8 Systems

15 Liters in D-12 Systems

22,7 Liters in D-18 Systems

Contents of extinguishing liquid are formulated with K₂CO₃. They have a denser fluidity compared to water and heavier in volume compared to water.

CAUTION!!!

—Cylinder liquid amounts shouldn't be calculated in kilogram. Since specific gravity of Fire Eraser ® is more, filling amount is determined according to volume containers and then filled.

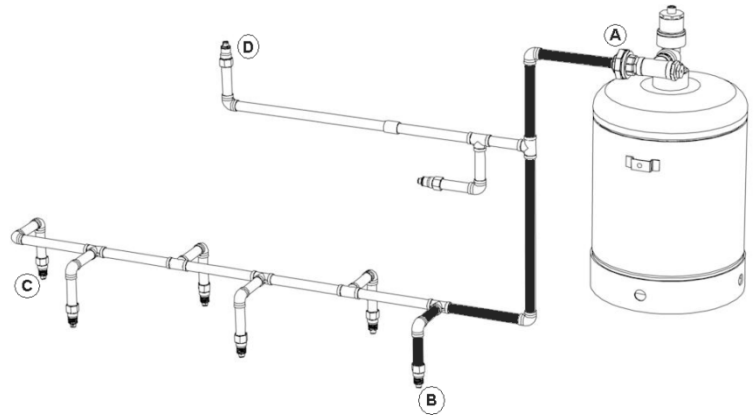
—All equipment and hands should be washed with plenty of hot water after having filled Fire Eraser ®. The liquid has minor irritating effect in case of elongated contact with skin. It shouldn't be drunk or mixed with food. All foods contaminated by liquid should be disposed. They should not be consumed.

MSDS report of Fire Eraser® liquid chemical cylinder is attached to the manual.

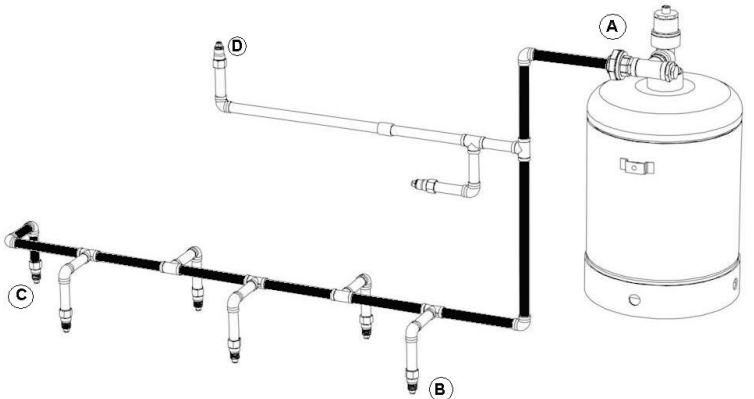
9. System Setup and Limits

9.1. 8 FLOW SYSTEM (D-8)

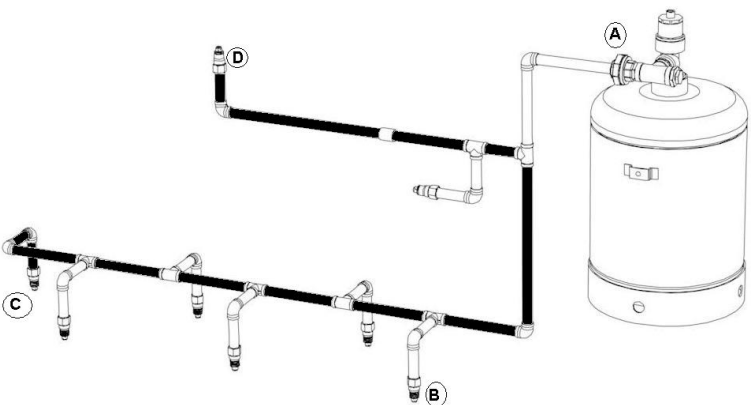
| Cylinder + First Nozzle Minimum Distance | | | | | |
|--|-----------------|-----|-----|------|------|
| Diameter | Fittings | 1 | 2 | 3 | 4 |
| 3/4" | Pipe | | | 0,7 | 0,5 |
| | 90° elbow | 1 | 1 | 2 | 3 |
| | Bull T | | | | |
| | Run T | | | 1 | 1 |
| 1/2" | Pipe | | 2,1 | 0,75 | 0,75 |
| | 90° elbow | | 2 | 1 | 1 |
| | Bull T | | 1 | 1 | 1 |
| | Run T | | 1 | | |
| | Red. 3/4 to 1/2 | | | 1 | 1 |
| 3/8" | Pipe | 2,6 | | | |
| | 90° elbow | 2 | | | |
| | Bull T | 1 | | | |
| | Run T | 1 | | | |
| | Red. 1/2 to 3/8 | | 1 | | |



| Cylinder + Furthest Nozzle Maximum Distance | | | | | |
|---|-----------------|----|-----|------|------|
| Diameter | Fittings | 1 | 2 | 3 | 4 |
| 3/4" | Pipe | | | 0,75 | 0,5 |
| | 90° elbow | 1 | 1 | 2 | 3 |
| | Bull T | | | | |
| | Run T | | | 1 | 1 |
| 1/2" | Pipe | | 2,1 | 0,75 | 0,75 |
| | 90° elbow | | 2 | 1 | 1 |
| | Bull T | | 1 | 1 | 1 |
| | Run T | | 1 | | |
| | Red. 3/4 to 1/2 | | | 1 | 1 |
| 3/8" | Pipe | 10 | 7 | 7 | 6,8 |
| | 90° elbow | 3 | 1 | 1 | 1 |
| | Bull T | | | | |
| | Run T | 6 | 4 | 4 | 4 |
| | Red. 1/2 to 3/8 | | 1 | 1 | 1 |

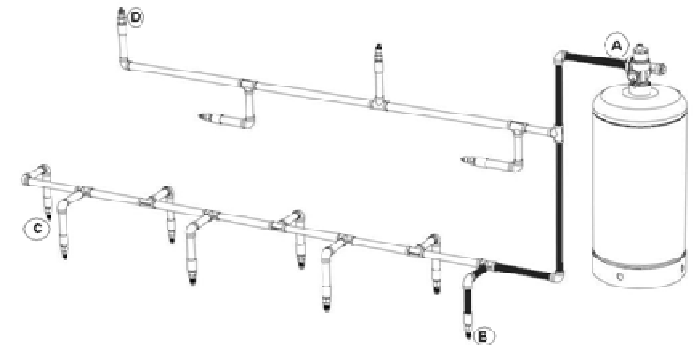


| Maximum Distance between the Furthest Two Nozzles | | | | | |
|---|-----------------|-----|------|---|---|
| Diameter | Fittings | 1 | 2 | 3 | 4 |
| 3/4" | Pipe | | | | |
| | 90° elbow | | | | |
| | Bull T | | | | |
| | Run T | | | | |
| | Red. 1 to 3/4 | | | | |
| 1/2" | Pipe | | 0,75 | | |
| | 90° elbow | | 1 | | |
| | Bull T | | 1 | | |
| | Run T | | 1 | | |
| | Red. 3/4 to 1/2 | | | | |
| 3/8" | Pipe | 9,8 | 7,5 | | |
| | 90° elbow | 3 | 2 | | |
| | Bull T | 1 | 1 | | |
| | Run T | 6 | 5 | | |
| | Red. 1/2 to 3/8 | | 2 | | |

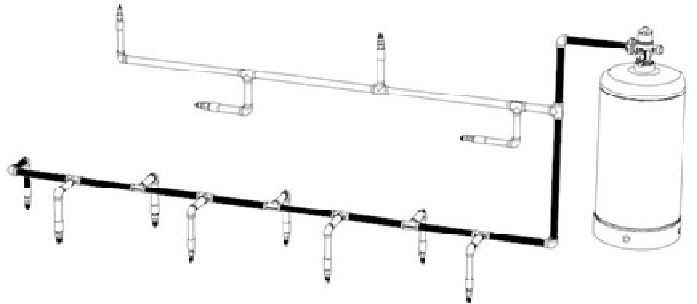


9.2. 12 FLOW SYSTEM (D-12)

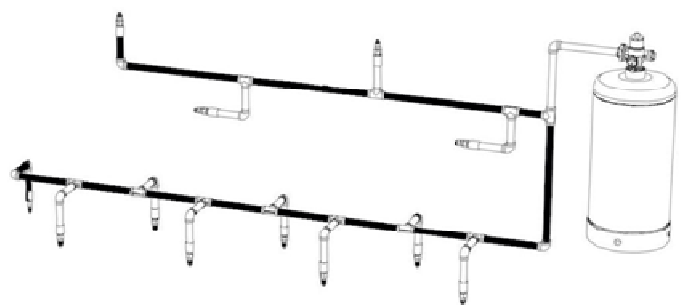
| Cylinder + First Nozzle Minimum Distance | | | | | |
|--|-----------------|---|-----|------|------|
| Diameter | Fittings | 1 | 2 | 3 | 4 |
| 3/4" | Pipe | | | 0,7 | 0,5 |
| | 90° elbow | | 1 | 2 | 3 |
| | Bull T | | | | |
| | Run T | | | 1 | 1 |
| 1/2" | Pipe | | 2,1 | 0,75 | 0,75 |
| | 90° elbow | | 2 | 1 | 1 |
| | Bull T | | 1 | 1 | 1 |
| | Run T | | 1 | | |
| | Red. 3/4 to 1/2 | | | 1 | 1 |
| 3/8" | Pipe | | | | |
| | 90° elbow | | | | |
| | Bull T | | | | |
| | Run T | | | | |
| | Red. 1/2 to 3/8 | | 1 | | |



| Cylinder + Furthest Nozzle Maximum Distance | | | | | |
|---|-----------------|---|-----|-----|-----|
| Diameter | Fittings | 1 | 2 | 3 | 4 |
| 3/4" | Pipe | | | 0,7 | 0,5 |
| | 90° elbow | | 1 | 2 | 3 |
| | Bull T | | | | |
| | Run T | | | 1 | 1 |
| 1/2" | Pipe | | 33 | 32 | 31 |
| | 90° elbow | | 3 | 2 | 2 |
| | Bull T | | 1 | | |
| | Run T | | 10 | 9 | 9 |
| | Red. 3/4 to 1/2 | | | 1 | 1 |
| 3/8" | Pipe | | 0,3 | 0,3 | 0,3 |
| | 90° elbow | | | | |
| | Bull T | | | | |
| | Run T | | | | |
| | Red. 1/2 to 3/8 | | | | |

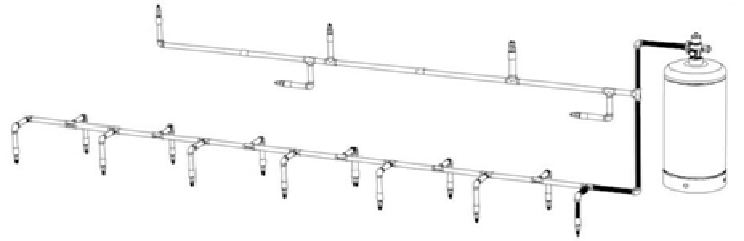


| Maximum Distance between the Furthest Two Nozzles | | | | | |
|---|-----------------|---|------|-----|-----|
| Diameter | Fittings | 1 | 2 | 3 | 4 |
| 3/4" | Pipe | | | | |
| | 90° elbow | | | | |
| | Bull T | | | 1 | 1 |
| | Run T | | | | |
| 1/2" | Pipe | | 22,5 | 22 | 22 |
| | 90° elbow | | 3 | 3 | 3 |
| | Bull T | | 1 | | |
| | Run T | | 10 | 10 | 10 |
| | Red. 3/4 to 1/2 | | | 2 | 2 |
| 3/8" | Pipe | | 0,6 | 0,6 | 0,6 |
| | 90° elbow | | | | |
| | Bull T | | | | |
| | Run T | | | | |
| | Red. 1/2 to 3/8 | | | | |

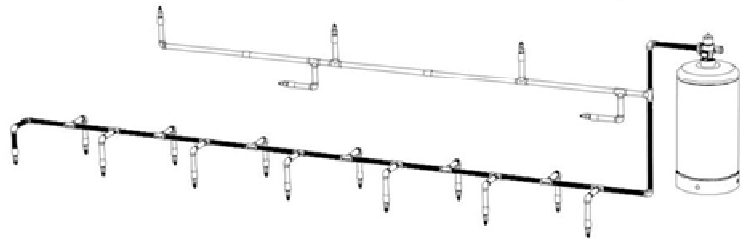


9.3. 18 FLOW SYSTEM (D-18)

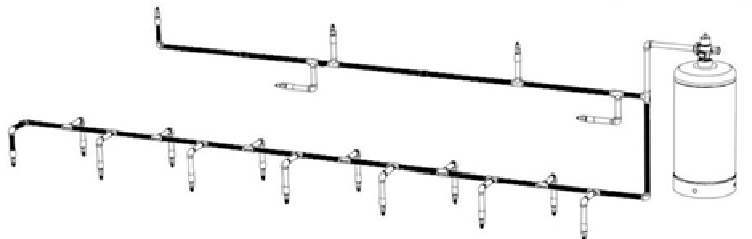
| Cylinder + First Nozzle Minimum Distance | | | | | |
|--|-----------------|---|---|------|------|
| Diameter | Fittings | 1 | 2 | 3 | 4 |
| 3/4" | Pipe | | | 0,7 | 0,5 |
| | 90° elbow | | | 2 | 3 |
| | Bull T | | | | |
| | Run T | | | 1 | 1 |
| 1/2" | Pipe | | | 1,35 | 0,75 |
| | 90° elbow | | | 1 | 1 |
| | Bull T | | | | 1 |
| | Run T | | | | |
| | Red. 3/4 to 1/2 | | | 1 | 1 |
| 3/8" | Pipe | | | | |
| | 90° elbow | | | | |
| | Bull T | | | | |
| | Run T | | | | |
| | Red. 1/2 to 3/8 | | | 1 | 1 |



| Cylinder + Furthest Nozzle Maximum Distance | | | | | |
|---|-----------------|---|---|-----|-----|
| Diameter | Fittings | 1 | 2 | 3 | 4 |
| 3/4" | Pipe | | | 0,7 | 0,5 |
| | 90° elbow | | | 2 | 3 |
| | Bull T | | | | |
| | Run T | | | 1 | 1 |
| 1/2" | Pipe | | | 13 | 12 |
| | 90° elbow | | | 2 | 2 |
| | Bull T | | | | |
| | Run T | | | 15 | 15 |
| | Red. 3/4 to 1/2 | | | 1 | 1 |
| 3/8" | Pipe | | | 0,3 | 0,3 |
| | 90° elbow | | | | |
| | Bull T | | | | |
| | Run T | | | | |
| | Red. 1/2 to 3/8 | | | 1 | 1 |



| Maximum Distance between Furthest Two Nozzles | | | | | |
|---|-----------------|---|---|-----|------|
| Diameter | Fittings | 1 | 2 | 3 | 4 |
| 3/4" | Pipe | | | | |
| | 90° elbow | | | | |
| | Bull T | | | 1 | 1 |
| | Run T | | | | |
| 1/2" | Pipe | | | 15 | 15,8 |
| | 90° elbow | | | 3 | 3 |
| | Bull T | | | | |
| | Run T | | | 16 | 16 |
| | Red. 3/4 to 1/2 | | | 2 | 2 |
| 3/8" | Pipe | | | 0,6 | 0,6 |
| | 90° elbow | | | | |
| | Bull T | | | | |
| | Run T | | | | |
| | Red. 1/2 to 3/8 | | | 2 | 2 |



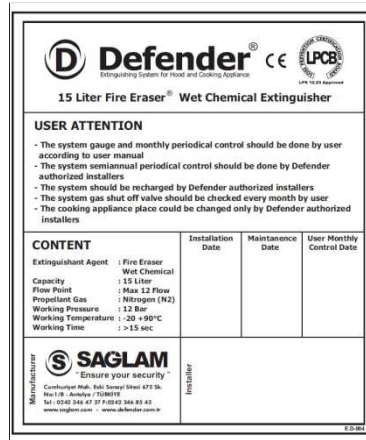
10. Labels and Documentation

The labels in the system are given below.

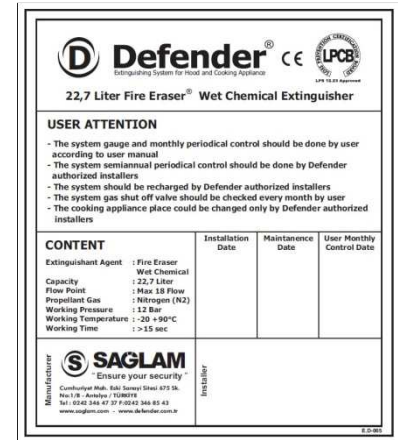
10.1. System Cylinder labels



D8 System Cylinder Label
ED.004



D12 System Cylinder Label
ED.005



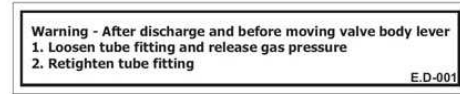
D18 System Cylinder Label
ED.006

Figure 64: System Cylinder Labels

10.2. Activation mechanism labels



Activation mechanism Status Label
ED-002



Activation mechanism Service Label
ED-001

Figure 65: Activation Mechanism Labels

10.3. Activation Button Label



Activation Button Label
ED-010

10.4 User Attention Label



User Attention Label
ED-011

Figure 66: Activation Button and user attention labels

Kitchen Cooking Appliances and Range Hood Extinguishing System



10.4. User Manuel Label

DAVLUMBAZ SÖNDÜRME SİSTEMİ

UYARILARI VE KULLANIM KILAVUZU

YANGIN ANINDA

- Selenin otomatik olarak devreye girmesi beklemeden manuel aktivasyon butonundaki halkayı kendinize doğru çekerek pimi yarındın olakın. Sistem aktive olacaktır.
- Isın müdahaleli olmadığı halde de davlumbaz filtresindeki çokalkı ağını yavaşça göğde algılama dedektörü enyene kopar ve sistem aktive olur.
- Sistem aktivasyonu ile birlikte tip krendeki Fire Eraser® Kimyasal söndürme sıvısı baca, filtre ve pğime çıkadından itibaren konumlandırılmış nozullar aracılığı ile pükürölüne yangını söndürülecektir.
- Sistem aktivasyonunda pğime çıkadından yoğun duman çıkarılır. Çıkarcıya yakın durulmamalıdır.
- Sistem aktivasyonu ile birlikte havalandırma fanı, pğime çıkadından enerji ve gaz akışı muhakkak durdurulmalıdır.
- Yangın anında tüm personel mutfaktan tahliye edilerek yedellerine bilgi verilmesi gerekyorsa tahliye çağrımalıdır.
- Yangından sonra tüm ekipman (Baca, Filtre ve Pğime çıkadın) bol suyla su ile yıkanarak temiz kullanılmalıdır.
- Mutfaktaki mevcut gazlara çok az miktarda kimyasal söndürme sıvısı bulaşmış olsa bile tamamı inha edilmesi kesinlikle katiptir.
- Kıymetli söndürme sıvısı yoğun bir şekilde kullanılmamalıdır. Takat bir maddede değildir. İnsan sağlığına zararlı değildir ancak tehli edicidir. Gazların tadını bozmaktadır. Yutulduğunda mide bulantısına sebep olur.
- Yangın sonrası tüm personel ile durum değerlendirilmesi yapılarak olay sonrası kazanımlar elde edilmelidir.
- Tektar odanın ve devreye alınak için servis firmasına arınınız. Sistem tekrar aktive edilmeden mütlü kullanılmayınız.

PERİYODİK KONTROLLER

Her gün göde yapılması gereken kontroller; (Vardiye kontrolleri)

- Naculan pğime ünitesinde herhangi bir engelle (keçir, keçir vb arızalar) asıl olmadığı kontrol edilmelidir.
- Pğime çıkadının üzerinde yer alan nozulların etkaks olduğu, pğime çıkadının merkezinde konumlandırıldığı ve nozul yağ kapaklarının yerinde olduğu kontrol edilmelidir.

Her hafta göde yapılması gereken kontroller;

- Her gün yapılan kontrollerle etk olarak;
- Manuel aktivasyon butonundaki halkanın takılı ve mühürünün yerinde olduğu kontrol edilmelidir.
- Sistem tüpü üzerindeki ve buton üzerindeki manometre basınçları ve pğide (12 Bar) olduğu kontrol edilmelidir.
- Sistem tüpünün yanında bulunan aktivasyon mekanizmasını hasarsız olduğu kontrol edilmelidir.
- Söndürme tüpünde ve boğalma borusu hattında hasar olup olmadığı kontrol edilmelidir.
- Söndürme tüpünde ve boğalma borusu hattında hasar olup olmadığı kontrol edilmelidir.

Her 6 ayda bir yapılacak kontroller

- Defender Davlumbaz Söndürme sisteminin her 6 ayda bir periyodik bakımı muhakkak yapılmalıdır.
- İmalatçı firma veya servis firmasından sistemin periyodik bakımının yapılması talep edilmelidir.
- Periyodik bakımda sistemin tüm aktif bileşenleri sökülür, standında göre temizli yapılır, tektar montaj yapılırak test için testine tabi tutulur. Testi başarılı geçen sistemler belgelendirilir. Yangın performansı tamdır.
- Çünkü Aylık ve 6 Aylık bakım ve kontrollerin yapıldığı yavaş olarak kayıt altına alınarak arızalanmaz.

KULLANICI UYARILARI

- Pğime çıkadının yerleştirilmesi ve işlenmesi değiştirilmeyiniz.
- Pğime gürültüsündeki değişiklikler servis firmasının kontrolünde yapılmalı, ihtiyaç göre söndürme sisteminde bulunan pükürölücü nozullar ve algılama dedektörlerinin işlenmesi değiştirilmelidir.
- Söndürme sisteminde servis firması yetkili personeli dışında müdahale edilmemelidir.
- Davlumbaz ve pğime çıkadının temizliği yapılmalıdır. Özellikle filtre, filtre alanı ve baca içi temizlenmelidir.
- Davlumbaz üst yüzeyi sürekli kontrol edilip yağ biriktirilmemelidir.
- Davlumbaz tektarındaki yağ tahliye kanalı her hafta temizlenmelidir.
- Yangından sonra filtre ve bacaların yağların birikmesinden ökmekte ve yayılmaktadır.
- Temizlik sırasında davlumbaz içinde ve dışında yer alan algılama hattına dikkatli olunmalıdır ve yerini değiştirilmeyiniz.
- Algılama hattına müdahale edilmesi halinde sistemin aktivasyonu meydana gelecektir.
- Show mutfaklardaki alan gösterilerinde davlumbaz filtresi uzun süre açık olma manzı kalmamalıdır.
- Mangal ve ısıtılarda ilk kullandığında sistemin gereğinden fazla kömür ve tüpünümü kimyasal kullanılmamalıdır.
- Yangın kullanım davlumbaz çalışırken yüksek su meylatına gelene kadar bekletilmeyen aktivasyonlara neden olmaktadır.
- Söndürme boru hattı ve pükürölücü nozul yolları kesinlikle değiştirilmemelidir.
- Yeni değiştirilmiş pükürölücü nozullar söndürme sıvısını yanlış alana boşaltır ve yangını söndürülemez.
- Selenin kullanımı için detaylı eğitim belgesinde yer almaktadır. Ancak her 6 ayda bir periyodik bakım sırasında servis firmasından bu eğitimleri tekrar alınmalıdır eğitim belgesinde yer almaktadır.
- Sistemde kullanıcı hatasından kaynaklanan her türlü yangın aktivasyon garanti kapsamı dışındadır.
- Sistemde yer alan emyeli mühürleri koparılmamalıdır. Mühürsüz sistemler garanti kapsamı dışındadır.
- Servis firmasının personelinin yetkili belgesi talep ediniz.
- Sistem periyodik bakımın yapıldığı takdirde imalat hatalarına karşı garanti süresi 2 yıldır.

İletişim Firması
SAĞLAM Yangın Güvenlik ve Elektrik Sistemleri San. Tic. A.Ş.
Cumhuriyet Mah. Sulu Sireli 2006 475 Sok. No:1/8 - Anadoluhisari / TÜRKİYE
Ankara T: 0312 344 47 37 F: 0312 344 85 43
İstanbul T: 0212 344 46 89 F: 0212 344 23 89
Açık Durum Yatırım Yatırımları: 0212 681 45 48

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info@saglam.com
www.defender.com.tr
info@defender.com.tr

User Manuel Label (English)
ED-006

DAVLUMBAZ SÖNDÜRME SİSTEMİ

UYARILARI VE KULLANIM KILAVUZU

YANGIN ANINDA

- Selenin otomatik olarak devreye girmesi beklemeden manuel aktivasyon butonundaki halkayı kendinize doğru çekerek pimi yarındın olakın. Sistem aktive olacaktır.
- Isın müdahaleli olmadığı halde de davlumbaz filtresindeki çokalkı ağını yavaşça göğde algılama dedektörü enyene kopar ve sistem aktive olur.
- Sistem aktivasyonu ile birlikte tip krendeki Fire Eraser® Kimyasal söndürme sıvısı baca, filtre ve pğime çıkadından itibaren konumlandırılmış nozullar aracılığı ile pükürölüne yangını söndürülecektir.
- Sistem aktivasyonunda pğime çıkadından yoğun duman çıkarılır. Çıkarcıya yakın durulmamalıdır.
- Sistem aktivasyonu ile birlikte havalandırma fanı, pğime çıkadından enerji ve gaz akışı muhakkak durdurulmalıdır.
- Yangın anında tüm personel mutfaktan tahliye edilerek yedellerine bilgi verilmesi gerekyorsa tahliye çağrımalıdır.
- Yangından sonra tüm ekipman (Baca, Filtre ve Pğime çıkadın) bol suyla su ile yıkanarak temiz kullanılmalıdır.
- Mutfaktaki mevcut gazlara çok az miktarda kimyasal söndürme sıvısı bulaşmış olsa bile tamamı inha edilmesi kesinlikle katiptir.
- Kıymetli söndürme sıvısı yoğun bir şekilde kullanılmamalıdır. Takat bir maddede değildir. İnsan sağlığına zararlı değildir ancak tehli edicidir. Gazların tadını bozmaktadır. Yutulduğunda mide bulantısına sebep olur.
- Yangın sonrası tüm personel ile durum değerlendirilmesi yapılarak olay sonrası kazanımlar elde edilmelidir.
- Tektar odanın ve devreye alınak için servis firmasına arınınız. Sistem tekrar aktive edilmeden mütlü kullanılmayınız.

PERİYODİK KONTROLLER

Her gün göde yapılması gereken kontroller; (Vardiye kontrolleri)

- Naculan pğime ünitesinde herhangi bir engelle (keçir, keçir vb arızalar) asıl olmadığı kontrol edilmelidir.
- Pğime çıkadının üzerinde yer alan nozulların etkaks olduğu, pğime çıkadının merkezinde konumlandırıldığı ve nozul yağ kapaklarının yerinde olduğu kontrol edilmelidir.

Her hafta göde yapılması gereken kontroller;

- Her gün yapılan kontrollerle etk olarak;
- Manuel aktivasyon butonundaki halkanın takılı ve mühürünün yerinde olduğu kontrol edilmelidir.
- Sistem tüpü üzerindeki ve buton üzerindeki manometre basınçları ve pğide (12 Bar) olduğu kontrol edilmelidir.
- Sistem tüpünün yanında bulunan aktivasyon mekanizmasını hasarsız olduğu kontrol edilmelidir.
- Söndürme tüpünde ve boğalma borusu hattında hasar olup olmadığı kontrol edilmelidir.
- Söndürme tüpünde ve boğalma borusu hattında hasar olup olmadığı kontrol edilmelidir.

Her 6 ayda bir yapılacak kontroller

- Defender Davlumbaz Söndürme sisteminin her 6 ayda bir periyodik bakımı muhakkak yapılmalıdır.
- İmalatçı firma veya servis firmasından sistemin periyodik bakımının yapılması talep edilmelidir.
- Periyodik bakımda sistemin tüm aktif bileşenleri sökülür, standında göre temizli yapılır, tektar montaj yapılırak test için testine tabi tutulur. Testi başarılı geçen sistemler belgelendirilir. Yangın performansı tamdır.
- Çünkü Aylık ve 6 Aylık bakım ve kontrollerin yapıldığı yavaş olarak kayıt altına alınarak arızalanmaz.

KULLANICI UYARILARI

- Pğime çıkadının yerleştirilmesi ve işlenmesi değiştirilmeyiniz.
- Pğime gürültüsündeki değişiklikler servis firmasının kontrolünde yapılmalı, ihtiyaç göre söndürme sisteminde bulunan pükürölücü nozullar ve algılama dedektörlerinin işlenmesi değiştirilmelidir.
- Söndürme sisteminde servis firması yetkili personeli dışında müdahale edilmemelidir.
- Davlumbaz ve pğime çıkadının temizliği yapılmalıdır. Özellikle filtre, filtre alanı ve baca içi temizlenmelidir.
- Davlumbaz üst yüzeyi sürekli kontrol edilip yağ biriktirilmemelidir.
- Davlumbaz tektarındaki yağ tahliye kanalı her hafta temizlenmelidir.
- Yangından sonra filtre ve bacaların yağların birikmesinden ökmekte ve yayılmaktadır.
- Temizlik sırasında davlumbaz içinde ve dışında yer alan algılama hattına dikkatli olunmalıdır ve yerini değiştirilmeyiniz.
- Algılama hattına müdahale edilmesi halinde sistemin aktivasyonu meydana gelecektir.
- Show mutfaklardaki alan gösterilerinde davlumbaz filtresi uzun süre açık olma manzı kalmamalıdır.
- Mangal ve ısıtılarda ilk kullandığında sistemin gereğinden fazla kömür ve tüpünümü kimyasal kullanılmamalıdır.
- Yangın kullanım davlumbaz çalışırken yüksek su meylatına gelene kadar bekletilmeyen aktivasyonlara neden olmaktadır.
- Söndürme boru hattı ve pükürölücü nozul yolları kesinlikle değiştirilmemelidir.
- Yeni değiştirilmiş pükürölücü nozullar söndürme sıvısını yanlış alana boşaltır ve yangını söndürülemez.
- Selenin kullanımı için detaylı eğitim belgesinde yer almaktadır. Ancak her 6 ayda bir periyodik bakım sırasında servis firmasından bu eğitimleri tekrar alınmalıdır eğitim belgesinde yer almaktadır.
- Sistemde kullanıcı hatasından kaynaklanan her türlü yangın aktivasyon garanti kapsamı dışındadır.
- Sistemde yer alan emyeli mühürleri koparılmamalıdır. Mühürsüz sistemler garanti kapsamı dışındadır.
- Servis firmasının personelinin yetkili belgesi talep ediniz.
- Sistem periyodik bakımın yapıldığı takdirde imalat hatalarına karşı garanti süresi 2 yıldır.

İletişim Firması
SAĞLAM Yangın Güvenlik ve Elektrik Sistemleri San. Tic. A.Ş.
Cumhuriyet Mah. Sulu Sireli 2006 475 Sok. No:1/8 - Anadoluhisari / TÜRKİYE
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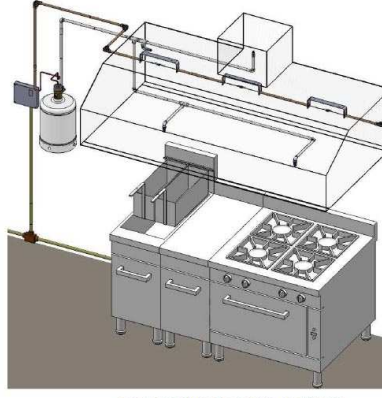
User Manuel Label (Turkish)
ED-007

10.5. User Manuel Book

Kitchen Cooking Appliances and Range Hood Extinguishing System



Kitchen Cooking Appliances and Range Hood Extinguishing Systems



DEFENDER KITCHEN COOKING APPLIANCES AND RANGE HOOD EXTINGUISHING SYSTEM

MECHANICAL ACTIVATION



TECHNICAL MANUAL

User Manuel (English) ED-99

Please Note!!
Removed, worn or illegible labels should be replaced during periodical inspection of the system.

11. Test and Commissioning

Mounting should be performed by an authorized mounting team. Mounting should be performed with the information and materials included in this system manual. Below mentioned steps should be followed.

- 1- First of all system cylinder should be fixed to a flat ground.
- 2- Activation mechanism is mounted.
- 3- Activation button, if any, is mounted.
- 4- Detector line is mounted.
- 5- Discharge line pipes are installed.
- 6- System mounting final tests are performed after mounting the nozzles.
- 7- Sealing is performed for warranty and safety.
- 8- Labels are attached in a legible manner.
- 9- Date label is attached to the sections showing the inspection and filling date on the cylinder.
- 10- System is visually inspected and users are trained about the system.

12. Training

Kitchen responsible persons should gather upon the approval of the cook and informed verbally according to the information on user's manual about:

- a. System description
- b. Automatic operation
- c. Manual operation in case of fire
- d. Periodical inspections
- e. Things to be taken into account while using.

The descriptions and participants are certified in writing.

13. Periodical Maintenance

System should be periodically maintained semi annually according to international standards. All active and passive components in the system should be checked by service personnel and maintenance should be performed. Periodical inspections and maintenances are given below.

13.1. Detectors and Detector Line Periodical Maintenance

- All corner pulleys in the system shall be dismantled and rollers inside the elbow shall be checked. Elbows of tight or dirty rollers shall be dismantled and washed with oil solvent and hot water and provided an easy movement.
- Inoperative corner pulleys should be replaced.
- All detectors in detection line shall be dismantled and washed with hot water and then mounted again. Detectors shall be physically checked visually and damaged ones shall be replaced.
- Detectors should be replaced at least once a year and old detectors should be destroyed.
- It shall be checked whether there is rust or damage on the guy wire used in the detector line or not. If there is rust or damage, it shall be replaced completely. No addition can be made.
- Aluminum pipes and connection rings that are used in the detection line shall be checked. Connection components (clamps) shall be checked. Damaged ones shall be replaced.

13.2. Activation Button Periodical Maintenance

- It shall be checked whether there is rust or damage on button pin and it shall be replaced if any.
- Button steel rope stopper shall be checked and replaced if damaged.
- Button pin stopper shall be checked and replaced if damaged.
- Button pin chain shall be checked and replaced if damaged.
- Detection line wire connection shall be checked and replaced if damaged.
- Button cover shall be checked and replaced if damaged.
- Button shall be gathered, covered and sealed.

13.3. Activation Mechanism Periodical Maintenance

- Mechanism spring shall be checked and replaced if damaged.
- Lever bar shall be checked. It shall be made to move easily and replaced if damaged.
- Mechanism body shall be checked and replaced if damaged.
- Micro switch, if any, shall be checked. Contact change and electricity, gas and fan turning off function shall be confirmed (Switch is optional. It may not be found in all systems).
- Propellant CO₂ cartridge should be replaced semi annually. Replacement date should be recorded on old CO₂ cartridge and returned to the company representative.

13.4. Activation Valve Periodical Maintenance

- It shall be checked that pressure within the cylinder is 12 bars from the manometer on the valve. If it is lower than 12 bars, it shall be investigated. After sealing has been ensured, cylinder pressure shall be increased to 12 bars.
- Solidness of the safety valve on the valve shall be checked and replaced if damaged.
- It shall be checked whether there is oxidation in valve, falls in the coating, etc. and replaced if one or more of the damages are seen.

13.5. Nozzle Periodical Maintenance

- Positioning places of nozzles shall be noted and all of them shall be dismantled.
- Oil cover, filter and filter ring of nozzles shall be dismantled.
- Pulverizer at the tip of the nozzle shall never be dismantled.
- All of them shall rest within hot water mixed with oil solvent for 15 minutes.
- They shall be washed with fresh water, dried and gathered.
- Nozzles shall be mounted on cooking appliances suitably.
- They shall be confirmed by checking the angle and centers.

13.6. System Cylinder Periodical Maintenance

- If there is corrosion resulting from extinguishing liquid around the cylinder or valve, cylinder shall be dismantled completely and inspected.
- During semi annual periodical maintenance;
 - a. Cylinder's external surface should be damage-free.
 - b. Cylinder pressure should be made up if low (it should be 12 bars).
 - c. Valve safety valve should be damage-free.
 - d. Valve cylinder connection o-ring should be damage-free.
- During annual periodical maintenance;
 - a. Cylinder's pressure shall be released, valve shall be dismantled and liquid shall be discharged to a clean container.
 - b. Cylinder interior shall be inspected by light against corrosion and rust.
 - c. The coating damage within the cylinder shall be checked.
 - d. Siphon threads and surface shall be checked against damages.
 - e. Extinguishing liquid shall be poured into glass cup and kept for 1 hour and checked against particles or residues.
 - f. Every 5 years, cylinder should be subject to hydrostatic test and certified.

Recharging the system

The recharging should be performed by certified staff. The recharging should be performed with the information and materials included in this system manual. Below mentioned steps should be followed.

1. The all valve connections should be removed.
 2. The system cylinder should be removed from mounting bracket.
 3. The valve and cylinder should be checked visually against to any damage. (Example: If the valve piston is break, should be change new piston.!))
 4. The valve cover should be removed then push the pulse pin back inside to cover and assembly the cover on to valve body.
 5. The cylinder and valve should be washed detailed.
 6. The cylinder should be filled with FireEraser wet chemical.
 7. The valve o-ring of muff should be changed.
 8. The valve should be tight on the cylinder.
 9. The cylinder should be pressurized through discharge outlet with filling apertures by pressing valve closing pin.
 10. The valve gauge should be indicate 12 bar.
-

13.7. Discharge Pipes Periodical Maintenance

All discharge pipes should be cleaned every two years or after system activation. The mechanism that can be seen in the following figure can be used for this purpose. The ring at the cylinder output shall be dismantled and connected to mains water. Oil covers and foils at nozzle tips shall be dismantled. It can be gathered in a bucket by means of a suitable hose from each nozzle tip. (cooking appliances under the range hood shouldn't be affected). Mains water shall be supplied and water shall pass through the discharge pipes for 10 minutes. At the end of 10 minutes period, mechanism shall be dismantled and system shall be commissioned again.

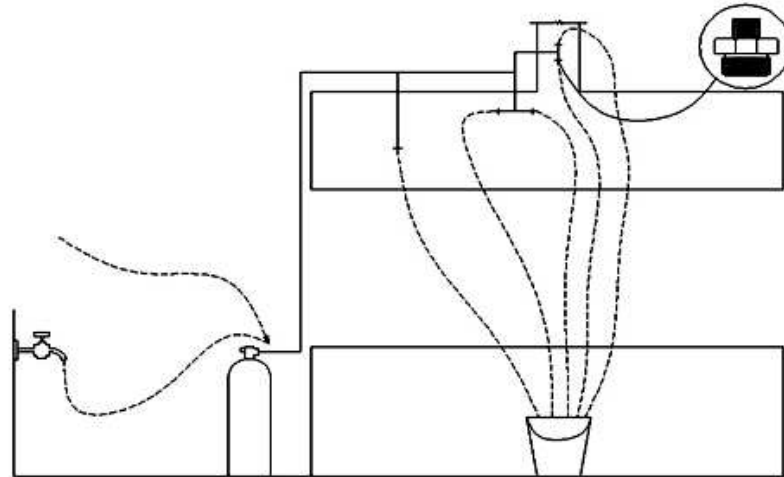


Figure 67: Recommended Mechanism for Washing the Discharge Pipes

13.8. Labels and Marking

- c. The label on the button shall be checked and replaced if damaged or torn out.
- d. The label on the cylinder shall be checked and replaced if damaged or torn out.
- e. User's manual next to the button shall be checked and replaced if damaged or torn out.
- f. The label for periodical maintenance and the staff that has fulfilled the maintenance shall be written on the label on the cylinder.
- g. CO2 cartridge replacement date, detector replacement date shall be written on the label on the cylinder.

14. Security Declarations

- MSDS Report for the nitrogen gas that is used as propellant gas in the system is attached to the Manual.
- MSDS Report of FireEraser® product that is used as extinguishing liquid in the system is attached.

15. Applications And Limitations Of Wet Chemicals

The Defender system uses a liquid chemical called Fire Eraser® as its agent. Fire Eraser, a solution of potassium carbonate in water, suppresses fires through a process involving the:

- Saponification of surface grease (turning it into combustion-resistant soap),
- Cooling effects of water vaporization,
- Inerting effects of resultant steam formation, and
- Interruption of the chemical chain reaction of combustion.

Hazards and equipment that can be protected using wet chemical extinguishing systems include the following:

- Restaurant, commercial, and institutional hoods
- Plenums, ducts, and filters with their associated cooking appliances
- Special grease removal devices

The wet chemicals used in the Defender Wet Chemical System are stable at both low and high temperatures. The upper storage temperature limit for the system is 120°F (49°C). The lower temperature limit is 0°F (-18°C)

WARNING

Upon system alarm notification, all personnel must evacuate the protected space. Failure to do so may result in temporary respiratory difficulties, disorientation, or personal injury.

15.1. Extinguishing Properties

When Fire Eraser wet chemical agent is applied in a concentrated liquid spray to a burning surface, it reacts quickly with the hot grease or oil to produce a foam blanketing the surface. This reaction, combined with the cooling effect of the Fire Eraser wet chemical agent, also reduces the possibility of fire reflash.

CAUTION

Wet chemical fire extinguishing agent is considered nontoxic, but is classified as a skin/eye irritant, and may cause temporary irritation to the eyes, skin, or respiratory system. Avoid unnecessary exposure.

15.2. Clean-Up

No unusual cleanup procedure is required. After the appliances have completely cooled, the residue from the discharge may be cleaned up with a wet cloth or sponge. Wear rubber gloves while cleaning.

If skin or eyes come in contact with the agent, flush thoroughly with water.

WARNING

Do not disturb the foam until the cooking appliances, plenum, and duct have cooled sufficiently. Do not put water on hot grease as this will cause violent steaming and spattering.

WARNING

Fire Eraser wet agent is electrically conductive. To avoid electric shock, de-energize all electric circuits to appliances, outlets, and wiring by disconnecting or turning off the electric power at the main fuse or circuit breaker box. Do not clean up Fire Eraser wet agent or touch electric appliances, outlets, power cords, or other wiring with electric power on.

16. System Main Components

| Part No. | Main Component |
|----------|--|
| 1200 | Activation Mechanism - Mechanical |
| 1300 | Manual Activation Button - Mechanical |
| 1450 | D8 Cylinder+9,5 Lt Fire Eraser+Activation Valve + Mounting Kit+Pressurized |
| 1550 | D12 Cylinder+15 Lt Fire Eraser+Activation Valve + Mounting Kit+Pressurized |
| 1650 | D18 Cylinder+22,7 Lt Fire Eraser+Activation Valve + Mounting Kit+Pressurized |
| 1800 | Type F Nozzle |
| 1700 | Type A Nozzle |
| 1900 | Type R Nozzle |
| 2100 | 130 Degrees Detector Kit |
| 2200 | 182 Degrees Detector Kit |
| 2300 | 260 Degrees Detector Kit |
| 9070 | Corner Pulley |
| 9021 | Micro switch and Mounting apparatus |
| 9074 | Steel Rope |

17. System Replacement Parts

| Part No. | Main Component |
|----------|---|
| 3100 | 9,5 Liters Fire Eraser Wet Chemical-Recharged |
| 3200 | 15 Liters Fire Eraser Wet Chemical- Recharged |
| 3300 | 22,7 Liters Fire Eraser Wet Chemical- Recharged |
| 2101 | 130 Degrees Detector |
| 2201 | 182 Degrees Detector |
| 2301 | 260 Degrees Detector |
| 9015 | 12 Grams CO2 Cartridge |
| 1107 | Safety Valve |
| 9076 | Oil Cover and Foil |
| 9005 | Manometer |
| 1105 | Activation Valve Piston |

18. List of System Components

| Part No. | Main Component | Part Name |
|----------|-------------------------------|-----------------------------|
| 1100 | Activation Valve - Mechanical | |
| 1101 | Activation Valve - Mechanical | Body |
| 1102 | Activation Valve - Mechanical | Pulse Pin |
| 1103 | Activation Valve - Mechanical | Top Cover |
| 1104 | Activation Valve - Mechanical | Pulse Pin Locking Ring |
| 1105 | Activation Valve - Mechanical | Piston |
| 1106 | Activation Valve - Mechanical | Piston Shim |
| 1107 | Activation Valve - Mechanical | Safety Valve |
| 9001 | Activation Valve - Mechanical | Gas Outlet Elbow+Union |
| 9027 | Activation Valve - Mechanical | Top Cover O-Ring |
| 9002 | Activation Valve - Mechanical | Piston O-Ring |
| 9003 | Activation Valve - Mechanical | Pulse Pin Ring |
| 9004 | Activation Valve - Mechanical | Bottom O-Ring |
| 9005 | Activation Valve - Mechanical | Manometer |
| 9006 | Activation Valve - Mechanical | Piston Ring |
| 9007 | Activation Valve - Mechanical | Pulse Pin Stopper Stay Bolt |
| 9008 | Activation Valve - Mechanical | Pulse Pin O-Ring |
| 9009 | Activation Valve - Mechanical | Piston Spring |
| 1200 | Activation Mechanism | |
| 1201 | Activation Mechanism | Body |
| 1202 | Activation Mechanism | Lever Bar |
| 1203 | Activation Mechanism | Needle |
| 1204 | Activation Mechanism | Lever Bar Pin |
| 1205 | Activation Mechanism | Tension Apparatus Body |
| 1302 | Activation Mechanism | Steel Rope Stopper (Round) |
| 1303 | Activation Mechanism | Pull Pin |
| 1304 | Activation Mechanism | Pin Ring |
| 9010 | Activation Mechanism | Body Fixing Bolt |

| Part No. | Main Component | Part Name |
|----------|---------------------------------------|------------------------------------|
| 9011 | Activation Mechanism | Needle O-Ring |
| 9001 | Activation Mechanism | Gas Outlet Elbow+Union |
| 9012 | Activation Mechanism | Steel Rope Fixing Screw |
| 9013 | Activation Mechanism | Box Cover Screw |
| 9014 | Activation Mechanism | Mounting Screw |
| 9015 | Activation Mechanism | Co2 Cartridge |
| 9016 | Activation Mechanism | Label |
| 9017 | Activation Mechanism | Tension Apparatus Bolt |
| 9079 | Activation Mechanism | Tension Apparatus Slotted Pin |
| 9019 | Activation Mechanism | Gas Outlet Copper Hose 6x1 |
| 9020 | Activation Mechanism | Box Cover Glass |
| 9021 | Activation Mechanism | Microswitch and Mounting Apparatus |
| 9022 | Activation Mechanism | Package Box |
| 9023 | Activation Mechanism | Body Box |
| 9024 | Activation Mechanism | Body Box Cover |
| 9018 | Activation Mechanism | Tension Apparatus Rivet Nut |
| 9025 | Activation Mechanism | Tension Spring |
| 9032 | Activation Mechanism | Pin Retention Ring |
| 9033 | Activation Mechanism | Pin stay Bolt |
| 9074 | Activation Mechanism | Steel Rope |
| 1300 | Manual Activation Button - Mechanical | |
| 1301 | Manual Activation Button - Mechanical | Stopper -(Cornered) |
| 1302 | Manual Activation Button - Mechanical | Steel Rope Stopper (Round) |
| 1303 | Manual Activation Button - Mechanical | Pull Pin |
| 1304 | Manual Activation Button - Mechanical | Pin Ring |
| 9028 | Manual Activation Button - Mechanical | Box Cover Screw |
| 9029 | Manual Activation Button - Mechanical | Box Mounting Screw |
| 9031 | Manual Activation Button - Mechanical | Label |
| 9032 | Manual Activation Button - Mechanical | Pin Retention Ring |
| 9033 | Manual Activation Button - Mechanical | Pin Stay Bolt |
| 9034 | Manual Activation Button - Mechanical | Button Box |
| 9035 | Manual Activation Button - Mechanical | Button Box Cover |
| 9036 | Manual Activation Button - Mechanical | Pull Pin Chain |
| 9037 | Manual Activation Button - Mechanical | Seal |
| 9038 | Manual Activation Button - Mechanical | Seal Wire |
| 9039 | Manual Activation Button - Mechanical | Steel Rope Fixing Thimble |
| 9040 | Manual Activation Button - Mechanical | Package Box |
| 9068 | Manual Activation Button - Mechanical | Stopper (Cornered) Mounting Screw |
| 1400 | D8 Cylinder | |
| 9041 | D8 Cylinder | 9,5 Liters (2,5 Gallons) Cylinder |
| 9100 | D8 Cylinder | Sleeve |
| 1401 | D8 Cylinder | Siphon |
| 9042 | D8 Cylinder | Mounting Stand |
| 9043 | D8 Cylinder | Label |

| Part No. | Main Component | Part Name |
|-----------------|-----------------------|--------------------------------|
| 9044 | D8 Cylinder | Package Box |
| 9101 | D8 Cylinder | Flat Ground Mounting Stand |
| 9102 | D8 Cylinder | Mounting Stand Mounting Screws |
| 9103 | D8 Cylinder | Mounting Stand Mounting Plugs |
| 1500 | D12 Cylinder | |
| 9045 | D12 Cylinder | 15lt (4 Gallons) Cylinder |
| 9100 | D12 Cylinder | Sleeve |
| 1501 | D12 Cylinder | Siphon |
| 9046 | D12 Cylinder | Mounting Stand |
| 9047 | D12 Cylinder | Label |
| 9048 | D12 Cylinder | Package Box |
| 9101 | D12 Cylinder | Flat Ground Mounting Stand |
| 9102 | D12 Cylinder | Mounting Stand Mounting Screws |
| 9103 | D12 Cylinder | Mounting Stand Mounting Plugs |
| 1600 | D18 Cylinder | |
| 9049 | D18 Cylinder | 22,7lt (6 gallons) Cylinder |
| 9100 | D18 Cylinder | Sleeve |
| 9050 | D18 Cylinder | Siphon |
| 9051 | D18 Cylinder | Mounting Stand |
| 9052 | D18 Cylinder | Label |
| 9053 | D18 Cylinder | Package Box |
| 9101 | D18 Cylinder | Flat Ground Mounting Stand |
| 9102 | D18 Cylinder | Mounting Stand Mounting Screws |
| 9103 | D18 Cylinder | Mounting Stand Mounting Plugs |
| 1800 | Type F Nozzle | |
| 1801 | Type F Nozzle | Nozzle Body |
| 9076 | Type F Nozzle | Oil Cover |
| 9059 | Type F Nozzle | Internal Part |
| 9055 | Type F Nozzle | Filter |
| 9056 | Type F Nozzle | Filter Ring |
| 9057 | Type F Nozzle | Oil Cover Folio |
| 1700 | Type A Nozzle | |
| 1701 | Type A Nozzle | Nozzle Body |
| 9076 | Type A Nozzle | Oil Cover |
| 9054 | Type A Nozzle | Internal Part |
| 9055 | Type A Nozzle | Filter |
| 9056 | Type A Nozzle | Filter Ring |
| 9057 | Type A Nozzle | Oil Cover Folio |
| 1900 | Type R Nozzle | |
| 1901 | Type R Nozzle | Nozzle Body |
| 9076 | Type R Nozzle | Oil Cover |
| 9060 | Type R Nozzle | Internal Part |
| 9055 | Type R Nozzle | Filter |
| 9056 | Type R Nozzle | Filter Ring |

| Part No. | Main Component | Part Name |
|-----------------|--------------------------------------|--------------------------------|
| 9057 | Type R Nozzle | Oil Cover Folio |
| 2100 | 130 Degrees Detector Kit | |
| 2101 | 130 Degrees Detector Kit | 130 Detector Body |
| 9061 | 130 Degrees Detector Kit | Detector Stand |
| 9062 | 130 Degrees Detector Kit | Wire Entry Union EMT One Way |
| 9039 | 130 Degrees Detector Kit | Steel Rope Fixing Thimble |
| 9063 | 130 Degrees Detector Kit | Steel Rope S Hook |
| 9070 | 130 Degrees Detector Kit | Corner Pulley |
| 9071 | 130 Degrees Detector Kit | Wire Entry Union EMT Two Ways |
| 9078 | 130 Degrees Detector Kit | Aluminum Pipe |
| 9072 | 130 Degrees Detector Kit | Detector Stand Mounting Screw |
| 2200 | 182 Degrees Detector Kit | |
| 2201 | 182 Degrees Detector Kit | 182 Detector Body |
| 9061 | 182 Degrees Detector Kit | Detector Stand |
| 9062 | 182 Degrees Detector Kit | Wire Entry Union EMT One Way |
| 9039 | 182 Degrees Detector Kit | Steel Rope Fixing Thimble |
| 9063 | 182 Degrees Detector Kit | Steel Rope S Hook |
| 9070 | 182 Degrees Detector Kit | Corner Pulley |
| 9071 | 182 Degrees Detector Kit | Wire Entry Union EMT Two Ways |
| 9078 | 182 Degrees Detector Kit | Aluminum Pipe |
| 9072 | 182 Degrees Detector Kit | Detector Stand Mounting Screw |
| 2300 | 260 Degrees Detector Kit | |
| 2301 | 260 Degrees Detector Kit | 260 Detector Body |
| 9061 | 260 Degrees Detector Kit | Detector Stand |
| 9062 | 260 Degrees Detector Kit | Wire Entry Union EMT One Way |
| 9039 | 260 Degrees Detector Kit | Steel Rope Fixing Thimble |
| 9063 | 260 Degrees Detector Kit | Steel Rope S Hook |
| 9070 | 260 Degrees Detector Kit | Corner Pulley |
| 9071 | 260 Degrees Detector Kit | Wire Entry Union EMT Two Ways |
| 9078 | 260 Degrees Detector Kit | Aluminum Pipe |
| 9072 | 260 Degrees Detector Kit | Detector Stand Mounting Screw |
| 3100 | 9,5 Liters Fire Eraser Wet Chemical | |
| 3101 | 9,5 Liters Fire Eraser Wet Chemical | 9,5 Liters Fire Eraser Liquid |
| 9064 | 9,5 Liters Fire Eraser Wet Chemical | Label |
| 9065 | 9,5 Liters Fire Eraser Wet Chemical | Drum |
| 3200 | 15 Liters Fire Eraser Wet Chemical | |
| 3201 | 15 Liters Fire Eraser Wet Chemical | 15 Liters Fire Eraser Liquid |
| 9064 | 15 Liters Fire Eraser Wet Chemical | Label |
| 9066 | 15 Liters Fire Eraser Wet Chemical | Drum |
| 3300 | 22,7 Liters Fire Eraser Wet Chemical | |
| 3301 | 22,7 Liters Fire Eraser Wet Chemical | 22,7 Liters Fire Eraser Liquid |
| 9064 | 22,7 Liters Fire Eraser Wet Chemical | Label |
| 9067 | 22,7 Liters Fire Eraser Wet Chemical | Drum |
| 8100 | Activation Pin Kit | |

| Part No. | Main Component | Part Name |
|----------|--------------------|----------------------------|
| 1302 | Activation Pin Kit | Steel Rope Stopper (Round) |
| 1303 | Activation Pin Kit | Pull Pin |
| 1304 | Activation Pin Kit | Pin Ring |
| 9032 | Activation Pin Kit | Pin Retention Ring |
| 9033 | Activation Pin Kit | Pin Stay Bolt |
| 9036 | Activation Pin Kit | Pull Pin Chain |
| 9037 | Activation Pin Kit | Seal |
| 9038 | Activation Pin Kit | Seal Wire |
| 9039 | Activation Pin Kit | Steel Rope Fixing Thimble |
| 9040 | Activation Pin Kit | Package Box |

19. Figure Index

Figure 1: An example application figure for a basic kitchen configuration.

Figure 2: Activation Chart

Figure 3: D8 System Cylinder

Figure 4: D12 System Cylinder

Figure 5: D18 System Cylinder

Figure 6: Manometer

Figure 7: Type 1 mounting apparatus

Figure 8: Type 2 mounting apparatus

Figure 9: Cylinder Wall Mounting

Figure 10: Cylinder Floor Mounting

Figure 11: 130 °C Fusible link detector

Figure 12: 182°C Fusible link detector

Figure 13: 260°C Fusible link detector

Figure 14: Detector mounting base

Figure 15: Detector mounting kit installation

Figure 16: Corner pulley

Figure 17: Activation Valve Details

Figure 18: Activation Valve Cover Detail

Figure 19: Activation Valve Body

Figure 20: Activation Valve Front View

Figure 21: Activation Valve Rear View

Figure 22: System Cylinders Siphons

Figure 23: Activation Button

Figure 24: Activation Button Details

Figure 25: Activation Mechanism Details

Figure 26: Activation Mechanism Installation

Figure 27: CO2 Carbon dioxide propellant cartridge

Figure 28: Tension Apparatus

Figure 29: Micro Switch

Figure 30: Type A Nozzle

Figure 31: Type F Nozzle

Figure 32: Type R Nozzle

Figure 33: Refilling Drums

Figure 34: Mechanical Gas Cut Off Valve

Figure 35: Electrical Solenoid Gas Cut Off Valve

Figure 36: System example with two discharge lines

Figure 37: System example with three discharge lines

Figure 38: System example with four discharge lines

Figure 39: A Configuration with Two Cylinders

Figure 40: A Configuration with Three Cylinders

Figure 41: Type F Nozzle placement in single vat deep fat fryer

Figure 42: Type A Nozzle placement in small scale deep fat fryers with low approach

Figure 43: Type F Nozzle Placement in Double Vat Deep fat fryers

- Figure 44: Type R Nozzle Placement in Gas Range Cookers
- Figure 45: Type R Nozzle Placement Limits in Gas Range Cookers
- Figure 46: Type A Nozzle Placement and Limits in Grill/Plate
- Figure 47: Type A Nozzle Placement and Limits in Chinese (WOK) Range Cookers
- Figure 48: Type F Nozzle Placement and Limits in Lava Stone, Ceramic etc. Grills
- Figure 49: Type A Nozzle Placement and Limits in Coal Barbecues
- Figure 50: Type A Nozzle Placement and Limits in Electrical Barbecues
- Figure 51: Type A Nozzle Placement and Limits in Gas Barbecues
- Figure 52: Type F Nozzle Placement and Limits in Wood Barbecues
- Figure 53: Type F Nozzle Placement and Limits in Tilting Pans
- Figure 54: Type F Nozzle Placement and Limits in Doner Cookers
- Figure 55: Type A Nozzle Placement and Limits in Range Hood Chimneys
- Figure 56: Type A Nozzle Placement and Limits in chimneys whose channel connection length is less than 50 cm
- Figure 57: Type A Nozzle Placement and Limits in Range Hood Chimneys
- Figure 58: Wrong mounting that shouldn't be performed in filter protection nozzle
- Figure 59: Solenoid valve control with one activation mechanism
- Figure 60: Gas Cut Off System with Micro Switch
- Figure 61: Limits between Discharge Pipes
- Figure 62: Run T and Bull T concepts in hydraulic calculations
- Figure 63: Detector Line Placement behind the Range Hood Filter
- Figure 64: System Cylinder labels
- Figure 65: Activation Mechanism Labels
- Figure 66: Activation Button and user attention Labels
- Figure 67: Recommended Mechanism for Washing the Discharge Pipes

Files to be Attached to Manual

- MSDS FireEraser
- The manufacturer company has ISO-9001/2008 (Certificate 71 100 K473) quality certificate.
- System has "CE Certificate" with CE-PED-B-DLC 002-10-TUR certificate number.
- The manufacturer company has Warranty certificate of the Ministry of Industry numbered 30.04.2010-82306.
- The manufacturer company has TSE 14.31.07/HYB 665 Service Place qualification certificate.
- The manufacturer company has the After-Sale Service Qualification certificate numbered 03-05-2011/31631 according to TSE 13345 standard.