



KitchenShield

WCK-kitchen fire suppression system

Lehavot

Advanced fire protection systems

DESIGN INSTALLATION MAINTENANCE AND RECHARGING MANUAL

No. 71-171

WCK - KITCHEN FIRE SUPPRESSION SYSTEM

TESTED AND LISTED BY
UNDERWRITERS LABORATORIES

TO: ANSI/CAN/UL/ULC 300 Standard for Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking Equipment and ANSI/CAN/UL/ULC 1254 Standard for Pre-Engineered Dry and Wet Chemical Extinguishing System Units.



Proprietary Notice

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Warranty Deed

Product name: WCK - KITCHEN FIRE SUPPRESSION SYSTEM

This Warranty Deed anchors the warranty of Lehavot Production and Protection (1995) Ltd. (“the Company”), subject to any law, in relation to all matters pertaining to the Automatic Fire Detection and Suppression Systems as specified hereunder.

1. Recitals and definitions

1.1. For the purposes of this appendix, the following terms shall have the definitions specified alongside them:

- | | |
|--|--|
| “The Customer” – | A purchaser of the System from the Company. |
| “The System” – | Automatic Fire Detection and Suppression System which was manufactured by the Company for the Customer according to the technical specifications provided by the Customer. |
| “The Components” – | Components of the System that were supplied by the Company. |
| “The Company’s Offices” – | The Company’s offices, which are located in Kibbutz Lehavot Habashan, 1212500. |
| ”The System technical specifications guide and general conditions” – | The instructions for operation, use and maintenance of the System, which were issued to the Customer on the System purchase date, including the System’s technical specifications. |
| “Work Hours” – | Sundays through Thursdays from 08:30 to 17:00, excluding Israeli religious holidays, national holidays and holiday eves. |
| “Fault Repair Services” – | Services as specified hereunder in clause 2.1.1. |
| “Warranty Services” – | Maintenance services and Fault Repair Services. |
| “Periodic Services” – | Periodic services that must be performed on the System, as specified in the System Manual. |
| “Warranty Period” – | In relation to the System – a period of 12 months as of the System purchase date by the Customer. |

2. Description of the Warranty Services

2.1. During the Warranty Period and subject to the fulfillment of all other conditions of this Warranty Deed, the Company shall provide the Customer with the following services for the System during Work Hours, as specified hereunder:

Fault Repair Services, including the supply of replacement parts needed to complete repair services as stated. To dispel any doubt, it is hereby clarified that the Warranty Services do not include any other or additional services beyond those specified above, and the Warranty Services encompass the full and sole warranty of the Company in relation to the System and the Components.

2.2. The Warranty Services will be provided at the Customer’s site.

2.3. In the event of a repair or replacement of a product and/or Component, the Company shall be allowed to use new products or parts equivalent in value to new or refurbished.

2.4. The Warranty Services are contingent upon the issue to the Company: (a) of the System (or the Component) about which a fault is being claimed; and (b) an original purchase receipt in which the name and address of the seller, the date and place of purchase and the product type are clearly legible.

3. The Customer’s obligation to report faults; response times and times for the provision of the Warranty Services

3.1. The Customer must immediately report to the Company’s Customer Service Department about any instance of a fault in the Components and/or an abnormal phenomenon in the operation of the System and/or the Components. During the Warranty Period, the Company shall provide the Warranty Services to the Customer solely during the Work Hours, and these hours only will be counted in the Company’s response time to a service call, as specified hereunder:

3.1.1. In the event of a malfunction that causes the System to be inoperable – if the Company receives a service call during Work Hours, the Company undertakes to respond to the service call within one business day of the date of its receipt. If the Company receives a service call other than during Work Hours, the Company undertakes to respond to the service call within four hours of the opening time of the Company’s Offices on the first business day after receiving the service call, and all, provided that the service itself will be provided solely during Work Hours.

3.1.2. In the event of a malfunction that does not cause the System to be inoperable – if the Company receives a service call during Work Hours, the Company undertakes to respond to the service call within three business days of the date of its receipt. If the Company receives a service call other than during Work Hours, the Company undertakes to respond to the service call within three business days of the opening

time of the Company's Offices on the first business day after receiving the service call, and all, provided that the service itself will be provided solely during Work Hours.

- 3.2. You may open a service call at the Company in relation to the Warranty Services by e-mail.
- 3.3. The Company is not issuing a representation or any undertaking regarding the timeframe that might be needed to repair a malfunction.

4. Consideration

- 4.1. During the Warranty Period and subject to the fulfillment of Customer's undertakings pursuant to this Warranty Deed, the Warranty Services shall be provided for no additional payment (the cost of this service is included in the cost of purchasing the Components).
- 4.2. Insofar as work and/or repair is requested that is not included within the scope of this Warranty Deed and/or in relation to a Component that is not included in the Warranty Services, the Company shall be allowed to perform the requested work and/or repair, subject to the receipt of a consideration and under the conditions to be agreed upon between the parties.

5. Exclusions from the Warranty Services and the Company's undertakings

- 5.1. Without derogating from the general purport of that stated, Warranty Services shall not be provided in relation to defects, malfunctions and problems in Components, depending upon the context, that were caused as a result of or in relation to one or more of the following: (a) default installation of the Components and/or on the System, unless such installation was performed by the Company; (b) modification, repair, adjustment, dismantling or work done on Components and/or on the System by any party who was not authorized to do so by the Company in advance and in writing; (c) use, storage, maintenance or transport of the Components contrary to the Company's instructions that shall be issued from time to time, and/or contrary to that stated in the System Manual; (d) keeping the System and/or the Components under unsuitable environmental conditions; (e) event of force majeure or events deriving from factors not under the Company's absolute control, including (but not derogating from) regulations, orders, actions or directives of the competent authorities, weather damages, damages from conflagrations, fire, water, earthquakes or other natural disasters, strikes, embargos, warfare and hostilities, disruptions, malfunctions or disturbances in the communications, electricity and/or internet networks and/or in the operation of other critical services; (f) breakage, liquid permeation, fire, sabotage and/or accident; (g) act or omission of a third party; (h) the use of parts or components that were not authorized by the Company in advance and in writing; (i) breach of any of the provisions of this Warranty Deed and/or the System Manual and the Technical Specifications and/or the General Conditions by the Customer; (j) unreasonable or abnormal use of Components and/or the System; (k) use of Components and/or the System in a way that is inconsistent with their intended purposes and the manufacturer's instructions, or other than in a professional, reasonable, safe and cautious manner and pursuant to the provisions of any law; (l) if the Company's representatives are not given reasonable access to the System and/or to the Components for the purpose of carrying out its undertakings pursuant to this Warranty Deed.

In instances as stated, the Company shall be allowed (but not obligated), at its sole discretion, to provide the Warranty Services for a consideration to be agreed upon between the parties.

6. Liability and limit of liability

- 6.1. This Warranty Deed constitutes the sole and exclusive remedy against the Company, and the sole and exclusive liability of the Company in relation solely to the matters pertaining to a defect in the Components and/or the System. It is hereby clarified that the Company shall not be liable, directly or indirectly, for any damages, losses, injuries, or deaths in connection with improper installation of the Components and/or the System by any party (unless such installation was performed by the Company)
- 6.2. This Warranty Deed supersedes any warranty and other obligation of the Company, whether in writing, orally, statutory liability (that is not compulsory), liability pursuant to contract or torts law or in any other way or manner, including, but without limiting the general purport of that stated above, if the matter is permitted pursuant to the applicable law, any condition or implied liability or any other conditions or undertakings pertaining to satisfactory quality or suitability for a particular purpose.
- 6.3. The Company is responsible for the System's compliance with relevant test certificates. Any modification made in the System, with or without the Company's knowledge, is not included in the Warranty and shall not be binding upon the Company.
- 6.4. To dispel any doubt, the Company clarifies and the Customer acknowledges that, notwithstanding that stated above, the operation of the System depends on numerous variable factors, such as the source of the outbreak of fire, the location of the source of the fire, the intensity and characteristics of the fire, the magnitude of the fire event and more. The System is not designed and does not purport to provide a solution to all fire hazards and scenarios that are liable to occur, and this shall not be deemed a failure, deficiency or defect in the System's operation, and the Customer hereby releases the Company and any party on its behalf from liability for any damage that might be caused to it and/or that was caused to it and/or to any third party in relation to that stated above.

7. Miscellaneous

- 7.1. Solely the provisions of Israeli law shall apply to this Warranty Deed. The competent courts in Tel-Aviv – Jaffa shall have sole jurisdiction relating to any matter pertaining to this Warranty Deed or deriving therefrom and no other court shall have jurisdiction.

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CHAPTER 1

GENERAL INFORMATION

Instruction Manual No. 71-171

WCK- Kitchen Fire Suppression System

TESTED AND LISTED BY

UNDERWRITERS LABORATORIES

TO: ANSI/CAN/UL/ULC 300 Standard for Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking Equipment and ANSI/CAN/UL/ULC 1254 Standard for Pre-Engineered Dry and Wet Chemical Extinguishing System Units.



Advanced fire protection systems

The WCK series automatic wet chemical suppression system is designed and tested to provide fire protection for commercial cooking operations. This protection system covers range hoods, plenums, (air spaces) ducts and appliances. This system is manufactured by Lehavot Fire Protection Ltd, Kibbutz Lehavot Habashan, ISRAEL.

The WCK systems are a pre-engineered type as defined by the NFPA 17A Standard for Wet Chemical Extinguishing Systems (Fire Suppression Systems).

It is essentially important that all processes for installation of the WCK series be performed as defined in this manual. All specifications and functions, including pipe limitations, nozzle coverage, detector placements, and so forth, have been stringently tested and conformed with the NFPA 17A standard. Use of components not included in this manual, or any installation beyond the limitations defined in the instruction manual, or repositioning of cooking appliances after system installation by any cause, or maintenance, not according to NFPA 17A, and NFPA 96, as stated in this manual shall void all WCK system listings and Lehavot Fire Protection warranty.

1.1 LISTING

The WCK series is listed by Underwriters Laboratories (UL) as a wet chemical fire extinguishing system unit of the pre-engineered type. The system is evaluated according to NFPA 17A and NFPA 96.

Tests required for Listing according to UL involved live fire tests under special conditions, as required by UL-300 for fire suppression in commercial kitchens, piping and installations. Test fires were allowed to reach high level of intensity before the agent was discharged. Representative tests were repeated using both maximum and minimum piping, as well as variations in the cylinder agent storage pressure, in order to simulate maximum and minimum temperature levels. Duct fire tests were extinguished when fans were operating, when fans were turned off, when dampers were open, and when dampers were closed. Splash tests were conducted on several appliances to assure that the discharge of the agent would not cause hot oil to splash, and thereby preserve maximum employee safety during commercial cooking operations.

1.2 DESIGN

The WCK pre-engineered series are based on mechanical and electrical components to be installed by and authorized trained and certified representative of LEHAVOT industries. The system consists of a cylinder charged with a liquid agent, and a discharge valve including a mechanical release valve. The amount of detectors, fusible links, nozzles, corner pulleys, "T" pulleys and manual activation stations is variable, as needed, according to each specific kitchen design.

The system operates automatically via a detector, or manually with a manual pull station. Either way the system operates by immediately shutting down energy/fuel sources to the cooking appliances. Electric shut down devices or suitable gas valves are referred to in this manual. Other equipment such as audible/visual alarms can be added as required.

The LEHAVOT WCK fire suppression system in commercial cooking equipment uses a spray liquid extinguishing agent (Wet Chemical) engineered to protect the cooking appliances, the ducts, the filters and the plenum. The primary objective for fire suppression is the saponification of grease laden surfaces, along with the cooling of hot oil and metal surfaces thereby reducing temperature levels below the combustion point.

When the system triggers operations, the exhaust fans shall be left on in order for the extinguishing agent penetrate into the ducts and cooling the air space and cooking areas. All air supply sources shall automatically shut down including all cooking appliances under the plenum. Some local authorities demand closing the exhaust by the Fire Suppression System. Check local requirements when installing the system.

The WCK extinguishing agent cylinders will not be installed in an environment below 0°C or over 49°C (32°F to 120°F).

1.3 DEFINITIONS OF TERMS

1.3.1 Agent cylinder assembly

Pressurized cylinder (vessel) with a dispersion valve and containing a wet chemical kitchen fire extinguishing agent.

1.3.2 Authority Having Jurisdiction (AHJ)

The organization, office or individual responsible for approving the equipment, that installation was done correctly and procedures followed.

The phrase "Authority Having Jurisdiction" is used in the NFPA documents in a broad manner, since different agencies are responsible for approvals, where public safety is in order.

1.3.3 Auxiliary equipment

Listed equipment used in conjunction with the LEHAVOT WCK kitchen fire system to shut down power, fuel, and air. Auxiliary equipment also includes dampers, sirens, or fire warning alarm systems.

1.3.4 Blow-off cap

A protecting cap, (made of rubber or metal), that is used to cover a nozzle opening and keeping it from getting blocked by grease.

1.3.5 Branch duct

Exhaust duct from a single hood or from any hazardous equipment.

1.3.6 Cable

A 1.6 mm (1/16") diameter stainless steel cable used to connect detectors, mechanical gas valves, and manual pull stations to the MRM. (7x7 standard, 450 lbs - tensile strength)

1.3.7 Common duct

Common exhaust duct extending from two or more hazardous locations;

1.3.8 Cooking appliance

Includes, but not limited to ranges, fryers, griddles, char broilers, etc.

1.3.9 Corner pulley

A device used with the detection network, mechanical gas valve and manual pull station which allows the cable to change direction 90° and still move freely for system operation.

1.3.10 Damper

A valve or plate located within, or at the end of a duct, for controlling the flow of exhaust gases and air.

1.3.11 Detector bracket

A bracket or housing that protects a fusible link.

1.3.12 Detection network

A network consisting of detection instruments connected by a cable, The cable extends throughout the EMT conduit, corner pulleys, and detectors. The detectors provide a mechanical input to the release mechanism that will activate the system automatically.

1.3.13 Distribution network

A network of pipes consisting of supply lines that delivers the extinguishing agent from the cylinder valve to the nozzles.

1.3.14 Duct

A conduit that carries warm and cool air, cooking vapors and is assembled with dampers, and other fittings, connected to the plenum

1.3.15 EMT pipe (Electric Metal Tubing)

Galvanized pipe Dia. 1/2", for the cables of the detection network, cylinder actuating network and the Manual Pull Station, according to standards UL797, 1/2" x 10 ft;

1.3.16 End of line detector

The end detector, or only detector, in the system. This is the end point of the Detection Network cable.

1.3.17 Flow point

Term used to describe the flow capacity of each discharge nozzle. This information is essential to determine the amount of cylinder discharge agent required for each installation.

1.3.18 Fusible links

A device attached to a tension cable consisting of two strips of metal soldered together with a fusible alloy that is designed to melt at a specific temperature, thus allowing the two pieces to separate. A fusible link is utilized as the triggering device in a fire suppression system that when separated it will release cable tension causing the system to discharge.

1.3.19 Gas valve

An electrical or mechanical valve that shuts down the flow of gas to a cooking appliance at the instant the fire suppression system is activated. This device is required by the NFPA 96 and shall be listed as a component of the system. Reset of gas valves shall be mechanical.

1.3.20 Grease

Animal fat, vegetal oils or any combination thereof used for cooking. Grease can be vaporized into exhaust air as grease laden vapors and can be in liquid or solid states.

1.3.21 Grease filter

This component traps oil from vapors. Exhaust vapors are funneled through the filter reducing the amount of combustible vapors into the environment.

1.3.22 Grease tight

To prevent leaking of grease from normal cooking processes.

1.3.23 Hood

Device provided above cooking appliances to capture and direct grease laden vapors. Hoods are made according to NFPA 96.

1.3.24 Input

An incoming event monitored by the MRM. For example: a detector senses fire (input), the system is activated (output), and shuts off the gas valve for the cooking appliance (output).

1.3.25 Inspection

A "quick check" done to assure that the system has not been tampered with and is in good operating condition.

1.3.26 Listed

Approved equipment, materials, components and parts published by an organization acceptable to the AHJ (Authority Having Jurisdiction). Listed products meet certain quality standards suitable for a specific use and maintain approved status following periodic inspections by the listing organization. Listed products are valid only if they show the approving label.

1.3.27 Maintenance

A thorough inspection to assure the system will operate as intended. Design parameters should be closely examined for hazardous changes since the last inspection. Parts and components should be closely examined tested or replaced if necessary.

1.3.28 Make-up air

The supply of air from an outside area into the hazardous area with the help of a dedicated fan aiding the exhaust of grease laden vapors

1.3.29 Manual pull station

A triggering device close to or remotely located from a fire that allows the system to be discharged manually.

1.3.30 Mechanical Release Module (MRM)

An assembly that connects detectors, manual pull stations, gas valves, micro switches and agent cylinder discharge valves. The MRM receives inputs and activates appropriate outputs – including agent release, auxiliary signals and power/gas shut-off.

1.3.31 Micro switch

A set of dry electrical contacts (without current), arranged in various configurations, used to initiating output functions, such as signals, to the building fire alarm. For example: audible/visual remote signal, electrical power shut-off, electric gas valve shut-off.

1.3.32 Nozzle

The discharging device used to deliver a specific quantity and flow pattern of the fire suppression agent to a specific appliance, duct size or plenum (air space) size.

1.3.33 Output

A system's response when an input command is received at the MRM. For example: agent release, power shut-off, remote signal, gas valve closure.

1.3.34 Perimeter

The measurement around the rectangle sides of a duct opening. For example: a duct opening measuring 23 cm (9") x 46 cm (18") would have a perimeter of 138 cm (54") ($46+46+23+23 = 138\text{cm}$) or ($9+9+18+18=54"$).

1.3.35 Plenum

The space between the filters and the portion of the hood behind the filters

1.3.36 Pre-engineered system

A system having pre-determined flow rates, nozzle pressures and quantities of agents. A Pre-Engineered System has specific pipe sizes, maximum and minimum pipe lengths, specifications for flexible hoses, number of fittings and number of nozzle types, as prescribed by a testing laboratory. The hazards protected by a pre-engineered system are specifically limited to type and size by a testing laboratory based on actual fire tests. Limitations on hazards that can be protected by these systems are contained in the manufacturer's installation manual, which is referenced as part of the listing.

1.3.37 Puff test

A test to determine that the distribution network's piping is clear and un-blocked. The test is conducted by running nitrogen through agent distribution lines and confirming all is clear.

1.3.38 Saponification

Soap like foam produced when fats and/or oils react with alkaline materials. Fire extinguishing agents made with sodium bicarbonate, potassium bicarbonate, potassium acetate and potassium carbonate cause Saponification when they come in contact with hot grease. Rendered animal fat and oils containing high percentages of saturated fat saponify better than cooking oils containing low percentages of saturated fat.

1.3.39 Series detector

Any detector located between the MRM and the terminal detector.

1.3.40 Supply line

(A system of pipe lines of Sch. 40 pipes 3/8" or 1/2" stainless steel or black iron pipe)

That portion of the agent distribution network piping that runs from the agent cylinder assembly outlet to the first "T".

1.3.41 Supply branch line

(A pipe line system of Sch. 40 pipes 3/8" stainless steel or black iron pipe)

All pipes and fittings from the first "T" in the system to the last end nozzle.

1.3.42 "S" hook

Used to connect a fusible link with a cable;

1.3.43 Test link

This device is used in place of a fusible link in order to easily test the detection network. The Test Link wire is easily cut, and simulates a fusible link separating under fire conditions. It is usually located on the terminal detector, and is used solely for test purposes.

CHAPTER 2

SYSTEM DESCRIPTION

Instruction Manual No. 71-171

WCK- Kitchen Fire Suppression System

TESTED AND LISTED BY

UNDERWRITERS LABORATORIES

TO: ANSI/CAN/UL/ULC 300 Standard for Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking Equipment and ANSI/CAN/UL/ULC 1254 Standard for Pre-Engineered Dry and Wet Chemical Extinguishing System Units.



Advanced fire protection systems

System description; Specifications for a pre-engineered system with wet chemicals for extinguishing fires in commercial and industrial kitchens

The LEHAVOT WCK Series;

2.1 GENERAL

The WCK for kitchens is a pre-engineered system. It contains a liquid agent stored under pressure that when activated is transmitted through supply lines and discharged through nozzles.

The System has been designed, assembled and maintained according to the instructions in the Lehavot Instruction Manual, number 71-171 - "Instruction for Design, Installation, Maintenance and Recharging Manual," NFPA 96, and NFPA 17A. This system shall be installed according to local regulations. Only authorized specialists that have been trained and qualified by LEHAVOT shall install, operate, and maintain the LEHAVOT WCK System.

2.2 EXTINGUISHING AGENT

The Lehavot " ORCHIDEE FX " liquid agent is based on a potassium compound that extinguishes cooking oil fires by means of cooling and saponification. The PH of the extinguisher agent is 9 or less and does not affect stainless steel surfaces.

2.3 THE CYLINDER ASSEMBLY / DISCHARGE VALVE

The cylinder is steel manufactured DOT 4B or 4BW, tested at a pressure of 35 bars (510 psi). The discharge valve and the extinguishing agent are charged at a pressure of 15 bars (220).

2.4 DETECTION

The detection network uses a continuous cable that connects special devices for detection in the WCK system with the use of "S" hooks links.

2.5 MECHANICAL RELEASE MODULE (MRM)

The MRM is a cocked spring type valve that receives input in mechanical form and releases output also in mechanical form. The module can automatically activate one cylinder, by means of detectors, or from a manual pull station. The nitrogen pressure in the cylinder can be seen through an opening in the cover of the activation valve. A closure seal can be placed on the cover. The cover shall be sealed only after the last test or after a follow-up check. Two holes are in the actuator case, one in the upper side, and one on the left side of the EMT outlet piping.

2.6 AGENT CYLINDER'S BRACKET

The mounting bracket is made of steel, zinc plated, and supplied by LEHAVOT.

2.7 DISCHARGE NOZZLES

Discharge nozzles are made of brass and are chrome plated. A nozzle consists of a body, internal filter, snap ring and a nozzle cap.

2.8 MANUAL PULL STATION

The manual pull station is based on a "double action" principle. In order for the system to be activated manually, pull the security pin and then the hand lever.

2.9 GAS VALVE

If the need for an electrical or mechanical gas valve is specified, it shall be UL Listed for use in commercial and industrial kitchens that are actuated by a manual start switch.

2.10 ELECTRICAL SWITCH

Switches that are UL Listed in and compatible with the other electrical equipment are supplied in order to complete the production functionality of the system. The switches are installed in the MRM.

CHAPTER 3

SYSTEM COMPONENTS

Instruction Manual No. 71-171

WCK- Kitchen Fire Suppression System

TESTED AND LISTED BY

UNDERWRITERS LABORATORIES

TO: ANSI/CAN/UL/ULC 300 Standard for Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking Equipment and ANSI/CAN/UL/ULC 1254 Standard for Pre-Engineered Dry and Wet Chemical Extinguishing System Units.



Advanced fire protection systems

3.1 FIRE EXTINGUISHING AGENT

The Lehavot liquid extinguishing agent is a special formulated potassium compound for use in fats and cooking oil fires. LEHAVOT ships the prefilled plastic containers, with date and batch P/N marked on each one.

prefilled containers P/N for respective cylinder capacities:

6 liters (P/N 36607000)

9 liters (P/N 36907000)

16 liters (P/N 36207000)

20 liters (P/N 36407000)

26 liters (P/N 36307000)



Warning: The Lehavot wet chemical is a strong basic mixture. Safety glasses and gloves SHALL be worn by all personnel that handle the material: contact with skin SHALL be avoided. In case of discharge, wash the solution off hoods and ducts, in order to avoid damage to appliances. Any food in contact with the agent shall be discarded.

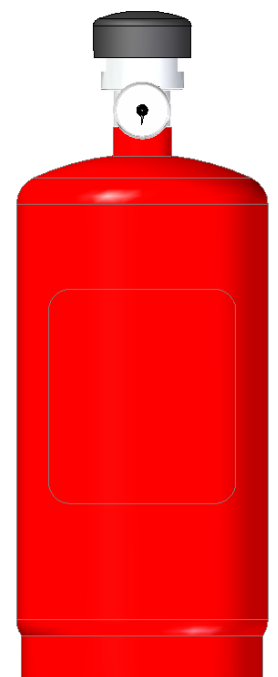
3.2 AGENT CYLINDERS

3.2.1 WCK 6 liter, WCK 9 liter

Agent cylinder 6 liters (P/N 36681799)

Agent cylinder 9 liters (P/N 36981799)

Cylinders, having capacities of 6 and 9 liters of Lehavot liquid agent, are shipped filled from the factory. The agent is pressurized with dry nitrogen at a pressure of 15 bar (220psi) at 21°C (70°F). The nitrogen charge is used as the expellant gas which discharges the agent into the discharge network. Cylinders for the system are produced with: DOT 4B, tested to 35 bar (510 psi). All components and cylinders are designed to work at temperatures from 0°C (32°F) to 49°C (120°F). The discharge valve is manufactured of brass and mechanically activated. The discharge valve has a female joint of 1/2"NPT.



3.2.2 WCK 16 liter, WCK 20 liter, WCK 26 liter

Agent cylinder 16 liters (P/N 36281799)

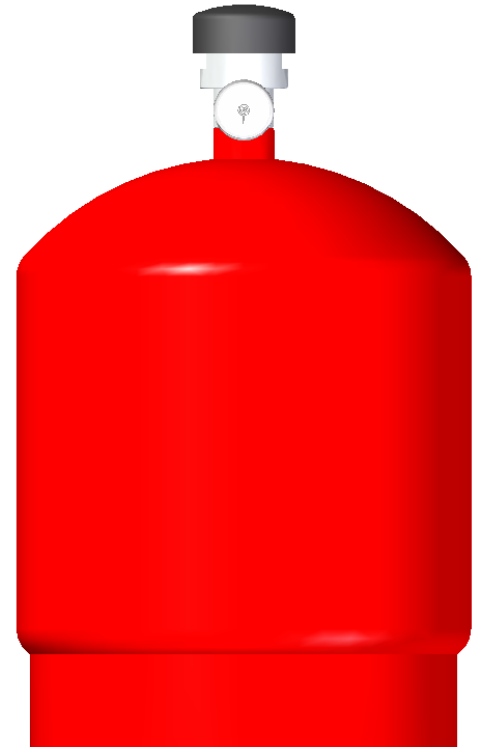
Agent cylinder 20 liters (P/N 36481799)

Agent cylinder 26 liters (P/N 36381799)

Cylinders, having capacities of 16 liters, 20 liters and 26 liters of Lehavot liquid agent, are shipped filled from the factory. The agent is pressurized with dry nitrogen at a pressure of 15bar (220 psi) at 21°C (70°F). The nitrogen charge is used as the expellant gas which discharges the Lehavot agent into the discharge network.

Cylinders for the system are produced with: DOT 4BW, tested to 35 bar (510psi). All components and cylinders are designed to work at temperatures from 0°C (32°F) to 49°C (120°F). The discharge valve is manufactured of brass and mechanically activated

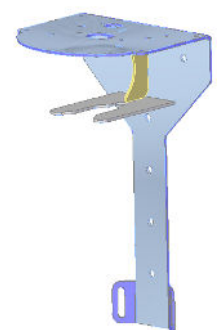
The discharge valve has a female joint of 1/2" NPT.



3.3 CYLINDER BRACKETS

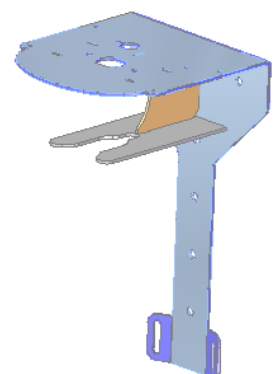
3.3.1 Bracket for 6/9 liter cylinder (P/N 36905109)

This mounting bracket is used to secure 6 or 9 liter cylinder assemblies to the mounting surface and connect the discharge valve to the distribution network. The bracket is made of steel with horizontal and vertical supports welded on it.



3.3.2 Bracket for 16/20/26 liter cylinder (P/N 36205109)

This mounting bracket is used to secure 16 or 20 or 26 liter cylinder assemblies to the mounting surface and connect the discharge valve to the distribution network. The bracket is made of steel with horizontal and vertical supports welded on it.



3.4 MECHANICAL RELEASE MODULE (MRM)

WCK 6 Liter – (P/N 36902000)

WCK 9 Liter – (P/N 36902000)

WCK 16 Liter – (P/N 36202000)

WCK 20 Liter – (P/N 36202000)

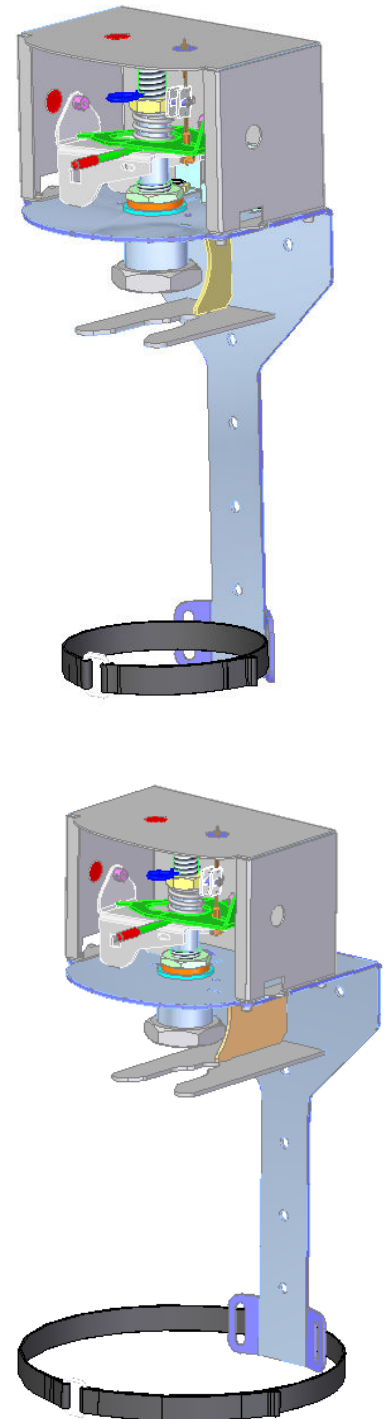
WCK 26 Liter – (P/N 36202000)

The MRM is used to activate the agent cylinder/discharge valve, either automatically or manually, by pressing the valve.

Automatic release of agent is accomplished when a fusible link separates in a fire condition and releases tension on the cable. This causes a spring-loaded trigger to activate the cylinder discharge valve.

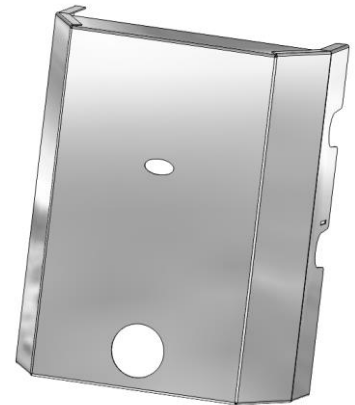
Manual release of the agent is accomplished by pulling on a manual activation station, which is connected to the MRM by a cable. The MRM is equipped with a limit-switch for monitoring, and shutting off (when triggered) the electrical signal, and other functions.

The MRM is shipped assembled together with the bracket



3.5 STANDARD MRM COVER (P/N 36205001)

The standard cover is supplied along with each MRM

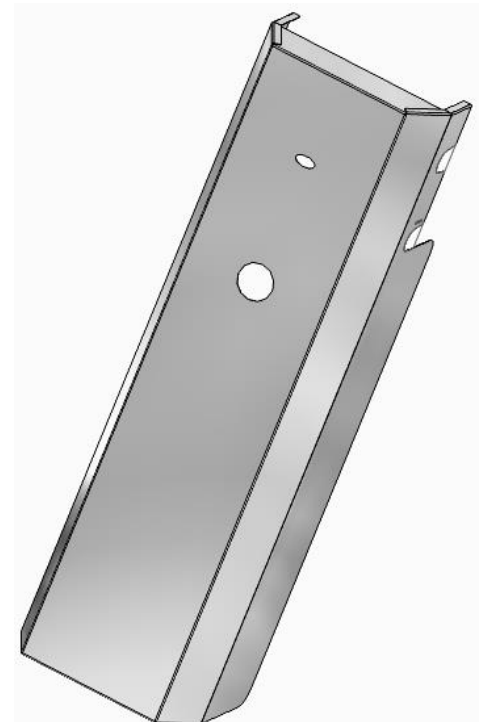


3.6 FULL MRM AND CYLINDER COVER (P/N 36905001)

The full MRM and Cylinder Cover is Suitable for cylinders size WCK-6 and WCK- 9

The full MRM and Cylinder Cover comes instead of the standard cover

This cover is ordered and supplied separately from the MRM



3.7 DISCHARGE SYSTEM ACTIVATION PIN (P/N 36202110)

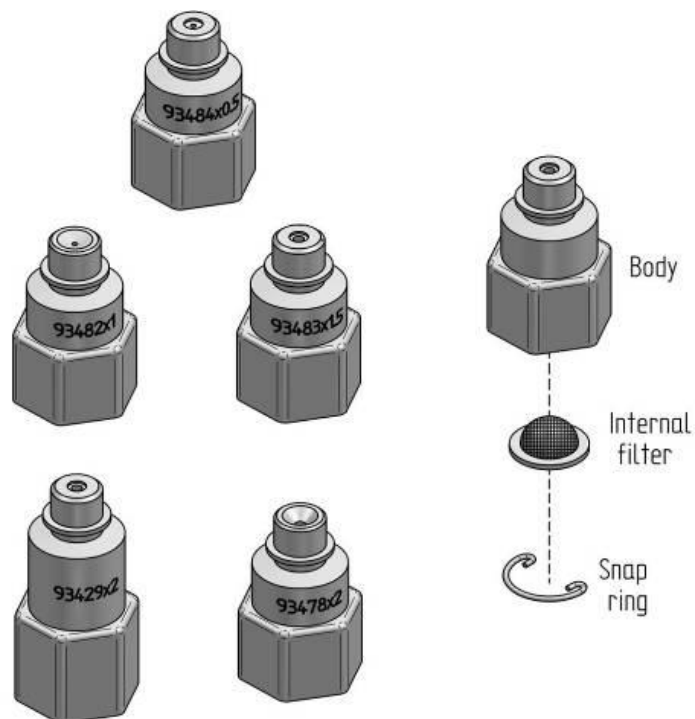
Located within the MRM;



3.8 DISCHARGE NOZZLES

Appliance Type	P/N	Flow Points	Markings	Ring Color
Ducts	36220016	1	93416 x 1	White
Fryers	36220029	2	93429 x 2	Red
Range (2), Wok, Gas radiant, Hood	36220082	1	93482 x 1	Orange
Ducts, Range (4), Griddle, Lava rocks, Pumice rocks, Synthetic rocks, Natural briquettes, Charcoal briquettes, Natural wood	36220083	1.5	93483 x 1.5	Yellow
Range (1), Upper Broiler, Salamander, Chain broiler	36220084	0.5	93484 x 0.5	Green
Griddle	36220078	2	93478 x 2	Blue

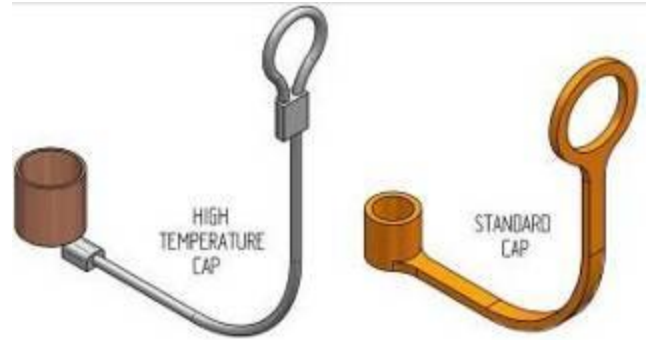
There are six types of nozzles listed for use with the LEHAVOT WCK System. Each nozzle has a specific flow rate and a specific discharge pattern. Each nozzle is equipped with different colored ring to help with the identification of the specific nozzle. Installation and coverage of each nozzle is described in Chapter 4 – **SYSTEM DESIGN** of this manual.



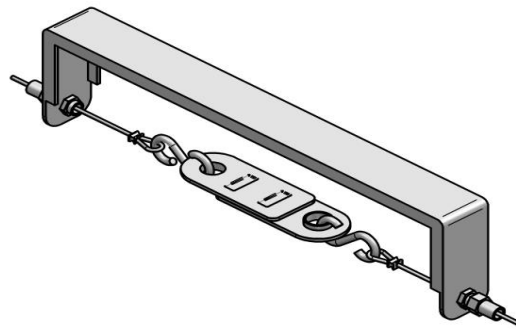
Each nozzle consists of 4 parts: **body, internal filter, snap ring, nozzle cap**

3.9 NOZZLE CAPS – STANDARD CAP (P/N 36222334) HIGH TEMPERATURE CAP (P/N 93412504)

Two types of nozzle caps are available for the LEHAVOT WCK System, a standard cap (P/N 36222334), provided with the nozzle, and high temperature cap (P/N 93412504). The standard cap can be used in environments not exceeding temperatures of 176.6°C (350°F). Where temperatures of normal working conditions exceed 176.6°C (350°F), the high temperature nozzle cap shall be used.

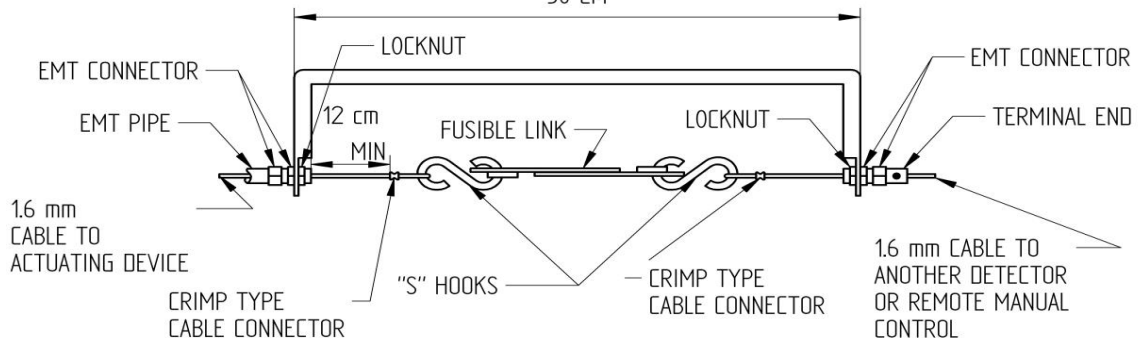


3.10 DETECTOR BRACKET (P/N 36610009)



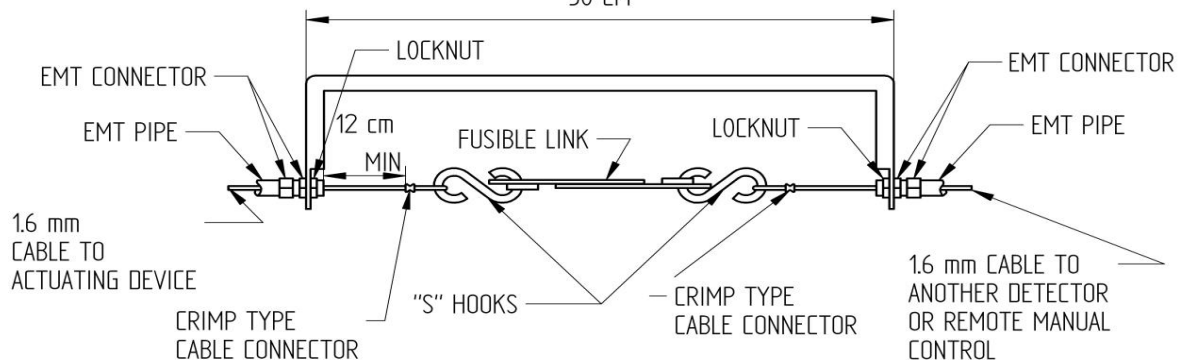
"END OF LINE DETECTOR"

30 CM



"SERIES DETECTOR LINE"

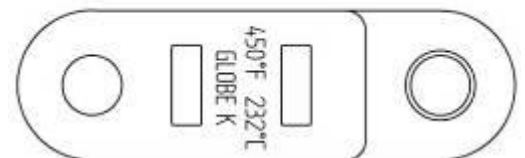
30 CM



Each detector in the LEHAVOT WCK system for kitchens is comprised of four parts: detectors bracket, two "S" links, two crimp type cable connector and a fusible link (ordered separately). The detector bracket serves as a support for the "S" links and is attached to a stable and rigid surface. The "S" links support the fusible link and a continuous cable under tension. At a predetermined temperature, the fusible link will separate, releasing tension on the cable and activating the system. This manual refers to series and terminal detectors. There is no difference in part numbers or dimensions between series and end of line detectors. An end of line detector is the last or only detector in the network and the cable shall end with a joined tension bolt. A series detector is any detector located between the last detector (end of line detector) and the MRM in the detector network.

3.11 FUSIBLE LINKS (SEE TABLE ON SECTION 4.18.3 "FUSIBLE LINKS SELECTION" INCLUDING P/N)

Four temperature ratings of fusible links are available. Fusible links are a combination of two links that have been electrically soldered: when melted by heat, the two halves of the link separate. Melting temperature and year of manufacture are stamped on each link.



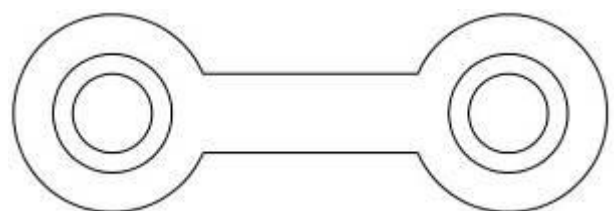
TENSION LOAD TYPE: "K"

MAXIMUM TENSION: 22.68 Kg (50 lb)

MINIMUM TENSION: 1.37 Kg (3 lb)

3.12 TEST LINK (P/N 93412891)

Test links are available for conducting functionality tests of the detection system. This device fits the detector in the same manner as the fusible links. It is normally placed on the terminal detector and can be cut, simulating a fusible links melting and separating under fire conditions.



3.13 CORNER PULLEY (EMT BEARING ANGLE) (P/N 36222309)

The LEHAVOT WCK system uses a high temperature corner pulley to change the direction of the cable by 90°. This corner pulley may be used in environments with temperatures up to 371°C (700°F) in normal working conditions. Mounting holes are provided for anchoring the corner pulley according to local jurisdictions.



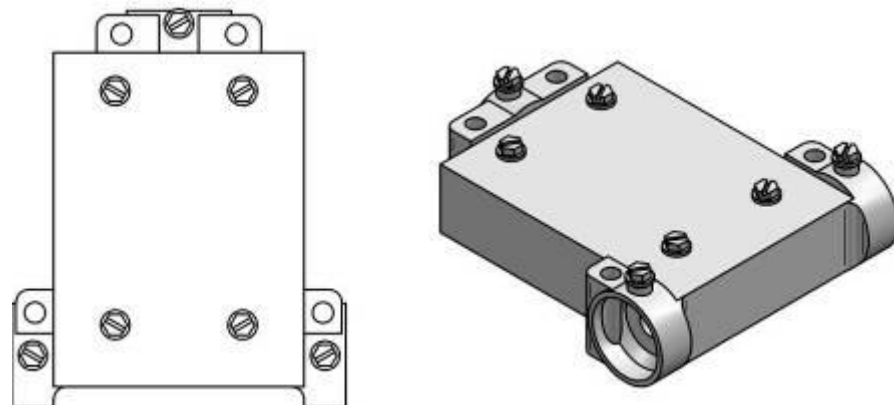
3.14 CORNER PULLEY CP5 (EMT BEARING ANGLE) (P/N 93416444)

The LEHAVOT WCK system also uses a high temperature corner pulley to change the direction of the cable by 90°. This corner pulley (Brooks Model CP5) allows complete assembly of conduit and corner pulleys prior to installing the cable.



3.15 T PULLEY (P/N 93412506)

A "T" pulley is used to change the direction of two cables by 90°. This device can be used with manual activation stations but not with fusible link detectors. **This "T" pulley can be used only within a temperature range of 0°C to 49°C (32°F to 120°F).**



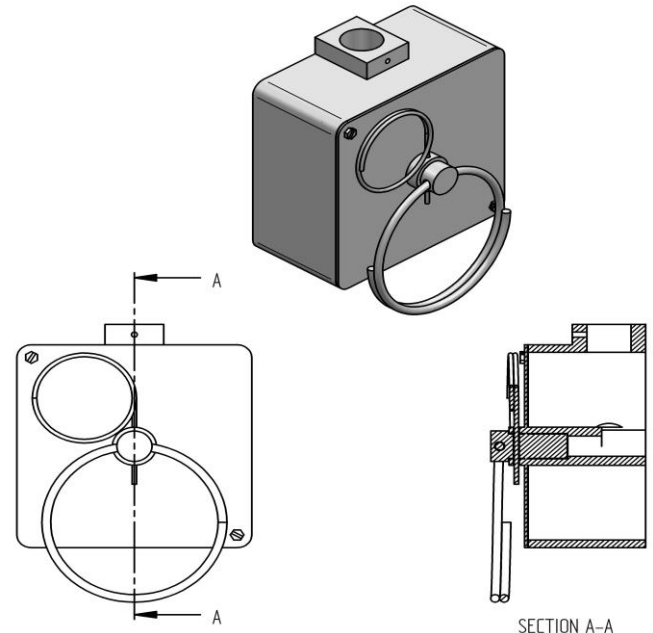
3.16 CABLE (P/N 92100070)

The cable extends from the MRM, through conduits and corner pulleys to detectors and manual activation stations. The cable is 1.6 mm (1/16") in diameter, stainless steel and available in 100 meter (328') spools.

3.17 MANUAL PULL STATIONS (P/N 36630010)

Each LEHAVOT WCK system shall have at least one manual pull station. This device provides a means of activating the system manually. Manual pull stations should be located at an exit and mounted at a height conforming to local jurisdictions. The manual pull station may be recessed into a wall, or surface mounted.

See section 4.19 (General limitations of the manual pull station) and section 5.8.1 (Manual pull station installation) for details.



3.18 MANUAL PULL STATIONS OVERSIZED (P/N 36224320)

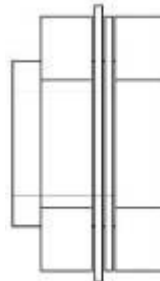
This Manual Pull Station may be either Surface or recess mounted. The oversized cover is large enough to cover the standard 4" octagonal sheetrock access hole and remain attractive and functional. Manual Pull Station should be located in the path of egress and mounted at a height conforming to local jurisdictions. The manual pull station may be recessed into a wall, or surface mounted.

See section 4.19 (General limitations of the manual pull station) and section 5.8.1 (Manual pull station installation) for details



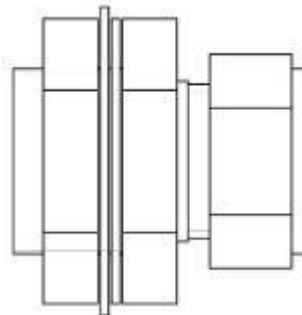
**3.19 QUICK SEAL ADAPTOR 3/8" (P/N 93412276)
QUICK SEAL ADAPTOR 1/2" (P/N 93414204)**

This registered mechanical bulkhead fitting produces a liquid tight seal around distribution lines where they penetrate hoods and ducts. These "quick-seal" adaptors are available in diameters of 3/8" and 1/2", in NPT threading.



**3.20 COMPRESSION SEAL ADAPTOR 3/8" (P/N 93412510)
COMPRESSION SEAL ADAPTOR 1/2" (P/N 93412512)**

The compression seal adaptor is a registered fitting that produces a liquid tight seal around pipes or conduits, where they penetrate hoods or ducts. Unlike quick-seal adaptors, compression seal adaptors are not threaded: conduits and pipes do not need to be cut or threaded.



3.21 NOZZLE SWIVEL ADAPTER (P/N 93416440)

The nozzle swivel adapter is an option to the installation of the nozzles and for easy aiming of the nozzels to the appliances. All nozzles may be use with the swivel adapter without any change in nozzle listing.



3.22 ELECTRICAL GAS VALVE

All electrical gas valves used by the WCK system shall be UL Listed for the intended end use.

Each valve consists of a 110/220 VAC solenoid which keeps the valve open against a spring. Upon activation of the system, current to the solenoid is interrupted by a micro-switch, causing the valve to close. A loss of electrical power will also cause an electrical gas valve to close. A manual reset shall be used with electrical gas valves. UL Listed sizes are 1/2", 3/4", 1", 1 1/4", 1 1/2", 2", 2 1/2", 3".



See section "4.21 Electrical gas valve applications".

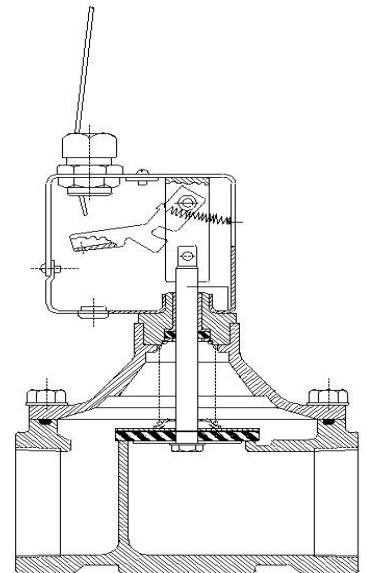
P/N	Size	Voltage	Manufacturer
36209200	1/2"	110 VAC	ASCO
36209202	3/4"		
36209204	1		
36209206	1 1/4"		
36209208	1 1/2"		
36209210	2"		
36209212	2 1/2"		
36209214	3"		
36209201	1/2"	220 VAC	
36209203	3/4"		
36209205	1		
36209207	1 1/4"		
36209209	1 1/2"		
36209211	2"		
36209213	2 1/2"		
36209215	3"		

3.23 MECHANICAL GAS VALVE

All mechanical gas valves used by the WCK system shall be UL Listed for the intended end use.

All LEHAVOT WCK mechanical gas valve kit operates a “pull to close” type gas shut-off valve, which is listed with the system. The valve is held open with a latching device. Upon system discharge a lever in the MRM will pull on a cable connected to the latch on the gas valve release the latch and allow closing the mechanical gas valve. The ASCO gas shut off valves approved for use with LEHAVOT WCK systems are listed below with appropriate part numbers.

See section “4.22 Mechanical gas valve applications”.



P/N	Size	Manufacturer
36209300	1/2"	ASCO
36209301	3/4"	
36209302	1	
36209303	1 1/4"	
36209304	1 1/2"	
36209305	2"	
36209306	2 1/2"	
36209307	3"	

3.24 MANUAL RESET RELAY (MRR)

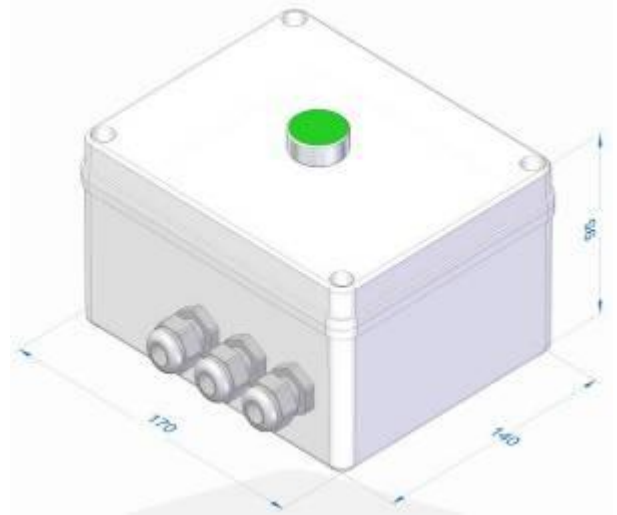
120V (P/N 36209009)

240V (P/N 36209019)

The manual reset relay shall be installed whenever an electric gas valve is connected. After the closing actuation of an electric gas valve (whether from a system discharge or power failure), the electric gas valve shall not be opened without first manually pressing the reset button on the manual reset relay. This procedure will reset the system including the electric gas valve, the pilot lights, and allowing gas to escape when the power is restored.

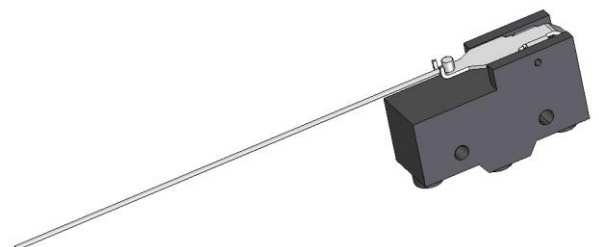
The Manual Reset Relay (MRR) is LISTED under UL No' 4RU9 (UL File S25148) and ULC No' SZT7 (ULC File S25148) and can be installed separately from the system.

Note: the rating of the MRR is – 120VAC 50/60 Hz Minimum 0.25 A Maximum 15A
240VAC 50/60 Hz Minimum 0.15 A Maximum 15A



3.25 MICRO SWITCH (P/N 02709009)

These micro-switches are mounted in the MRM. They are used to control various output functions. These output functions may involve turning power off or on. Examples of output functions are: sounding a visual or audible alarm, activating an electrical gas shut-off valve, sending a signal to a building fire alarm system, shutting off fans, or energizing a relay switch to shut off electrical appliances.



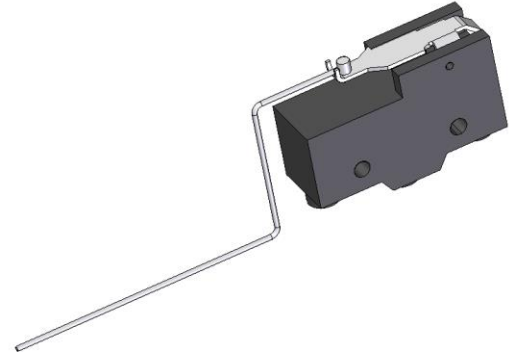
The connections of the micro switch are: COM - White

N.O. – Red

N.C. - Black

3.26 ADDITIONAL MICROSWITCHES (P/N 36202469)

In all MRM two additional micro switches can be added to the two that are already installed in. When ordering an additional micro-switches notice that their P/N 36202469 is different from those that are installed in the MRM already. The two micro-switches come with appropriate screws which allow their installation to the bracket in MRM



The connections of the micro switch are:

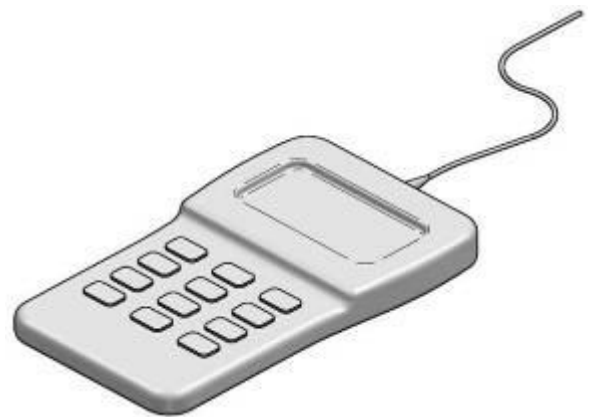
COM - White

N.O. – Red

N.C. - Black

3.27 DIGITAL THERMOMETER (INSTALLATION EQUIPMENT)

In order for the design of a Fire Extinguishing System to be complete, the detection system shall be accurate and calibrated. A precise temperature level shall be decided upon, where there will be a separation of the fuse and activation of the system. A heat probe with a rod allows a digital reading of the temperature of each detector. Measurements can be read in the Fahrenheit or Celsius scales.



3.28 CONTROL PANELS

When used a releasing device control panel shall be UL

Listed and compatible with the electrical equipment specified in this manual.

3.29 SPARE PART KIT (P/N 36202329)

The Spare Parts Kit is used when part of the MRM, Detection system or Manual Pull Station system was lost during instalation.

The kit includes the following parts:

Cable tansion ASSY	1 pcs
Discharge System Activatio Pin	1 pcs
Terminal End	1 pcs
Crimping Type Cable Connector	6 pcs
Cable Tightening Screw	4 pcs
Allen screw M5 x 12	2 pcs
Spring lock washer M5	2 pcs

3.30 WCK DISCHARGE VALVE OVERHAUL KIT (P/N 36203049)

Each time that the system is discharged for any reason, a complete overhaul must be done to the discharge valve of the cylinder.

To do this, overhaul use the Discharge Valve Overhaul Kit (P/N 36203049)

The kit includes the following components:

- One 54Ø O-Ring
- One Piston assembaly
- One Spring
- One Piston Screw
- One 27Ø O-Ring

The instructions on how to carry out the overhaul are found in Chapter 8

3.31 INSTALLATION KIT (P/N 36206050)

With the installation kit a qualified installer can install the suppression system without the additional dedicated tools



CHAPTER 4

SYSTEM DESIGN

Instruction Manual No. 71-171

WCK- Kitchen Fire Suppression System

TESTED AND LISTED BY

UNDERWRITERS LABORATORIES

TO: ANSI/CAN/UL/ULC 300 Standard for Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking Equipment and ANSI/CAN/UL/ULC 1254 Standard for Pre-Engineered Dry and Wet Chemical Extinguishing System Units.

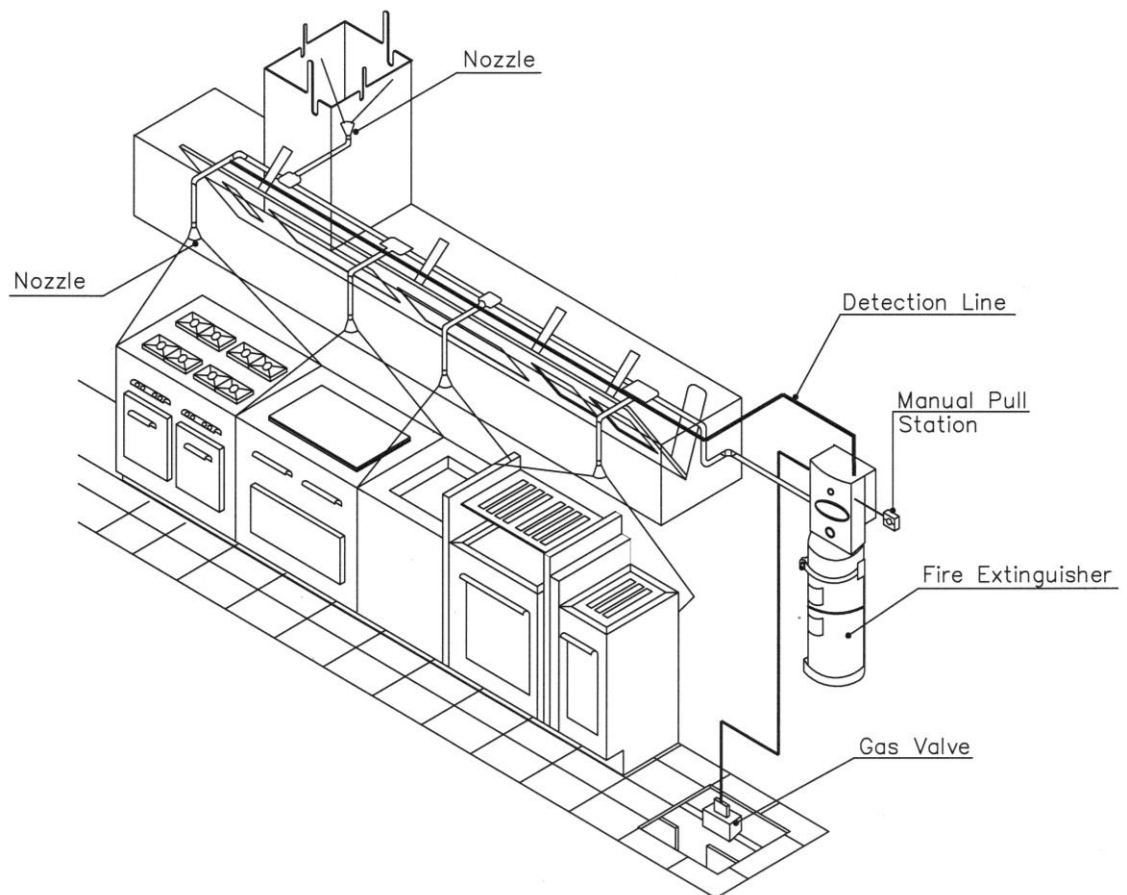


Advanced fire protection systems

4.1 GENERAL

In order for the WCK Fire Suppression System to operate with precision accuracy, it is absolutely essential that each plan of the system be evaluated, and carried out, with precision. This chapter covers kitchen design. The following items are discussed:

- **Limitations of nozzle locations.**
- **Proper volumes of extinguisher agent.**
- **Limitations of the detection network.**
- **Limitations of the manual pull station.**
- **Mechanical and electrical gas valve applications.**
- **Limitations of micro-switches.**

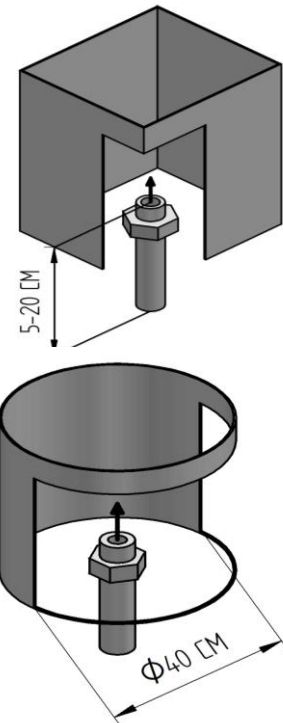


The LEHAVOT WCK System has been designed according to NFPA 17A, through fire tests. These systems have been proven successful when installed according to the limitations described in this manual. Technical drawings of the system design shall be prepared for a comparative check-up drawing of the installation. In the final test, these drawings shall be updated and marked as the actual construction drawings. Copies shall be kept in the corresponding project folder for further future reference.

4.2 DUCT PROTECTION LIMITATIONS - FOR SINGLE FLOW POINTS NOZZLE (P/N 93416)

The LEHAVOT WCK System Nozzle (P/N 93416) is registered to protect kitchen cooking ducts in a perimeter of 127 cm (50") or diameter of 40 cm (16"). Each nozzle has single flow-point. Each nozzle shall be centered in the center of the duct. Nozzle outlet is to be placed 5 cm to 20 cm (2" to 8") into the duct opening, and aimed at the center of the duct.

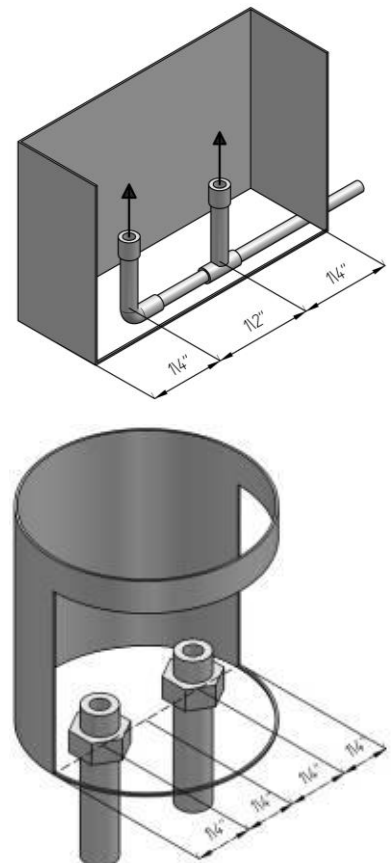
NOTE: Nozzles P/N 93416 is listed to protect a restaurant cooking exhaust duct of unlimited length, and unlimited change in direction if the diagonal measurement of the duct exceeds 46 cm,(18") an additional nozzle shall be added



4.3 DUCT PROTECTION LIMITATIONS – FOR TWO SINGLE FLOW POINTS NOZZLES (P/N 93416)

Two LEHAVOT nozzles (P/N 93416) will protect ducts with a perimeter of 127 cm to 190 cm (50" to 75"), or a maximum diameter of 60 cm (24"). To correctly position the nozzles, a rectangular duct should be divided along its longest side into four equal distances. A nozzle should be placed at one quarter of the duct width (or diameter) with both nozzles on the centerline. Nozzle outlet is to be placed 5 cm to 20 cm (2" to 8") into the duct opening, and aimed at the center of the cross section of the duct opening. Each nozzle has single flow points.

NOTE: Nozzles P/N 93416 is listed to protect a restaurant cooking exhaust duct of unlimited length, and unlimited change in direction. The maximum perimeter for each module shall not exceed 127 cm (50"). If a diagonal measurement of the rectangular duct exceeds 46 cm,(18") an additional nozzle shall be added

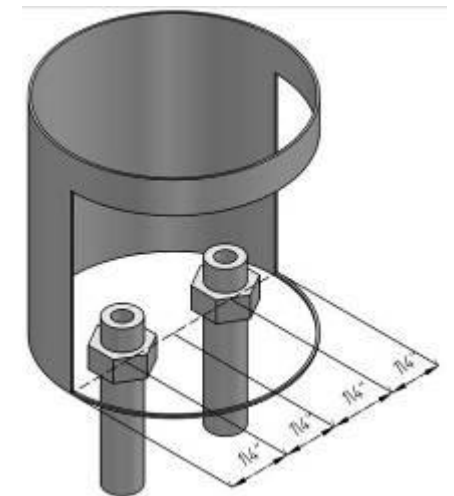
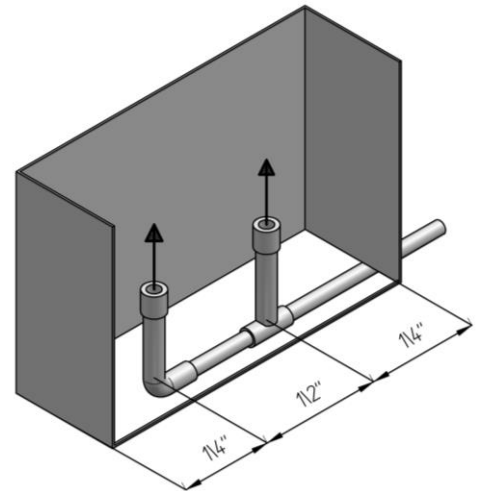


4.4 DUCT PROTECTION LIMITATIONS- FOR TWO 1½ FLOW POINTS NOZZLES (P/N 93483)

The LEHAVOT duct nozzle (P/N 93483) is registered to protect a commercial cooking exhaust duct up to a perimeter of 254 cm (100"), or a diameter of 81 cm (32"), with two nozzles. The nozzles total three flow points. In order to properly position the nozzles, a rectangular duct should be divided along its longest side into four equal distances. A circular duct should be divided along its center line into four equal distances. The nozzles are to be placed at the one quarter and three quarter position of the duct width (or diameter) with both nozzles on the center line. Nozzle outlet is to be placed 5 cm to 20 cm (2" to 8") into the duct opening. In a vertical duct, they are to be aimed straight up.

NOTE: If the diagonal dimension of each module of the rectangular duct exceeds 70cm (28"), an additional nozzle shall be added.

SPECIAL NOTE: Nozzles P/N 93483 is listed to protect a restaurant cooking exhaust duct of unlimited length, and unlimited change in direction. Nozzles P/N 93416 & 93483 cannot be used together in the same distribution branch line.

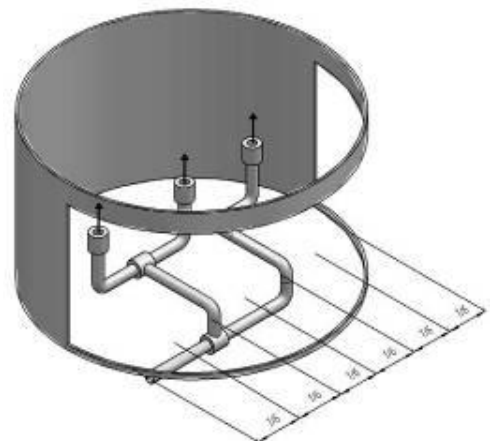
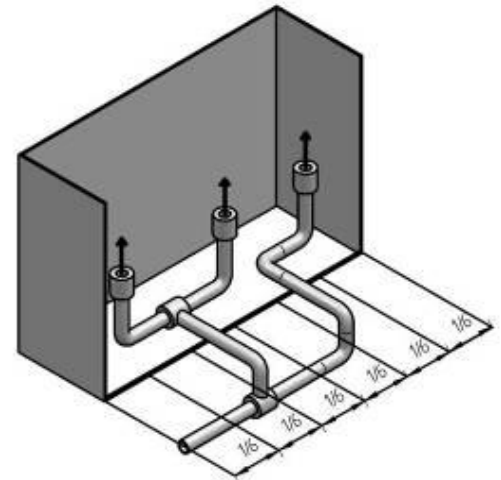


4.5 DUCT PROTECTION LIMITATIONS - FOR THREE 1½ FLOW POINTS NOZZLES (P/N 93483)

The LEHAVOT nozzle (P/N 93483) is registered to protect commercial kitchens cooking exhaust ducts of unlimited length and up to 380 cm (150") in perimeter, or 122 cm (48") diameter, with three nozzles. The nozzles total 4.5 flow points. In order to properly position the nozzles, a rectangular duct should be divided along its longest side into 6 equal distances. A circular duct should be divided along its center line into 6 equal distances. The nozzles are to be placed at positions of one sixth, one half, and five sixths on the center line, of the duct width (or diameter). Nozzle outlet is to be placed 5 cm to 20 cm (2" to 8") into the duct opening. In a vertical duct, they are to be aimed straight up.

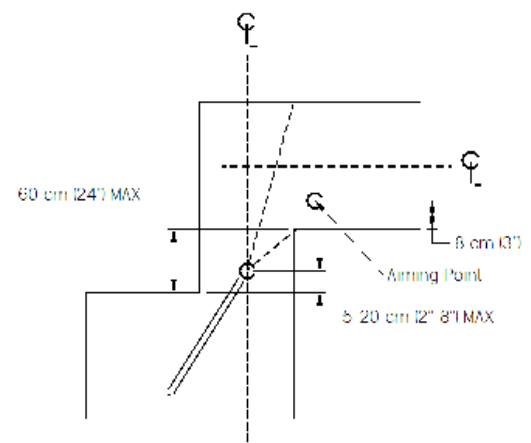
NOTE: If the diagonal dimension of each module of the rectangular duct exceeds 70cm,(28") an additional nozzle shall be added.

SPECIAL NOTE: Nozzles P/N 93483 is listed to protect a restaurant cooking exhaust duct of unlimited length, and unlimited change in direction. Nozzles P/N 93416 & 93483 cannot be used together in the same distribution branch line.



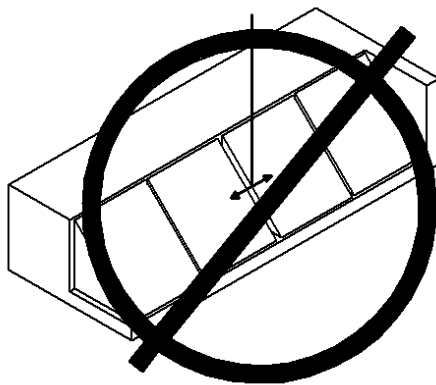
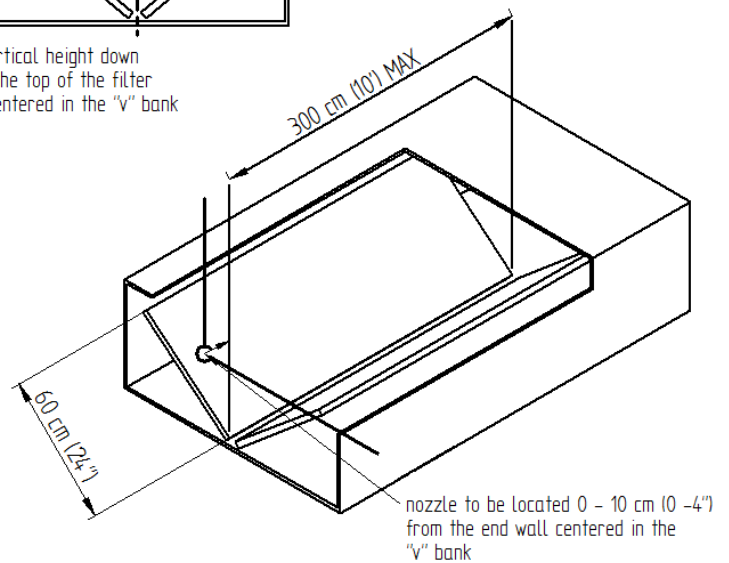
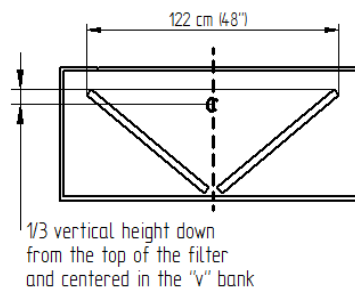
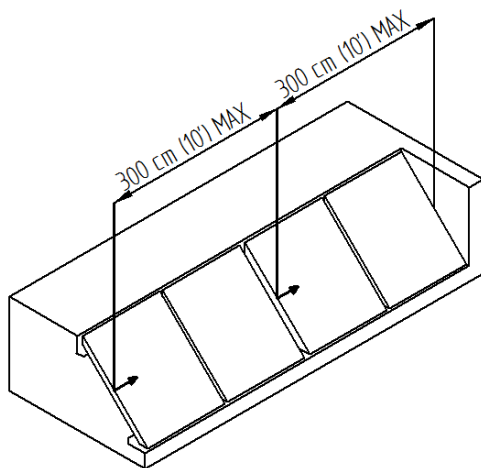
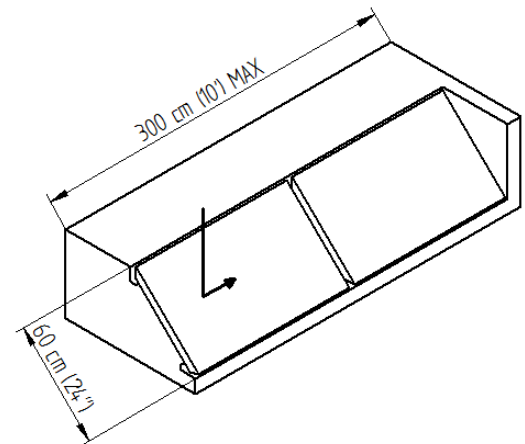
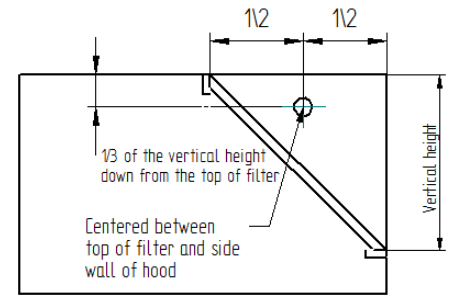
4.6 NOZZLE LOCATION AND AIMING FOR HORIZONTAL DUCTS

In horizontal ducts, nozzles are to be located on the centerline. Nozzle outlet is to be placed 5 cm–20 cm (2" to 8") into the duct opening. They are to be aimed to a point 8 cm (3") above the base of the horizontal duct and in the same vertical plane of the nozzle. See illustration.



4.7 PLENUM PROTECTION LIMITATIONS, SINGLE FLOW POINTS NOZZLE (P/N 93482)

The LEHAVOT appliance, plenum nozzle (P/N 93482) is capable of protecting plenums up to 300 cm (10') long and 122 cm (48") wide, with either a single inclined filter bank or a "V" bank filter arrangement. Filter height cannot exceed 60 cm (24"). Each plenum nozzle uses single flow points. The nozzle shall be positioned 10 cm (4") maximum from the wall, aimed horizontally, and positioned at $\frac{1}{3}$ the filter height, from the top of the filter.



NOTE: Plenums exceeding 300 cm (10') in length may be protected by multiple nozzles, nozzles may be positioned facing each other or facing the same direction along the entire plenum area.

4.8 FRYER PROTECTION

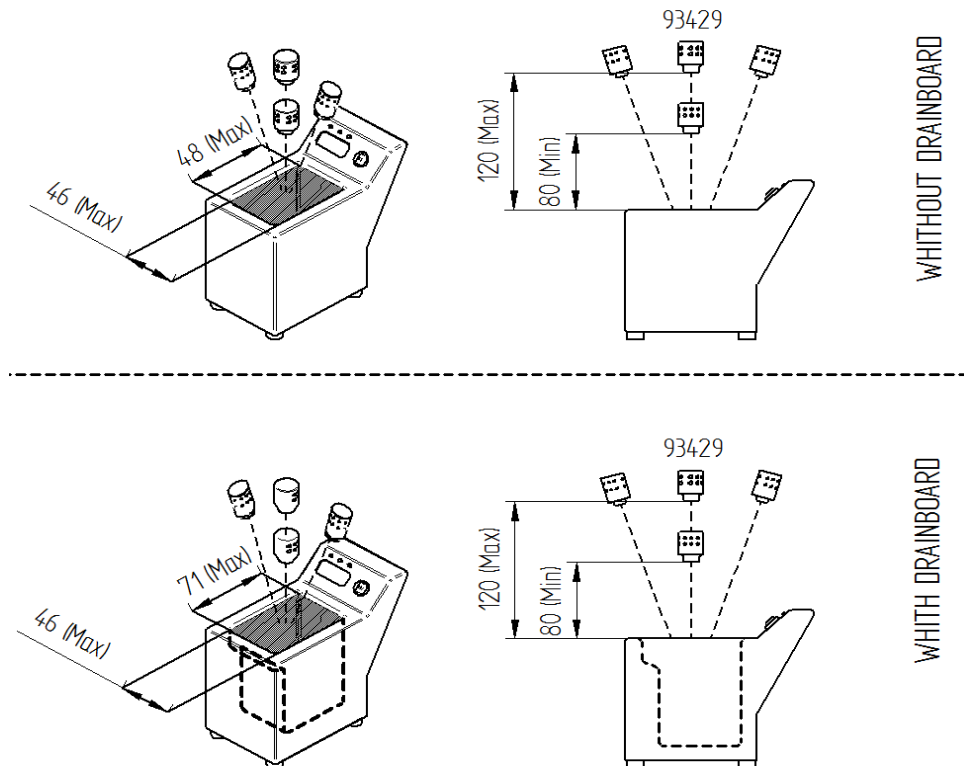
4.8.1 Full vat

Two flow points nozzle (P/N 93429)

Maximum area: 46 cm x 48 cm (18" x 19") not including drain board

46 cm x 71 cm (18" x 28") including drain board

- The LEHAVOT fryer nozzle (P/N 93429) uses two flow points and protects a full vat fryer.
- If the fryer does **not** include a drainboard, the maximum fryer dimensions for single nozzle coverage are 46 cm x 48 cm (18" x 19"), and the maximum protected area is 0.22m² (2.36f²).
- If the fryer **includes** a drainboard the maximum fryer dimensions for single nozzle coverage are 46 cm x 71 cm (18" x 28"), and the maximum protected area 0.32m² (3.34f²). However, the maximum hazard area shall not exceed 46 cm x 48 cm (18" x 19"). The nozzle shall be located directly above the protected area. Nozzle heights shall be between 80 cm – 120 cm (31.5" - 47") above the appliance. The nozzle must be located along or anywhere within the protected area. Nozzles shall be aimed to the center of the hazard area of the appliance, to the point as illustrated in the related drawing.



NOTE: Maximum and minimum heights shall be measured Vertically from the tip of the nozzle to the top surface of the appliance.

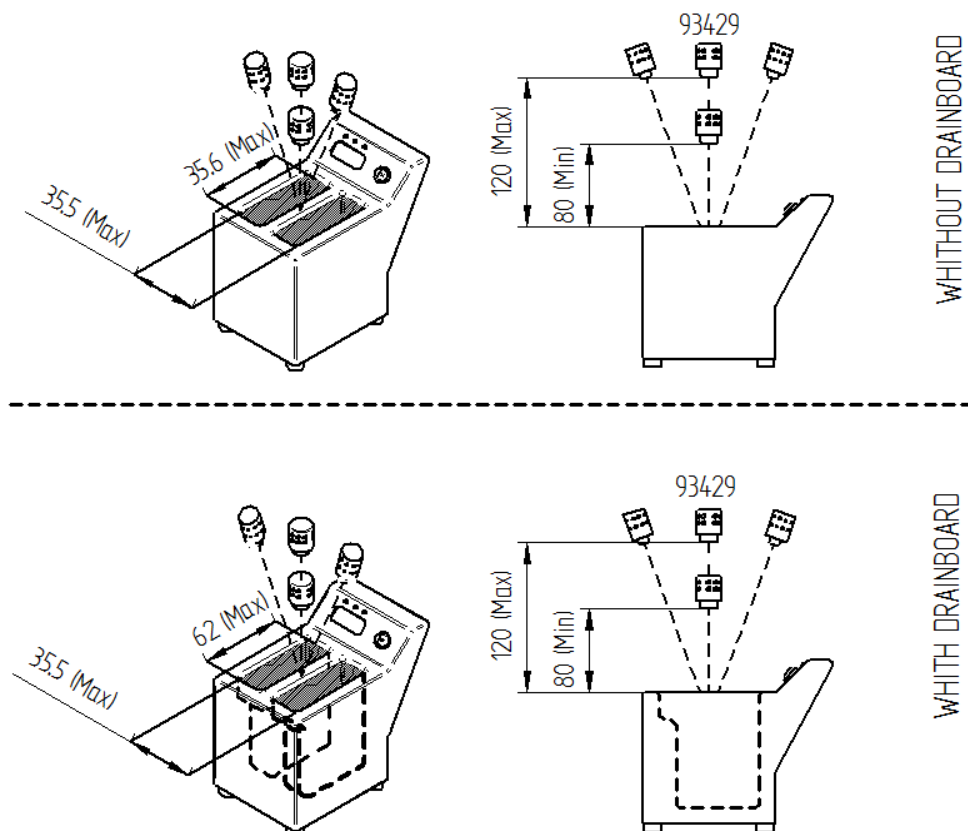
4.8.2 Split vat

Two flow points nozzle (P/N 93429)

Maximum area: 35.5cm x 35.6 cm (14" x 14") not including drain board

35.5 cm x 62 cm (14" x 24.5") including drain board

- The LEHAVOT fryer nozzle (P/N 93429) uses two flow points and protects a full vat fryer.
- If the fryer does **not** include a drainboard, the maximum fryer dimensions for single nozzle coverage are 35.5 cm x 35.6 cm (14" x 14"), and the maximum protected area is 0.13m² (1.4f²).
- If the fryer **includes** a drainboard the maximum fryer dimensions for single nozzle coverage are 35.5 cm x 62 cm (14" x 24.5"), and the maximum protected area 0.22m² (2.36f²). However, the maximum hazard area shall not exceed 35.5 cm x 35.6 cm (14" x 14"). The nozzle shall be located directly above the protected area. Nozzle heights shall be between 80 cm– 120 cm (31.5" - 47") above the appliance. The nozzle must be located along or anywhere within the protected area. Nozzles shall be aimed to the center of the hazard area of the appliance, to the point as illustrated in the related drawing.

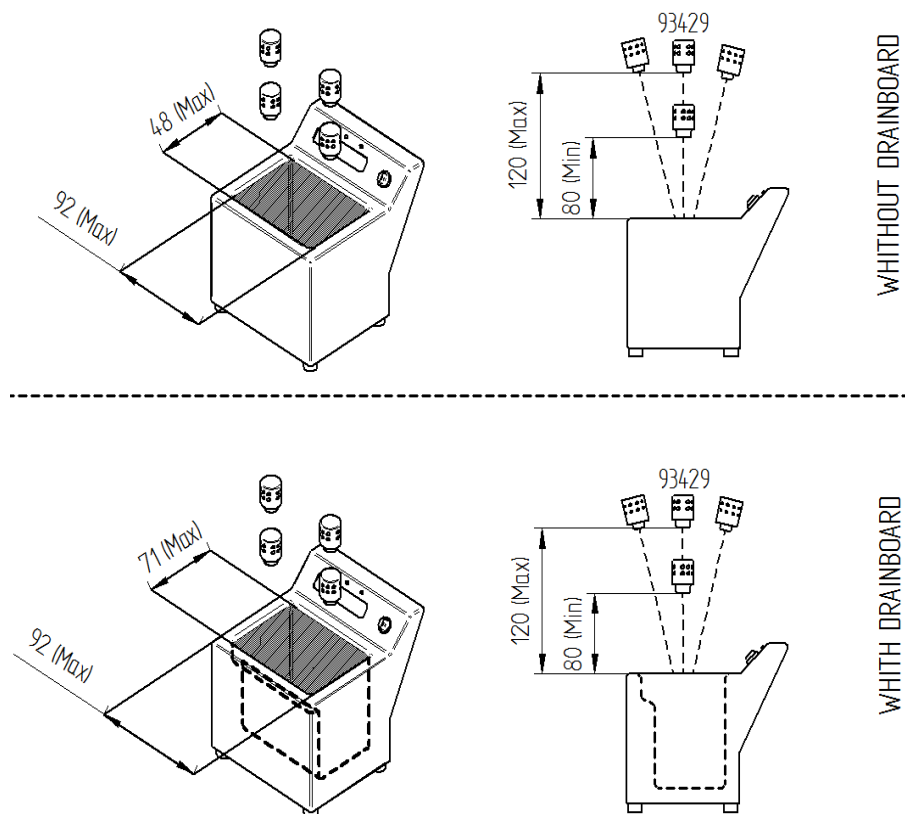


NOTE: Maximum and minimum heights shall be measured Vertically from the tip of the nozzle to the top surface of the appliance.

4.8.3 Fryer exceeding single nozzle protection

The LEHAVOT fryer nozzle (P/N 93429) may be used to protect single vat fryers with maximum areas exceeding the single vat coverage, up to a maximum protected area of 0.32 m² (3.44f²). The fryer shall be divided into modules for coverage of a single nozzle. Located and aim for each module shall be as described in the section of single nozzle coverage.

- For a module that does **not** include a drainboard, the maximum module dimension for single nozzle coverage is 46 cm x 48 cm (18" x 19"). The maximum protected area is 0.22 m² (2.36f²).
- If the module does **include** a drainboard, the maximum module dimension for single nozzle coverage is 46 cm x 71 cm (18" x 28"). The maximum protected area is 0.32 m² (3.44f²). However, the maximum frying area is 46 cm x 48 cm.



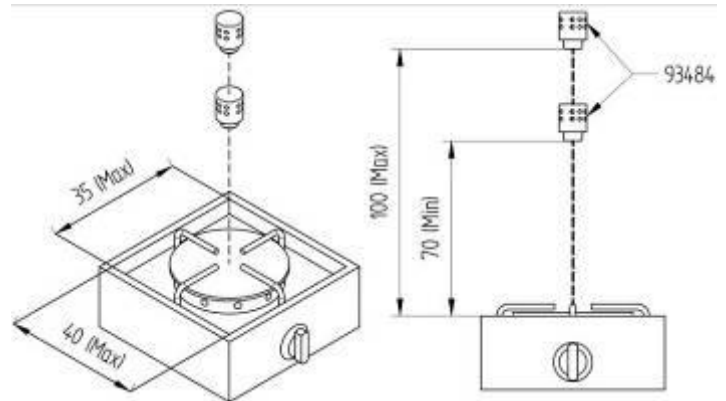
NOTE: Maximum and minimum heights shall be measured Vertically from the tip of the nozzle to the top surface of the appliance.

4.9 RANGE LIMITATIONS

4.9.1 Range with single burner.

Nozzle with 1/2 flow points (P/N 93484)

The LEHAVOT nozzle (P/N 93484) with 1/2 flow points shall protect a single burner with a surface area of 35 cm x 40 cm (13.8" x 15.7"). The nozzles shall be located directly above the center of the burner and 70 cm–100 cm (27.5" - 39.4") above the burners surface. The nozzle shall be aimed at the center of the burner.

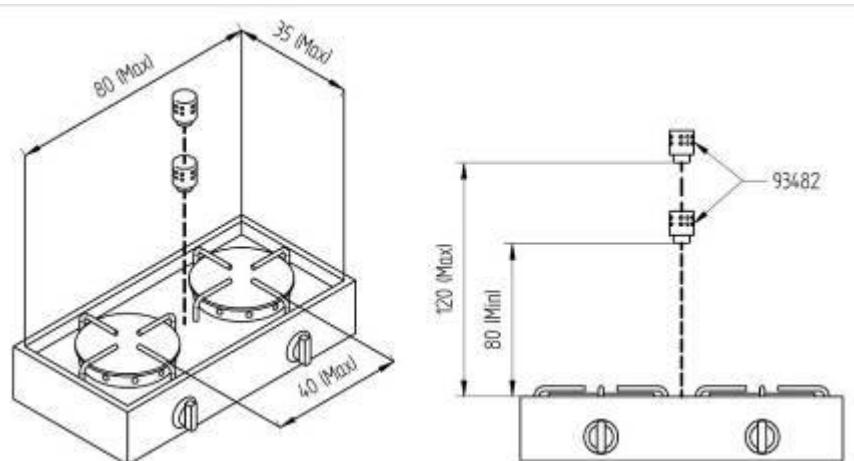


NOTE: Maximum and minimum heights shall be measured Vertically from the tip of the nozzle to the top surface of the appliance.

4.9.2 Range burner protection – Two burners

Nozzle with single flow points (P/N 93482)

The LEHAVOT nozzle (P/N 93482) has single flow points and shall protect a range surface area of 80 cm x 35 cm (31.5" x 13.8"). The distance

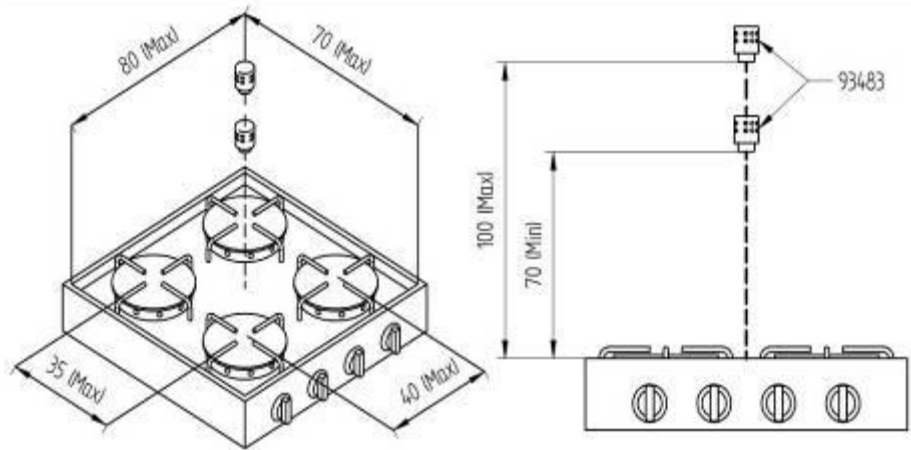


between the burners center shall not exceed 40 cm (15.7"). The nozzle shall be located 80 cm–120 cm (31.5" - 47") above the burners surface and centered between the two burners. The range surface area is measured from the outside of the burner to the outside of the burner.

NOTE: Maximum and minimum heights shall be measured Vertically from the tip of the nozzle to the top surface of the appliance.

4.9.3 Range protection with four burners Nozzle with 1 ½ flow points (P/N 93483)

The LEHAVOT nozzle (P/N 93483) has 1 ½ flow points and shall protect a range surface area of 80 cm x 70 cm (31.5" x 27.5"). The distance between the burners center shall not exceed 35

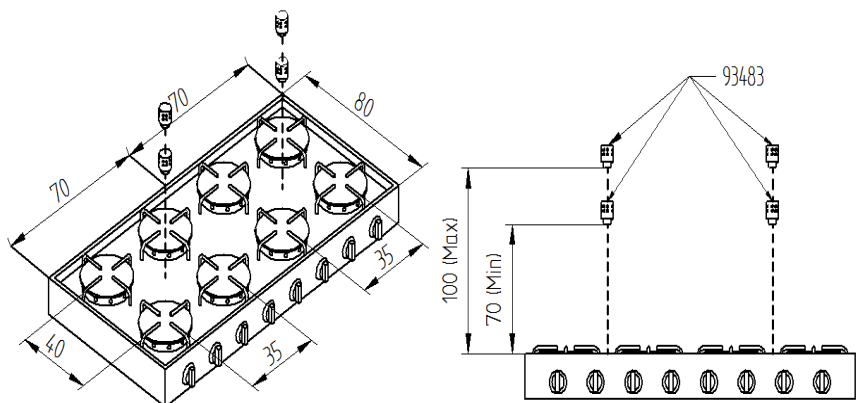


cm – 40 cm (13.8" x 15.7"). The nozzle shall be located 70 cm – 100 cm (27.5" - 39.4") above the burners surface and centered between the four burners. The range surface area is measured from the outside of the burner to the outside of the burner.

NOTE: Maximum and minimum heights shall be measured Vertically from the tip of the nozzle to the top surface of the appliance.

4.9.4 Range protection – multiple nozzle (P/N 93483)

For ranges that have a surface area exceeding the capabilities of a single nozzle, multiple nozzles shall be used, provided that the surface area of the range is divided into equally sized modules.

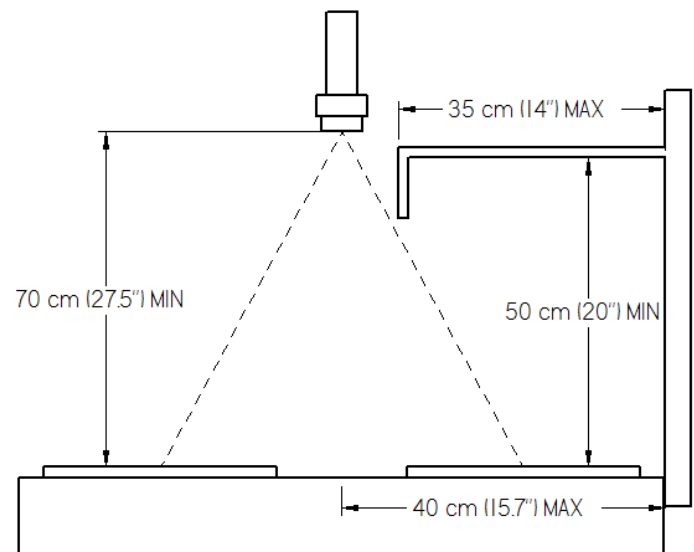


Each module shall be equal to, or less than, 80 cm x 70 cm (31.5" x 27.5"). The nozzle shall be located between 70 cm – 100 cm (27.5" - 39.4") above the range surface and centered between each set of burners.

NOTE: When using this nozzle to protect a two burner range, the aiming point is where a 20 cm (8") radius from the center of each burner crosses one another.

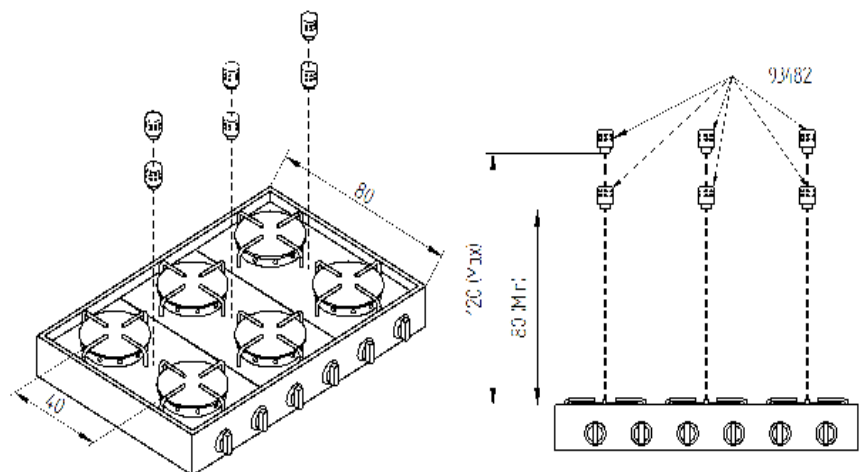
4.9.5 Protection with shelving nozzle (P/N 93482/93483)

If a back shelf obstructs the spray pattern of the protection nozzle, locate the nozzle as shown, and still within its minimum range of 70 cm (27.5"). and when the minimum height of the shelf is not more then 50 cm (20") and the length of it is not more then 35 cm (14") When the shelf interferes with nozzle orientation, it may be necessary to route the pipe under the shelf, or drill a hole through the shelf, for placement of the nozzle. Always receive an agreement in shelf alteration before performing the work.



4.9.6 Range protection – multi nozzle (P/N 93482)

For ranges that have a surface area exceeding the capabilities of a single nozzle, multi nozzles shall be used provided that the surface area of the range is divided into equally sized modules. Each

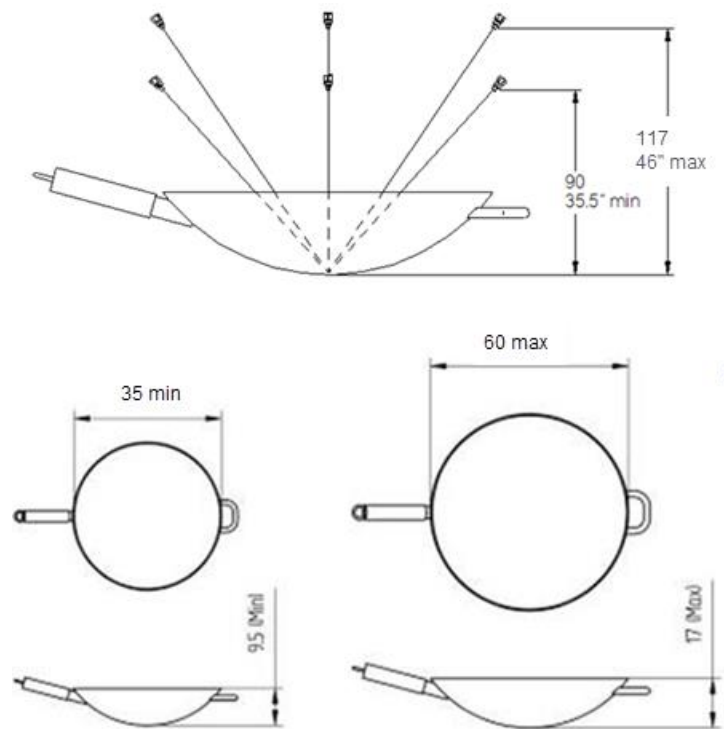


module shall be equal to or less than 80 cm x 35 cm (31.5" x 13.8"). The nozzle shall be located between 80 cm – 120 cm (31.5" x 47") above the range surface and centered between

NOTE: Maximum and minimum heights shall be measured Vertically from the tip of the nozzle to the top surface of the appliance.

4.10 WOK PROTECTION – NOZZLE WITH SINGLE FLOW POINTS (P/N 93482)

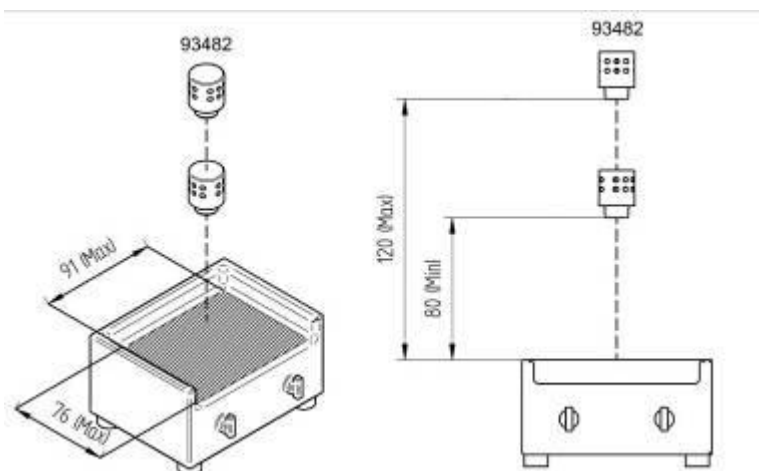
The LEHAVOT appliance plenum nozzle (P/N 93482) has a single flow points and will protect a wok with dimensions between a minimum diameter of 35 cm (13.5") and a maximum of 60 cm (23.6"), inclusive. The wok shall have a height dimension between a minimum of 9.5 cm (3.5") and a maximum of 17 cm (7"), inclusive. The nozzle must be located along or anywhere within the protected area and aimed to the center of the wok. The nozzle shall be located at a height between 90 cm - 117 cm (35.5" - 46") and measured from the bottom of the inside of the wok to the tip of the nozzle.



4.11 GRIDDLE PROTECTION

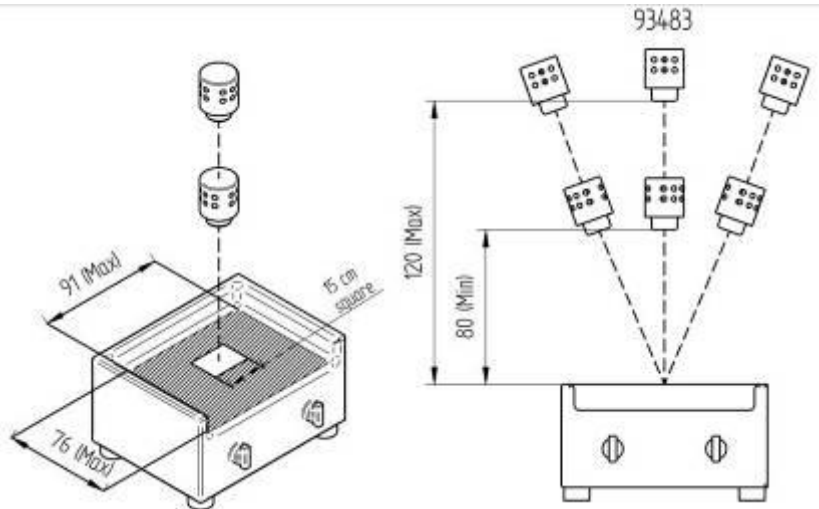
4.11.1 Griddle Protection – Nozzle with a single flow point (P/N 93482)

The LEHAVOT griddle nozzle (P/N 93482) has a single flow point and will protect a griddle surface 91 cm wide x 76 cm deep (36" x 30"), for a maximal working area of 0.69 m² (7.42ft²). The nozzle shall be located only directly above the appliance and between 80 cm - 120 cm (31.5" - 47") above the surface of the appliance.



4.11.2 Griddle protection - Nozzle with 1 ½ flow points (P/N 93483)

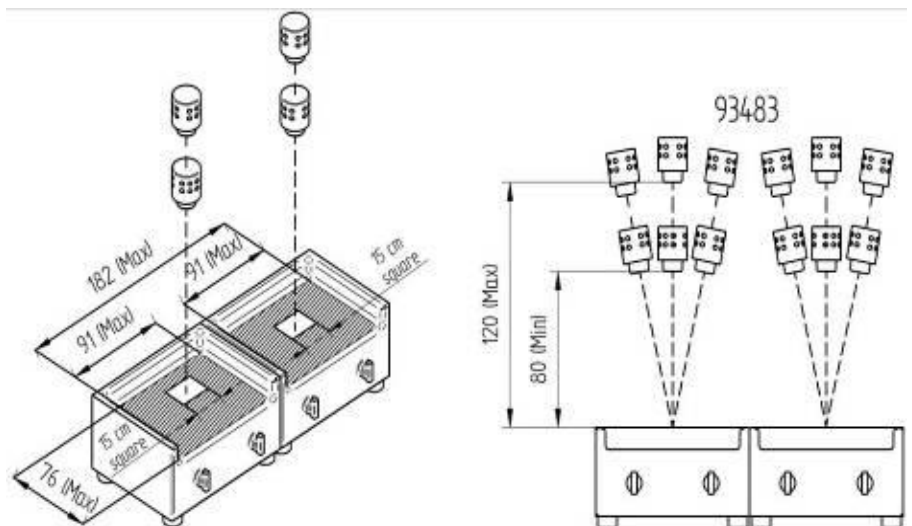
The LEHAVOT griddle nozzle (P/N 93483) has single 1 ½ flow points and will protect a griddle surface 91 cm wide x 76 cm deep (36" x 30"), for a maximal working area of 0.69 m² (7.42ft²). The nozzle shall be located directly above or centered on one side of



the appliance and between 80 cm - 120 cm (31.5" - 47") above the surface of the appliance. The nozzle must be located along or anywhere within the protected area. The aiming point for the nozzle is the "point of intersection" of a straight line from the nozzle location to the center of the appliance, with a 15 cm (6") square, generated around the center point of the griddle.

4.11.3 Griddle protection - Multi nozzles with 1 ½ flow points (P/N 93483)

Multiple LEHAVOT griddle nozzles (P/N 93483 - 1 ½ flow points) may be used to protect a griddle surface area greater than 91 cm x 76 cm (36" x 30"). The griddle shall be divided into modules for single

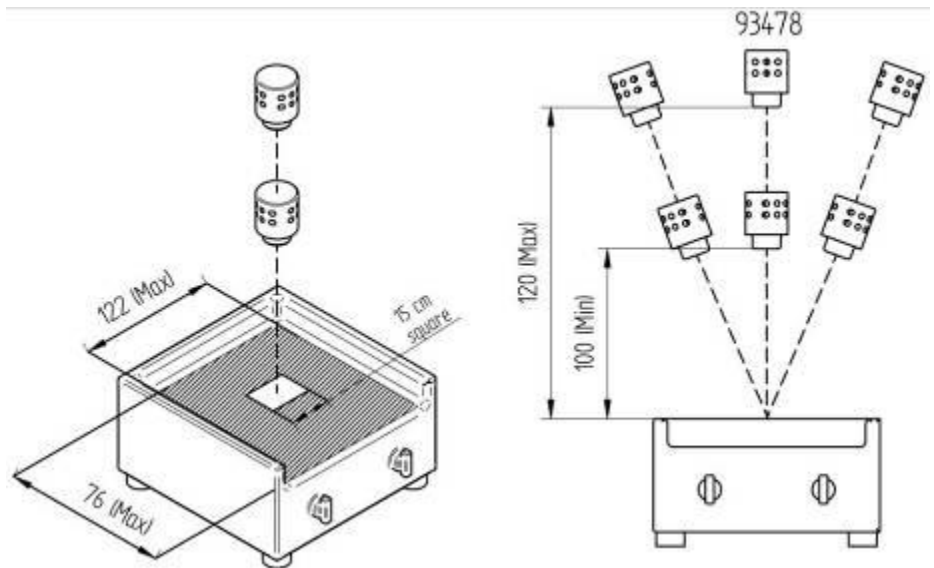


nozzle coverage and the nozzles located, and aimed, for each module as described for single nozzle coverage.

NOTE: Maximum and minimum heights shall be measured Vertically from the tip of the nozzle to the top surface of the appliance.

4.11.4 Griddle protection - Nozzle with two flow points (P/N 93478)

The LEHAVOT griddle nozzle (P/N 93478) has two flow points and will protect a griddle surface 122 cm wide x 76 cm deep (48" x 30"), for a maximal working area of 0.93 m² (10f²). The



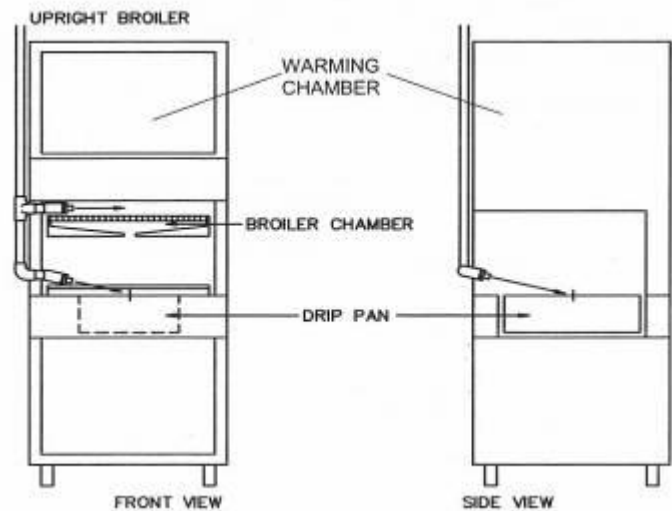
nozzle shall be located directly above or centered on one side of the appliance in a height range between 100 cm - 120 cm (39.4" - 47") above the appliance surface. The nozzle must be located along or anywhere within the protected area. The aiming point for the nozzle is the "point of intersection" of a straight line from the nozzle location to the center of the appliance, with a 15 cm (6") square, generated around the center point of the griddle.

NOTE: Maximum and minimum heights shall be measured Vertically from the tip of the nozzle to the top surface of the appliance.

4.12 CHAR BROILER (GRILL) PROTECTION

4.12.1 Upright broiler two nozzles with 1/2 flow points (P/N 93484)

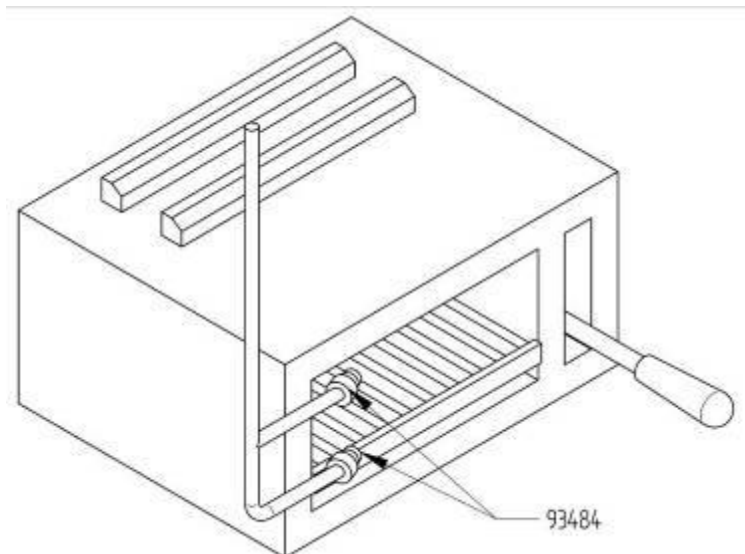
LEHAVOT upright broiler nozzles are required for this application. Each upright nozzle (P/N 93484) equals 1/2 flow points. These nozzles shall be used in pairs, equaling a total of single flow points. These nozzles will protect an internal broiler chamber measuring 60 cm x 40 cm (23.6" x 5.7"). The nozzles



shall be positioned at the front opening of the broiler, with the top nozzle located at the grate and aimed toward the center of the drip pan.

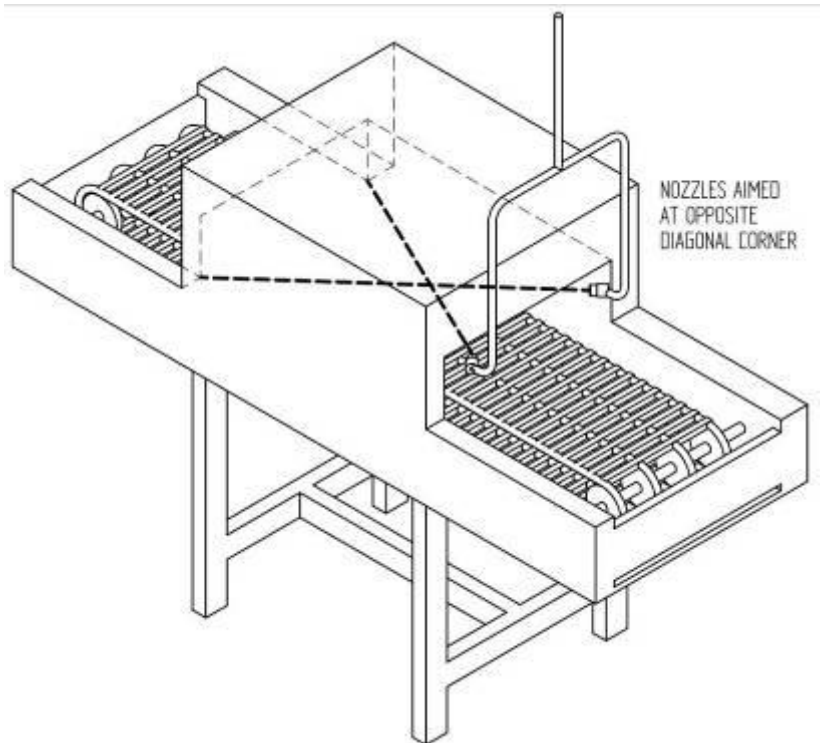
4.12.2 Salamander protection two nozzles with 1/2 flow points (P/N 93484)

LEHAVOT salamander protection nozzles are required for this application (P/N 93484) Two 1/2 flow points. These nozzles shall be used in pairs, equaling a total of single flow points. The nozzles will protect salamander surface 65 cm x 37 cm (25.6" x 14.5") for a maximal working area 0.24 m² (2.58ft²). The nozzles shall be positioned at the front opening of the broiler, with the top nozzle located at the grate and aimed toward the center of the drip pan.



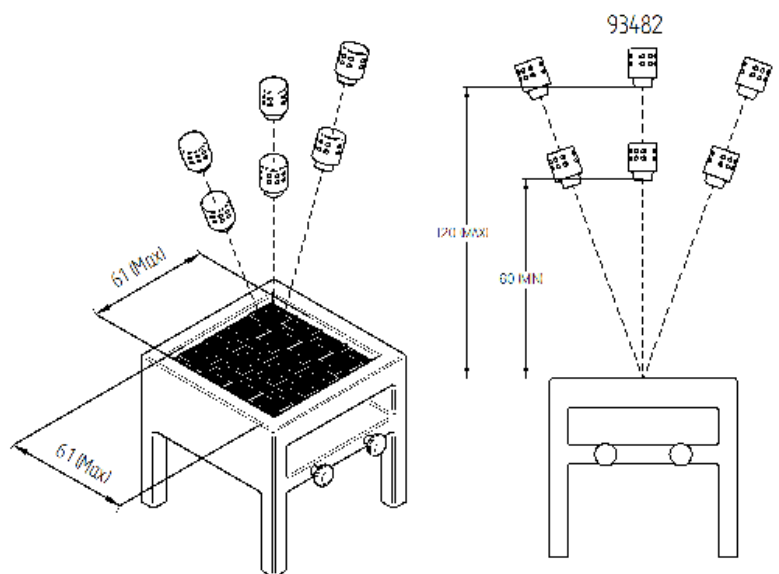
4.12.3 Chain broiler protection – two Nozzle with 1/2 flow points (P/N 93484)

The LEHAVOT chain broiler nozzle (P/N 93484 – Two x 1/2 flow points) has a total single flow point and will protect a chain broiler surface 92 cm x 63 cm (36.2" x 24.8") for a maximal working area 0.58 m² (6.24ft²). Each nozzles shall be positioned at the front opening of the broiler, with the top nozzle located at the grate and aimed at opposite diagonal corner.



4.12.4 Gas radiant char broiler protection - Nozzle with single flow points (P/N 93482)

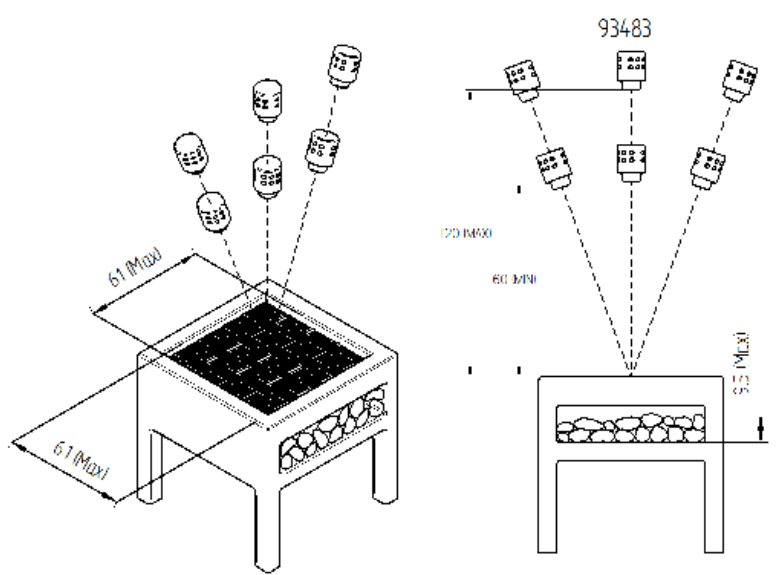
A 1 flow point's nozzle (P/N 93482) will protect a gas radiant char broiler with a maximum cooking surface of 61 cm x 61 cm (24" x 24"). The appliance nozzle uses a 1 flow points and for this application shall be located between 60 cm – 120 cm (23.5" - 47") above the cooking surface anywhere, along or within, the perimeter of the appliance aimed toward the center.



NOTE: Maximum and minimum heights shall be measured Vertically from the tip of the nozzle to the top surface of the appliance.

4.12.5 Lava, pumice or synthetic rocks protection - One nozzle with 1 1/2 flow points (P/N 93483)

A 1½ flow point's nozzle (P/N 93483) will protect a lava, pumice or synthetic rock char broiler with a maximum cooking surface of 61 cm x 61 cm (24" x 24"). The appliance nozzle uses a 1½ flow points and for this application shall be located between 60 cm – 120 cm (23.5" - 47") above the cooking surface

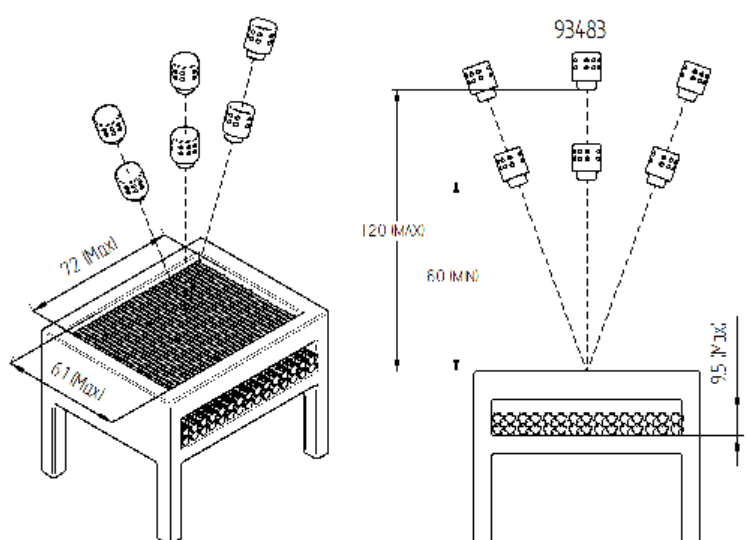


anywhere, along or within, the perimeter of the appliance aimed toward the center. The maximum rock depth shall not exceed 9.5 cm (3.7").

NOTE: Maximum and minimum heights shall be measured Vertically from the tip of the nozzle to the top surface of the appliance.

4.12.6 Natural charcoal, briquettes and natural wood char broiler protection one nozzle with 1 1/2 flow points (P/N 93483)

A 1½ flow point's nozzle (P/N 93483) will protect a natural and charcoal briquette and natural wood char broiler with a maximum cooking surface of 72 cm x 61 cm (28.3" x 24"). The appliance nozzle uses a 1½ flow points and for this application shall be located between 60 cm – 120 cm (23.5" - 47") above the cooking surface anywhere,



























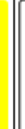



along or within, the perimeter of the appliance aimed toward the center. The maximum charcoal/wood depth shall not exceed 9.5 cm (3.7").

NOTE: Maximum and minimum heights shall be measured Vertically from the tip of the nozzle to the top surface of the appliance.

4.12.7 WCK Restaurant system nozzle application chart

LEHAVOT WCK restaurant system nozzle application chart

Appliance	Nozzle P/N	Nozzle Ring Color	Flow Points	Width (cm)	Length (cm)	Min. Height (cm)	Max. Height (cm)
Deep Fat Fryer – without Drain board	93429		2	46 (18")	48 (19")	80 (31.5")	120 (47")
Deep Fat Fryer – with Drain board	93429		2	46 (18")	71 (28")	80 (31.5")	120 (47")
Deep Fat Fryer, Split – without Drain board	93429		2	35.6 (14")	35.6 (14")	80 (31.5")	120 (47")
Deep Fat Fryer, Split – with Drain board	93429		2	35.6 (14")	62 (24.5")	80 (31.5")	120 (47")
Range – Single burner	93484		0.5	35 (13.8")	40 (15.7")	70 (27.5")	100 (39.4")
Range – Two burner	93482		1	35 (13.8")	80 (31.5")	80 (31.5")	120 (47")
Range – Four burner	93483		1.5	70 (27.5")	80 (31.5")	70 (27.5")	100 (39.4")
Wok	93482		1	35-60 dia. (13.7"-23.6")	9.5-17 depth (3.5"-7")	90 (35.5")	117 (46")
Griddle (overhead nozzle only)	93482		1	76 (30")	91 (36")	80 (31.5")	120 (47")
Griddle	93483		1.5	76 (30")	91 (36")	80 (31.5")	120 (47")
Griddle	93478		2	76 (30")	122 (48")	100 (39.4")	120 (47")
Upright Broiler	93484 x 2		1	40 (15.7")	60 (23.5")	-	-
Salamander	93484 x 2		1	37 (14.5")	65 (25.6")	-	-
Chain broiler	93484 x 2		1	63 (24.8")	92 (36.2")	-	-
Char broiler – Gas radiant	93482		1	61 (24")	61 (24")	60 (23.5")	120 (47")
Char broiler – Lava rocks	93483		1.5	61 (24")	61 (24")	60 (23.5")	120 (47")
Char broiler – Purnice rocks	93483		1.5	61 (24")	61 (24")	60 (23.5")	120 (47")
Char broiler – Synthetic rocks	93483		1.5	61 (24")	61 (24")	60 (23.5")	120 (47")
Char broiler – Natural charcoal	93483		1.5	61 (24")	72 (28.3")	60 (23.5")	120 (47")
Char broiler – charcoal briquettes	93483		1.5	61 (24")	72 (28.3")	60 (23.5")	120 (47")
Char broiler – Natural wood	93483		1.5	61 (24")	72 (28.3")	60 (23.5")	120 (47")
Plenum	Nozzle P/N		Flow Points	Width (cm)	Length (CM)		
Single Bank / V-Bank	93482		1	120 (47")	300 (120")		
Duct	Nozzle P/N		Flow Points	Max Perimeter (cm)	Diameter (cm)	Length (cm)	Max. Diagonal (cm) per Nozzle
Rectangular	93416		1	124 (50")	-	Unlimited	46 (18")
Circular	93416		1	-	40 (15.7")	Unlimited	-
Rectangular	93416 x 2		2	190 (75")	-	Unlimited	46 (18")
Circular	93416 x 2		2	-	60 (24")	Unlimited	-
Rectangular	93483 x 2		3	254 (100")	-	Unlimited	70 (28")
Circular	93483 x 2		3	-	81 (32")	Unlimited	-

Protection is not limited to the items listed on this chart. Modulating larger appliances are an acceptable practice. See your LEHAVOT WCK Manual for additional information.

4.13 AGENT QUANTITY AND CYLINDER SELECTION

After reviewing the hazards and determining the required number and type of nozzles, calculate the amount of agent and the number and type of cylinders needed. Factor in the number of flow points that are needed for the system. This is essential to determine the agent quantity and cylinder options. See the table below. It is possible to connect up to 6 cylinders of any type in one system.

Cylinder Design Data

Cylinder Type	WCK 6	WCK 9	WCK 16	WCK 20	WCK 26
Number of Flow Points	5	7	12	16	20
Amount of Agent - Liters	6.5 (1.17 gal)	9.1 (2.37 gal)	15.6 (4.12 gal)	20.8 (5.5 gal)	26 (6.87 gal)
Cylinder Gross Weight (Kg)	14.7 (32.3 lb)	18.9 (41.6 lb)	30.4 (67 lb)	39.2 (86.2 lb)	46.5 (102.3 lb)
Cylinder & MRN Height (cm)	66.5 (26")	79.7 (31.5")	68.2 (27")	83.5 (33")	83.5 (33")
Cylinder O.D. (cm)	17.4 (7")	17.4 (7")	32.4 (12.75")	32.4 (12.75")	32.4 (12.75")

4.13.1 Single / Multiple cylinder WCK 6/9/16/20/26

4.13.1.1 System description:

The LEHAVOT WCK 6-9-16-20-26 wet chemical systems are special design systems. They are registered for Fire Suppression that can be used in cooking appliances, plenums and ducts of commercial kitchens. All installed systems can be activated manually or automatically. The system uses a wet chemical agent designed to suppress fires in a process that includes:

- Foaming of oily surfaces
- A mist that produces a cooling effect
- Vaporization as result of remaining in an inertial state
- Stopping of the burning chain process.

The type of serial systems to be selected for installation shall be decided according to instructions in the "Design" chapter of this manual. This chapter reviews distribution pipe limitations that shall be considered. For the particular construction of a system of one cylinder, the main supply line from the cylinder to the first "T" will use a diameter of 3/8" or 1/2" Sch 40 Black Iron pipe or Stainless Steel pipe. The supply branch line extending from the first "T" to the last nozzle is a diameter of 3/8" stainless steel Sch 40 pipe. Limitations for this system are described in the following pages. Information in other locations is of no influence to system limitations.

4.14 GENERAL SYSTEMS LIMITATIONS

4.14.1 System types

SYSTEM TYPE	NO. OF FLOW POINTS	
	Maximum	Minimum
WCK 6	5	2
WCK 9	7	5
WCK 16	12	7
WCK 20	16	12
WCK 26	20	12
WCK 16 + WCK 6	17	12
WCK 16 + WCK 9	19	12
WCK 16 + WCK 16	24	16

Note:

1. Different types of nozzles shall not be mixed together on one the same branch line (Duct, Hood or Appliances). Up to 4 flow points are allowed on the same branch line.
2. Different types of pipes can be mixed together in the same system. System pipes shall be, with diameter of 3/8" or 1/2" Sch 40 Sch 40 Black Iron pipe or Stainless Steel pipe.
3. The distribution piping network in the "LEHAVOT WCK" Kitchen Fire Suppression System consists of: main supply line, branch lines of the ducts, hood and appliances.

4.14.2 Supply line

Supply Line is the piping that leads from the cylinder to the first "T".

4.14.3 Duct branch line

Duct branch line is the distribution piping that leads from the main supply branch line to the duct nozzles, including all the connectors.

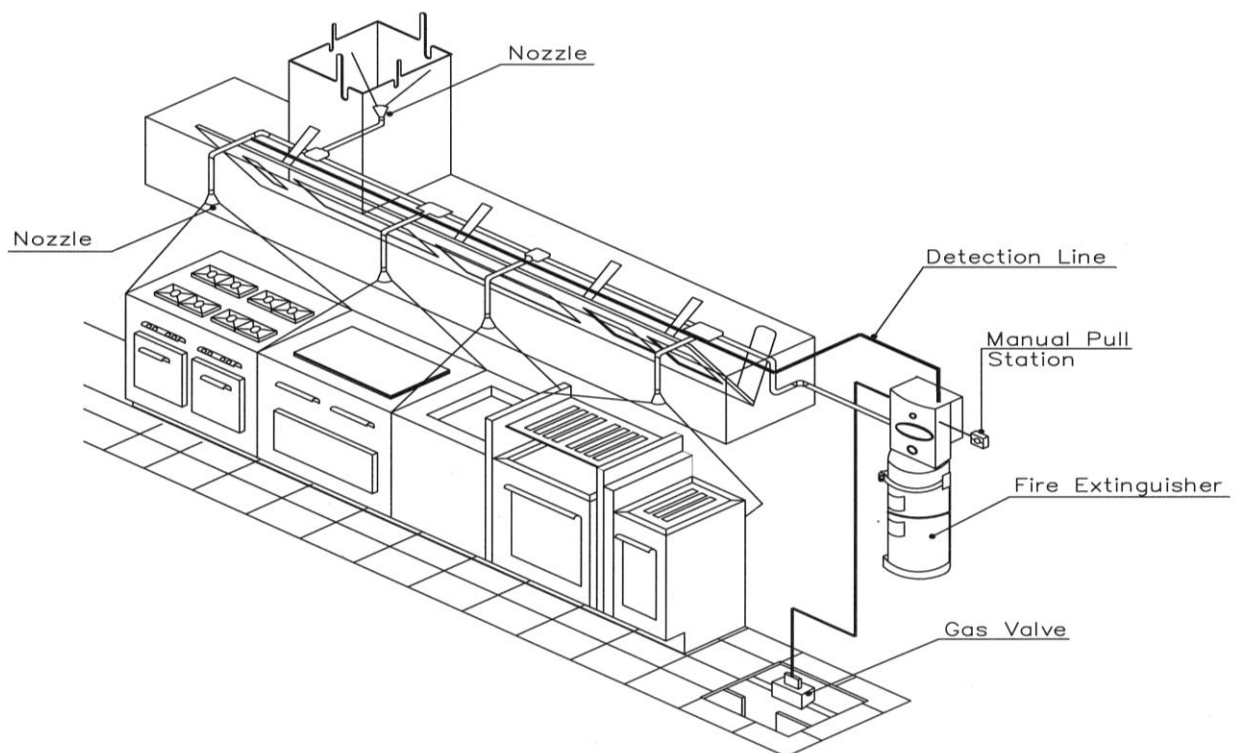
4.14.4 Hood branch line

The distribution piping leading from the main supply branch line to the hood nozzles, including all connectors

4.14.5 Appliances supply branch line

The distribution piping leading from the main supply branch line to the cooking appliance nozzles including all connectors installed at the line exists.

Note: A typical design for a single cylinder system.



4.15 GENERAL REQUIREMENTS FOR DISTRIBUTION PIPING NETWORK:

All pipes in the distribution network shall be 3/8" and 1/2" Sch. 40 Black Iron pipes or stainless steel pipes.

WARNING: USE OF GALVANIZED PIPES IS STRICTLY PROHIBITED

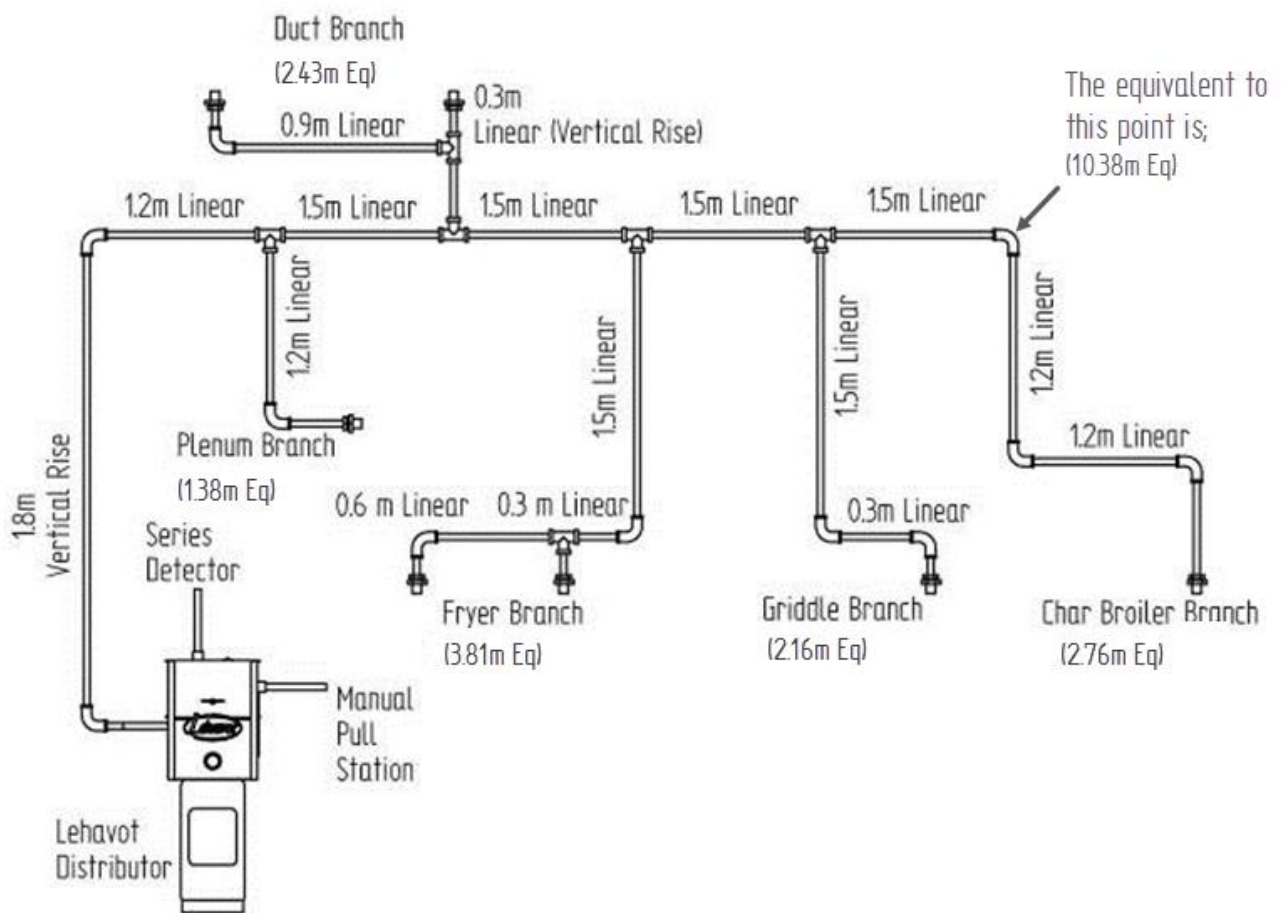
4.15.1 Piping comparison

The installation of the piping has limitations which involve both linear (direction of the pipe) and length of the pipe. The linear piping is the straight pipe used for the main supply line, supply branch line and appliance supply branch line. Total system piping equals the sum of all lengths of the main supply line, branch line and appliance supply branch line plus all fittings attached to that line. For each fitting used there is a friction loss. Each of fitting type has its own friction loss. See Table 4.15.2.

4.15.2 Pipe fitting equivalent length (in meters)

Pipe diameter	Elbow 90°	Elbow 45°	Flow through branch T	Side outlet to - T	Straight Fittings
3/8"	0.18 (7")	0.12 (4.7")	0.24 (9.5")	0.81 (32")	0.1 (3.9")
1/2"	0.2 (8")	0.15 (6")	0.45 (18")	1 (39")	0.15 (6")

Illustration Example



4.16 PIPING LIMITATIONS

4.16.1 Main supply line limitations

Pipe and fittings leading from cylinder to first "T"

Cylinder type	Pipe diameter	Maximum equivalent length of piping (m)	Minimum equivalent length of piping (m)	Maximum vertical rise above the cylinder (m)
WCK 6	3/8"	9 (29.5')	2.6 (8.5')	3 (10')
WCK 9	3/8"	9 (29.5')	2.6 (8.5')	3 (10')
WCK 16	3/8"	12 (39.4')	3.2 (10.5')	3 (10')
WCK 20	1/2"	12 (39.4')	4.9 (16')	3 (10')
WCK 26	1/2"	12 (39.4')	4.9 (16')	3 (10')
WCK 16 + 6	1/2"	12 (39.4')	3.2 (10.5')	3 (10')
WCK 16 + 9	1/2"	12 (39.4')	3.2 (10.5')	3 (10')
2 x WCK 16	1/2"	12 (39.4')	3.2 (10.5')	3 (10')

4.16.2 Supply branch line

The total of all piping and fittings leading from the first "T" to all nozzles

Cylinder type	Pipe diameter	Maximum No' of flow points	Maximum equivalent length of piping (m)	Minimum equivalent length of piping (m)	Maximum vertical rise above the cylinder (m)
WCK 6	3/8"	5	9.5 (31')	7.5 (24.6')	1 (3.2')
WCK 9	3/8"	7	11 (36')	7.5 (24.6')	1 (3.2')
WCK 16	3/8"	12	30 (98.5')	11 (36')	1 (3.2')
WCK 20	3/8"	16	35 (115')	15 (49.2')	1 (3.2')
WCK 26	3/8"	20	35 (115')	15 (49.2')	1 (3.2')
WCK 16 + 6	3/8"	17	30 (98.5')	11 (36')	1 (3.2')
WCK 16 + 9	3/8"	19	35 (115')	15 (49.2')	1 (3.2')
2 x WCK 16	3/8"	24	40 (131.2')	15 (49.2')	1 (3.2')

Note:

- A. The max vertical rise refers to the rise of the pipe above the branch line. For example into the duct
- B. It is permissible to run 2 meters (6.5') of pipe from the main supply line to the supply branch line, as long as the main supply line is less than 8 meters (26') or the equivalent.
- C. When installing 1/2 flow points nozzles, two shall always be used on the same supply branch line. For each cylinder installation up to eight 1/2 flow points nozzles may be installed, but not in the same branch line.
- D. The nozzles outlet for the ducts will be placed no more than 20cm (8") deep into the duct and no less than 5cm (2").
- E. All pipes of a single or multi cylinder system shall be 3/8" or 1/2" Sch 40 Black Iron pipes or Stainless Steel pipes.

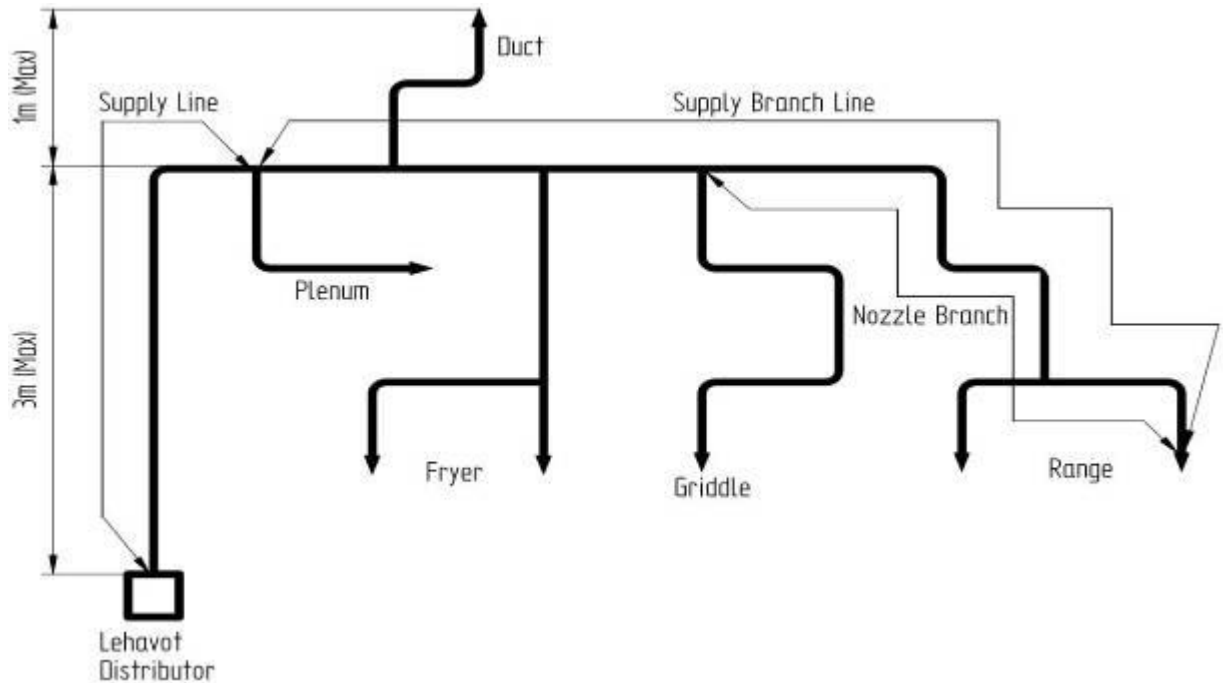
4.17 FITTINGS / JOINTS FOR THE WCK SYSTEM

4.17.1 All pipe fittings / adaptors for the system will be Sch. 40 Black Iron, stainless steel or 150 lb fittings of the following type:

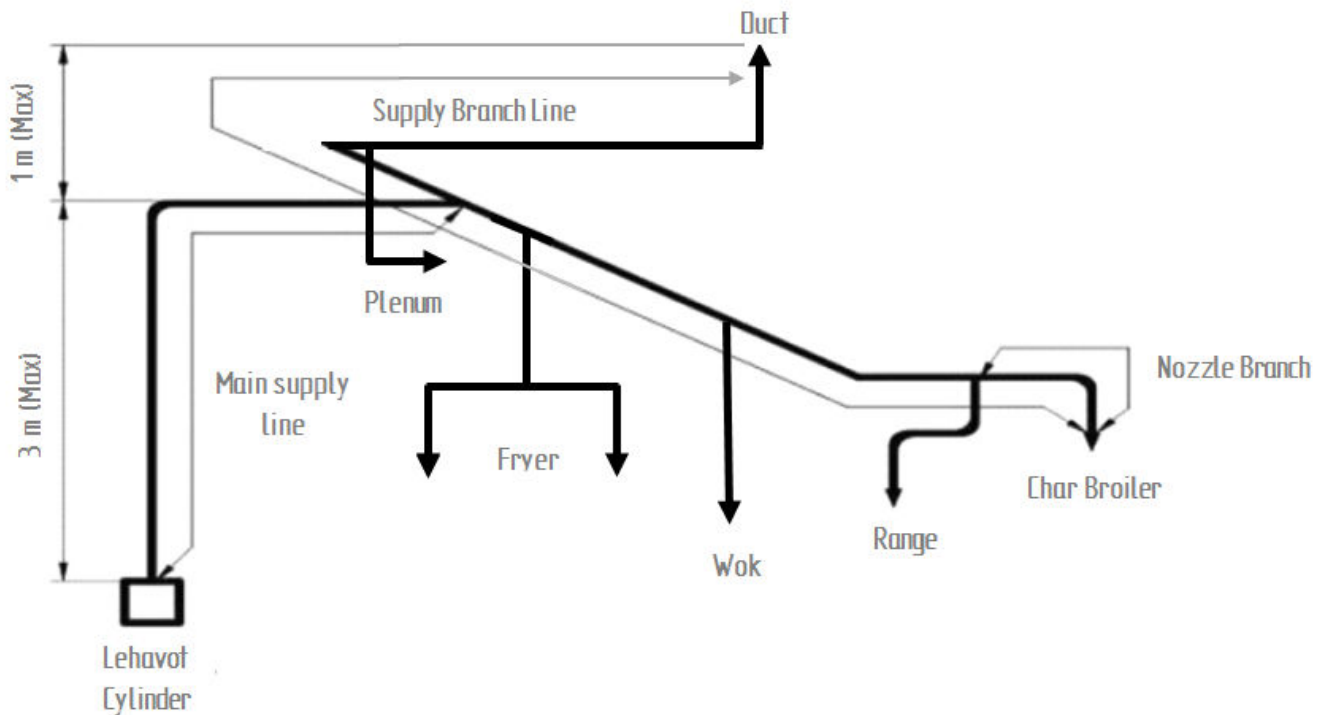
Union 3/8"
Elbow 90° 3/8"
Elbow 45° 3/8"
90° Elbow Female to Male 3/8"
Female Joint 3/8"
Male Joint 3/8"
T 3/8"
Bushing 1/2" x 3/8"
Female Joint 1/2" x 3/8"
Union 1/2"
Elbow 90° 1/2"
Elbow 45° 1/2"
90° Elbow Female to Male 1/2"
Female Joint 1/2"
Male Joint 1/2"

At each entrance into duct a "Quick seal" adaptor or a "Compression seal" adaptor will be used

A Typical distribution network for a single cylinder using a supply line of 3/8" or 1/2" pipe



STRAIGHT PIPING SYSTEM



SPLIT PIPING SYSTEM

Note: The diagrams above do not represent the only configuration possible – they are informative and for reference only.

4.18 DETECTION NETWORK

Optimum fire extinguishing system performance relies on proper detection network design. This section discusses the type of detectors used, their selection, and placement, and design limitations.

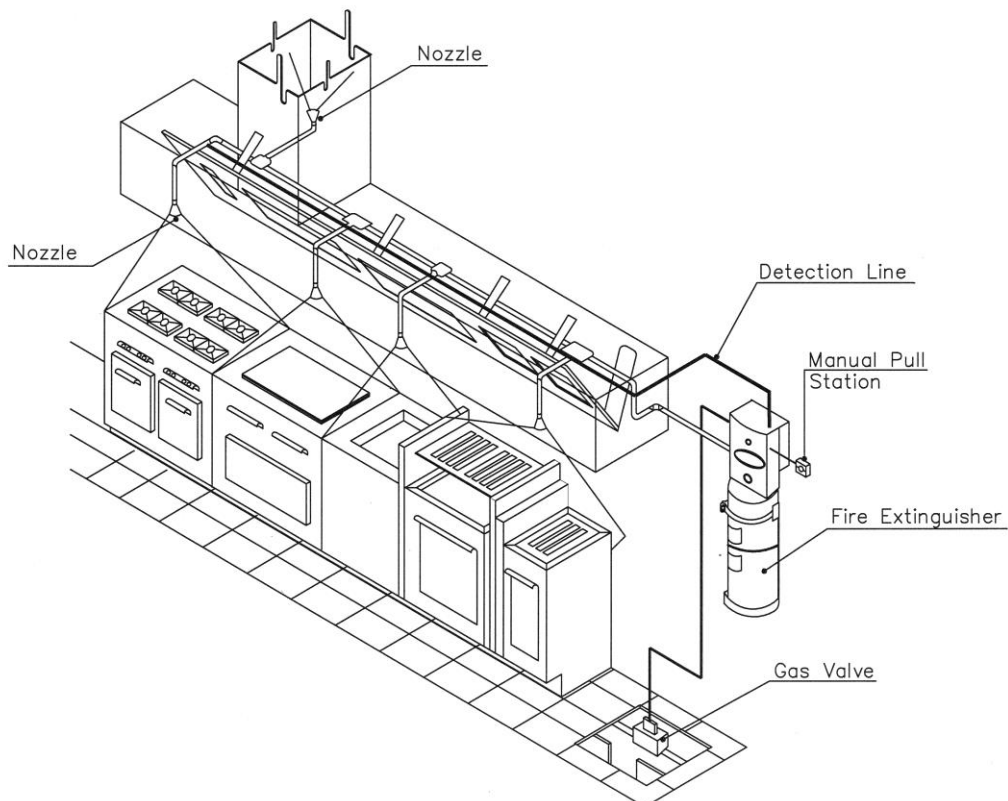
The LEHAVOT WCK Fire Extinguishing System uses: one continuous cable, corner pulleys, a detector bracket, S hooks, fusible links, a terminal link connector, and a temperature measuring device.

The quantity of detectors to be used in a system depends on the number of ducts, number of appliances and the location of the appliances under the hood.

4.18.1 Determining location and number of detectors

In order to detect a fire in the duct, a detector is required to be placed within the duct opening or up to 30 cm (12") inside the duct. If it is mounted inside the duct, the bracket cannot shield the fusible link from hot vapors moving through the duct.

Every appliance below the hood needs a detector above it, and position it within the path of exhaust vapors. Except in an appliance that is located right under the duct opening.



Exception: If the appliance is below the plenum, such that it is directly below the duct opening, there is no need for a second detector for this appliance, assuming that the duct detector is no more than 30 cm (12") inside the opening.

Warning: Do not locate detectors directly in the path of gas appliance exhaust. Doing so could result in unnecessary discharge of the system.

4.18.2 General limitations for the detection network

Item	Maximal amount
Cable Ø 1.6 mm (1/16")	36m (118')
Corner pulley (EMT pulley)	27 units
Detector	16 units

EMT = Electrical Metal Tubing

4.18.3 Fusible links selection

In order to assure that the appropriate fusible link is selected, measure temperatures with a digital thermometer, Measure temperatures at all detector locations during cooking operations, when exhaust fans are operating. Record temperatures of each detector in the job file documentation for future reference. Select fusible links according to temperatures measured. Select fusible links with melting temperatures 40°C (104°F) higher than the temperatures measured at detectors.

P/N	Fusible link heat scale	Heat measured
22003150	F212 (C 100)	F 70-150 (C 21-65)
22003160	F280 (C 138)	F151-225 (C 66-107)
22003170	F360 (C 182)	F 226-300 (C108-149)
22003180	F450 (C 232)	F301-375 (C 150-191)
-	Consult factory	F376 (C 192) And up

4.19 MANUAL PULL STATION

Every installation of a LEHAVOT WCK Fire Extinguishing System shall have at least one manual pull station. The manual pull station network consists of a cable, corner pulleys, a pull station box, EMT guide pipes, and (if two manual pull stations are installed,) a "T" pulley is required.

4.19.1 General Limitations of the manual pull station

Item	Maximal amount
Cable Ø 1.6 mm (1/16")	32m (105')
Corner pulley (EMT pulley)	20units
Manual pull stations	2 units
"T" pulley	1unit

Note:

1. When using a "T" pulley reduce the number of regular pulleys from the total by two.
2. When using a "T" pulley, the maximum cable length allowed for the longer section shall not exceed 32 m (105') (see sections 5.8.2).
3. The manual pull station shall be installed at a height not exceeding 120cm (48") and not below 106.7cm (42") from the floor. The manual pull station will be located at a minimum of 3m (10'), when possible, and a maximum of 6 m (20') from the protected kitchen appliances within the path of egress.

You can consult the local fire jurisdiction for advice and clarification.

4.20 CYLINDER ACTUATION NETWORK

In the "LEHAVOT WCK" Kitchen Fire Suppression System, connecting up to 6 cylinders of any type is allowed (WCK 6, 9, 16, 20, 26). The cylinders will discharge when the detection network is activated by the MRM or by the manual pull station.

4.20.1 General limitations of the cylinder actuation network

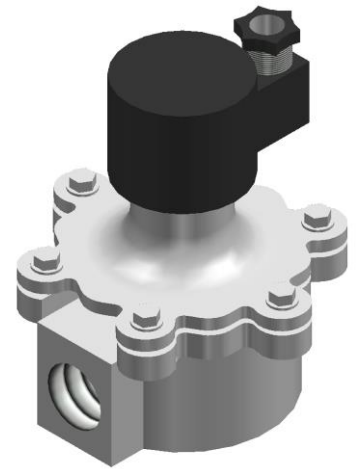
Maximal amount	Item
1.6 Ø cable (1/16")	20m (65.5')
Corner pulley (EMT pulley)	16 units

Note: In the WCK system, it is possible to manifold two cylinders.
See section 4.14.1 for system general limitations.

4.21 ELECTRICAL GAS VALVE APPLICATIONS

110/220 VAC electrical gas valves may be used with the LEHAVOT WCK Fire Extinguishing System. The electrical shut off valve used with the system shall be UL Listed, with gas LPG. It shall be held open by energizing an electric solenoid and wired through a micro-switch and manual release relay. A qualified electrician shall do any field wiring and all connections, on site, involving the shut-down of electrical cooking equipment or an electrical gas valve.

(See section 3.22 Electrical gas valve for all UL Listed sizes).



4.21.1 Electrical gas valve functions

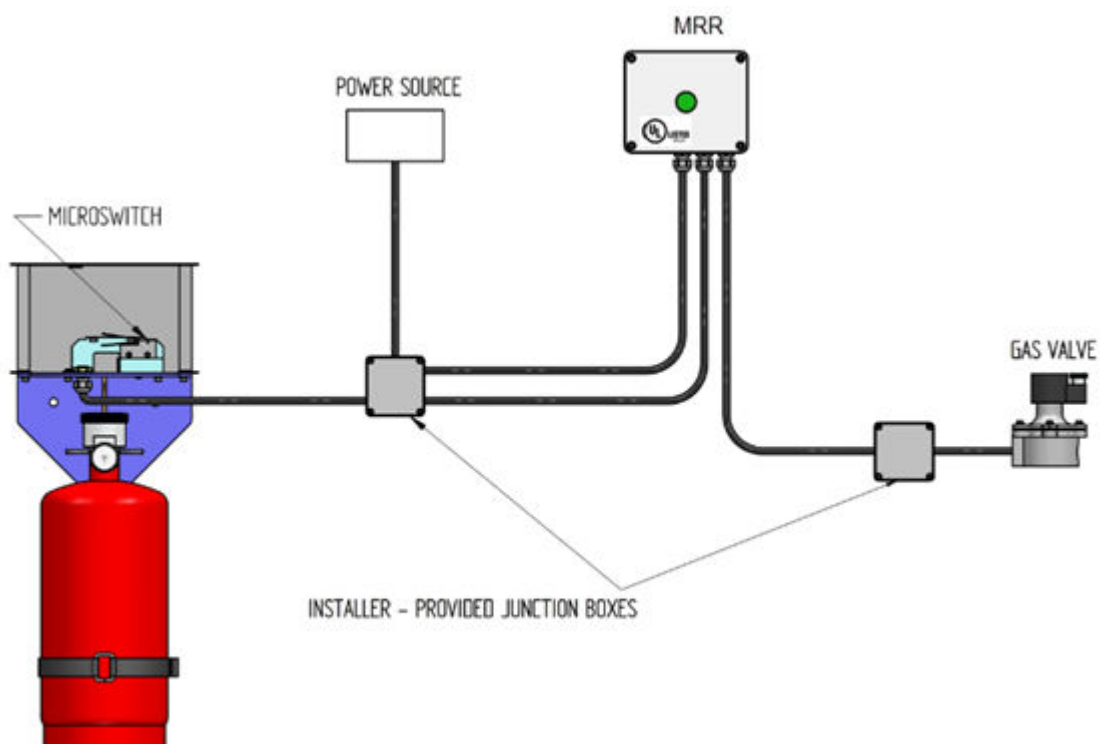
Power to the electric gas valve is run through a NC (normally closed) contact on a micro-switch, located in the MRM. In normal working conditions (no fire), current flows to the solenoid on the electric gas valve, holding the valve open. In a fire condition, when the MRM activates the extinguishing system, the micro-switch contacts switch, opening the contacts in the manual reset relay (MRR). This interrupts current to the gas valve and causes it to close. The manual reset relay (MRR) shall be reset before current will flow to the valve and cause it to open. A loss in electrical power, even momentary, will require manual resetting of the relay before the electrical gas valve will open again.

Note: 1. the rating of the MRR is – 120VAC 50/60 Hz Minimum 0.25 A Maximum 15A
240VAC 50/60 Hz Minimum 0.15 A Maximum 15A

2. All the field wiring connections need to be identified as “**Non-supervised**”
3. Electrical equipment and their installation shall be compliant with the national electrical standard

Wiring diagram for the manual reset relay

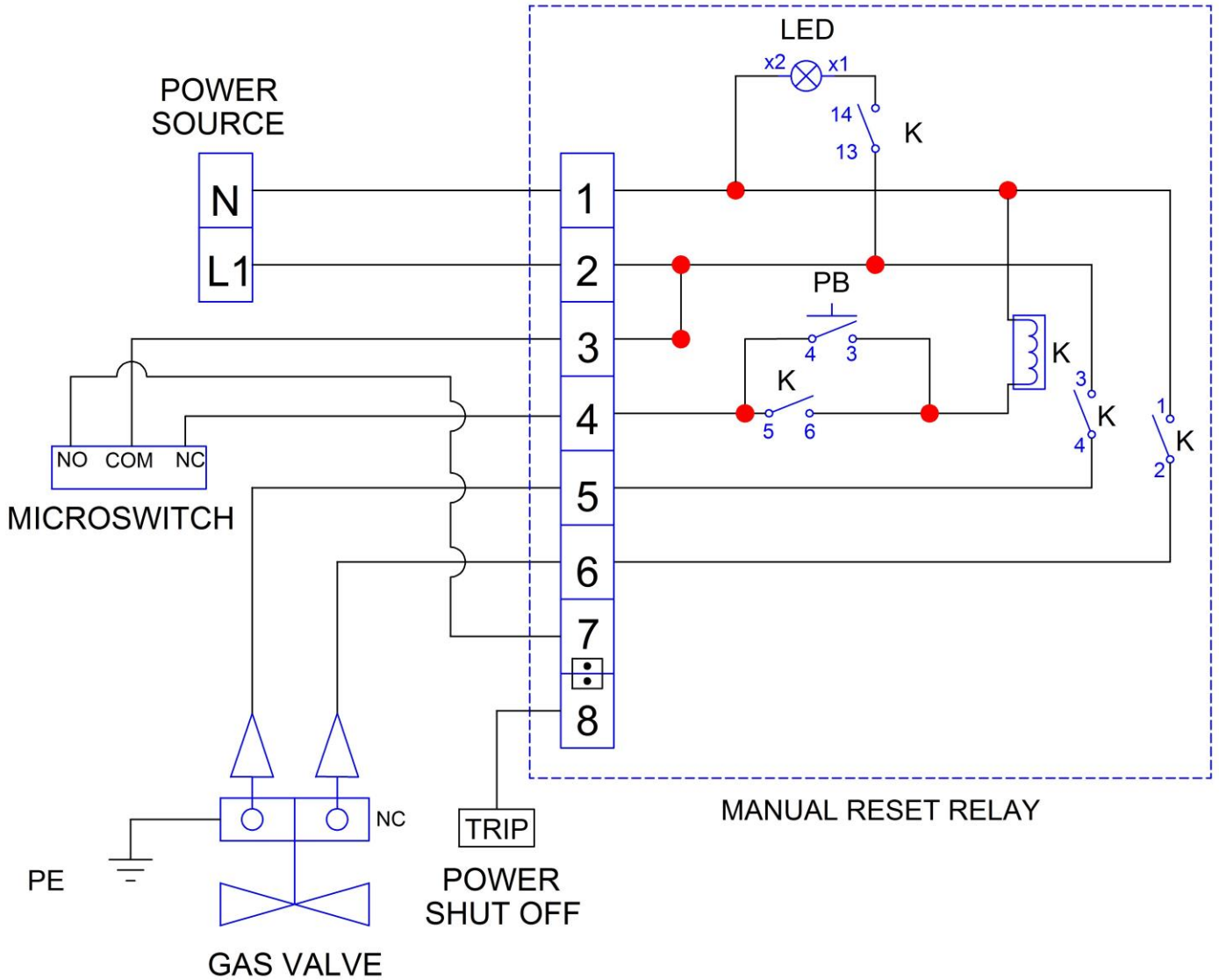
(all connections are “Common” type connections)



Wiring schematics

(all connections are "Common" type connections)

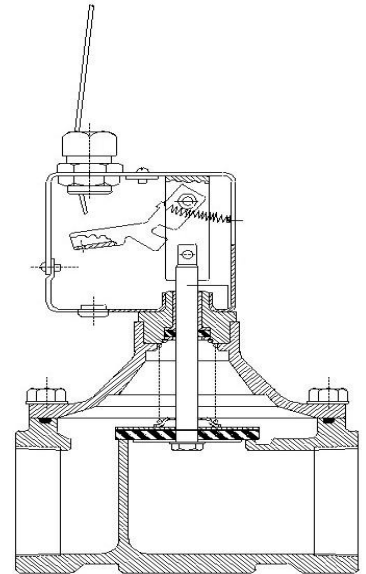
WCK GAS VALVE ELECTRIC DAIGRAM



4.22 MECHANICAL GAS VALVE APPLICATIONS

A mechanical gas valve may be used with the LEHAVOT WCK Fire Extinguishing System. The mechanical shut off valve used with the system shall be UL Listed for gas. A cable under tension attached between the MRM and the mechanical gas valve maintains the gas valve in the operating position. Immediately upon a system discharge, the MRM closes the mechanical gas valve by allowing the cable, via an internal spring, to shut off the gas.

(See section 3.23 Mechanical gas valve for all UL Listed sizes).



4.22.1 Mechanical gas valve limitations

Item	Maximal amount
Cable Ø 1.6 mm (1/16")	35 m (115')
Corner pulley (EMT pulley)	25 units
Mechanical Gas Valve	2 units
"T" pulley	1unit

Notes:

1. When using a "T" pulley reduce the number of regular pulleys from the total by two.
2. When using a "T" pulley, the maximum cable length allowed for the system shall not exceed 35 m (115') (see sections 5.11.2).
3. The mechanical gas valve shall be installed closest as possible to the kitchen appliances to ensure optimum disconnection of the gas as fast as possible. Should this not be possible, consult with the Authority Having Jurisdiction for alternatives.

CHAPTER 5

SYSTEM INSTALLATION

Instruction Manual No. 71-171

WCK- Kitchen Fire Suppression System

TESTED AND LISTED BY

UNDERWRITERS LABORATORIES

TO: ANSI/CAN/UL/ULC 300 Standard for Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking Equipment and ANSI/CAN/UL/ULC 1254 Standard for Pre-Engineered Dry and Wet Chemical Extinguishing System Units.



Advanced fire protection systems

5.1 GENERAL

Before installation of a system:

- Do a complete analysis of hazards
- Design the system
- Draw a proposed system layout (blueprint)

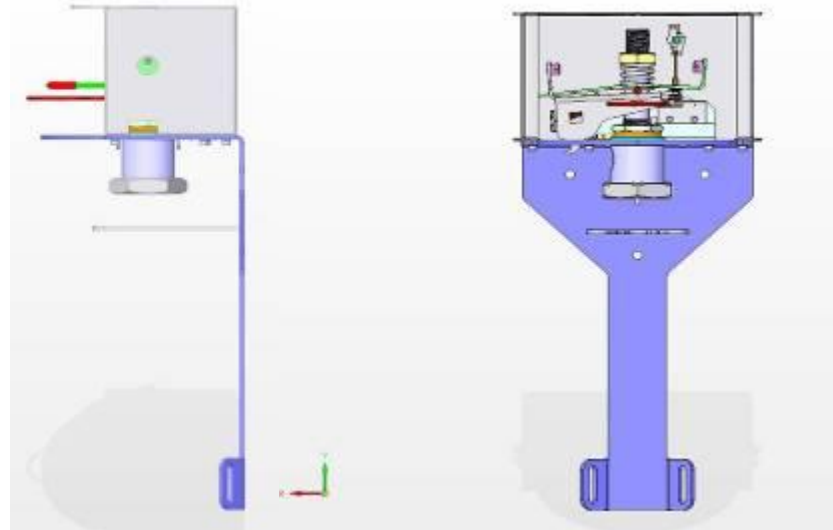
The design, drawings and bill of materials shall be compared with conditions found on site, and discrepancies noted before proceeding. Materials such as pipes, fittings, EMT pipes, fasteners, mounting and securing hardware for pipes and conduits, are not supplied by LEHAVOT WCK System. These items are chosen and supplied by the installer. The cylinder shall be installed in an environment that does not exceed the system's temperature range of 0°C - 49°C (32°F - 120°F).

All system components – MRM, cylinder assembly, fusible links, manual pull stations, gas shut off devices, corner pulleys, "T" pulley, etc. – shall be as specified for use with the LEHAVOT WCK System. Use of components that are not in this manual and/or UL Listed for the intended end use will void the LEHAVOT warranty and may affect the system performance.

5.2 CYLINDER BRACKET INSTALLATION

- Choose a suitable location for the cylinder bracket and MRM.
- Take into consideration the possibility that the discharge pipe can be positioned to the left or right of the cylinder depending on the location of the hood in relation to the cylinder (The MRM is part of the bracket).
- Ensure that the pressure gauge is viewable.
- Ascertain the access to the cylinder will be clear, free for maintenance and recharging.
- Verify that the location is certified with the local fire authorities.
- Make sure that the bracket can accommodate the weight of the cylinder and MRM. To install, use a frame to mark the drill holes. Install the bracket loosely with one of the anchors. Adjust the height vertically/horizontally. Mark the rest of the drill holes, and tighten with the remaining anchors.

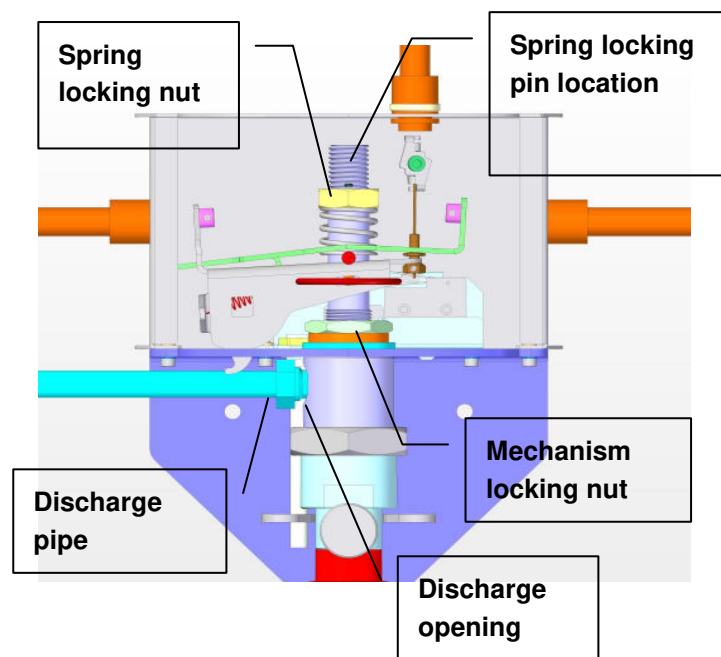
At least 3 holes shall be used for bracket installation



5.3 DIRECTION OF THE DISCHARGE OPENING

After the installation of the cylinder bracket at its proper location, the discharge opening shall be pointed correctly towards the hood:

1. Remove the spring locking pin.
2. Release the spring locking nut to the end of the thread.
3. Release the mechanism-locking nut to the thread's end.
4. Turn the discharge exit 180° left or right, as needed. Verify that the mechanism is placed inside the frame properly then tighten the mechanism- locking nut completely using a special wrench.
5. Tighten the spring locking nut past the hole for the spring locking pin.
6. Insert the spring locking pin in its position on the threaded rod.



5.4 DISTRIBUTION PIPING NETWORK INSTALLATION

For the distribution piping network limitations – see Chapter 4 - System Design.

5.4.1 Pipe

Use only Sch 40 Black Iron pipe or Stainless Steel pipe, 3/8" or 1/2".

5.4.2 Fittings

Use Sch. 40 Black Iron Fittings, Stainless Steel fittings or 150 lb fittings. The types of fittings and adaptors are listed in Chapter 4-System Design.

All pipes and fittings shall be clean of grease and metal shavings. All piping shall be approved for hard surfaces with matching hangers, hooks and connectors. All piping shall be connected tightly to prevent leaks.

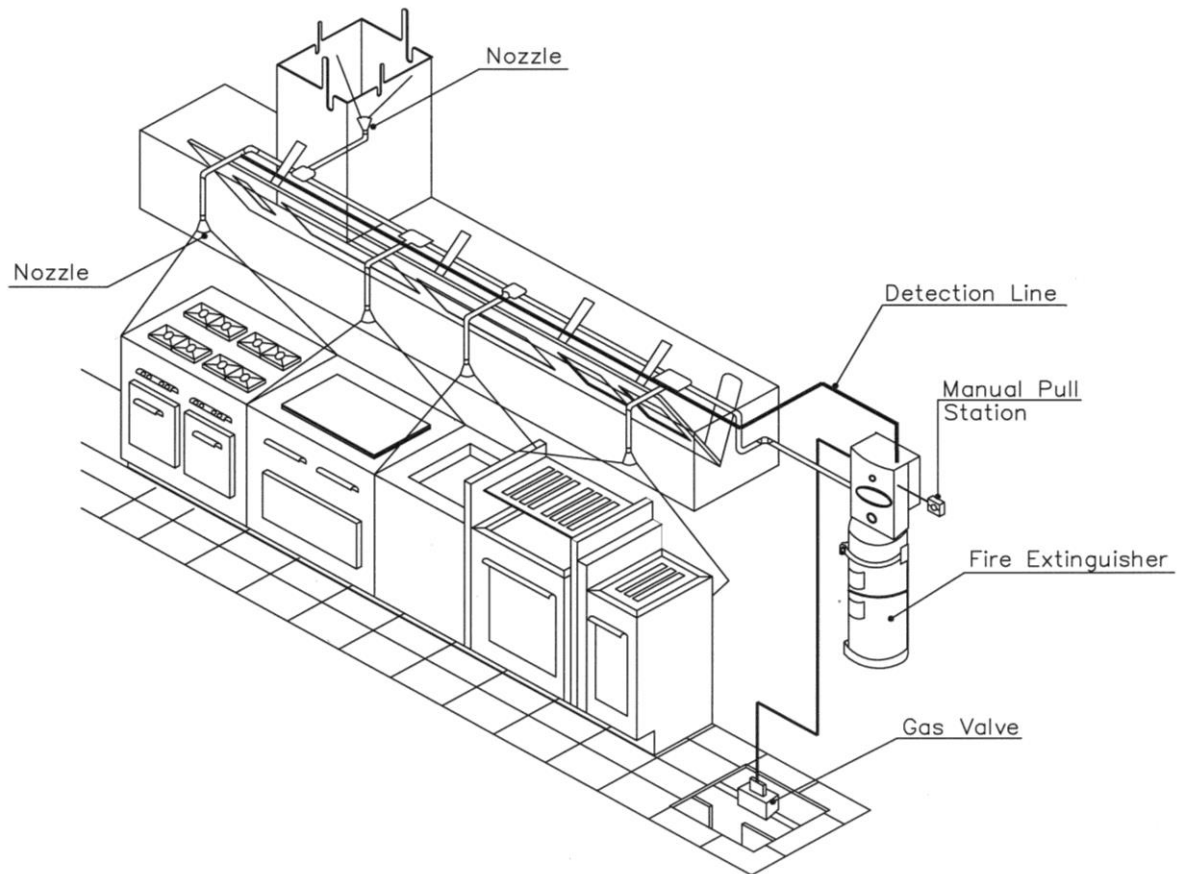
Note: The use of Teflon strips, insulating materials or any other sealing compound is strictly prohibited.

5.4.3 Installation procedure

The LEHAVOT WCK Suppression System for kitchens does not require a balancing of distribution pipe lines. The distribution-piping network should run as straight as possible from the cylinder to the protected zone. Verify that the direction of the discharge opening is pointing in the direction of the hood, (The WCK system makes it possible to direct the discharge opening to a desired direction). Connect a "record" fitting to the discharge opening (one "record" is required at every discharge pipe connection), Connect the discharge piping to the "record" and lay the piping to the protected zone in a straight a manner as possible. The pipe splitting to the different protection branches will be done with a "T" fitting. Next is the installation of all the piping and nozzles to every duct, filter, appliance, and apparatus that needs protection under the hood.

Ensure that each nozzle is properly installed and correctly positioned according to the appliance or area needing protection. Verify that the system meets design limitations listed in Chapter 4. After installation is complete, inspect the system and compare that it matches the plan drawing. Mark every necessary change or exception for the final version of the drawing and job file.

Note: The location and positioning of the nozzles is essential for the system's ideal performance.

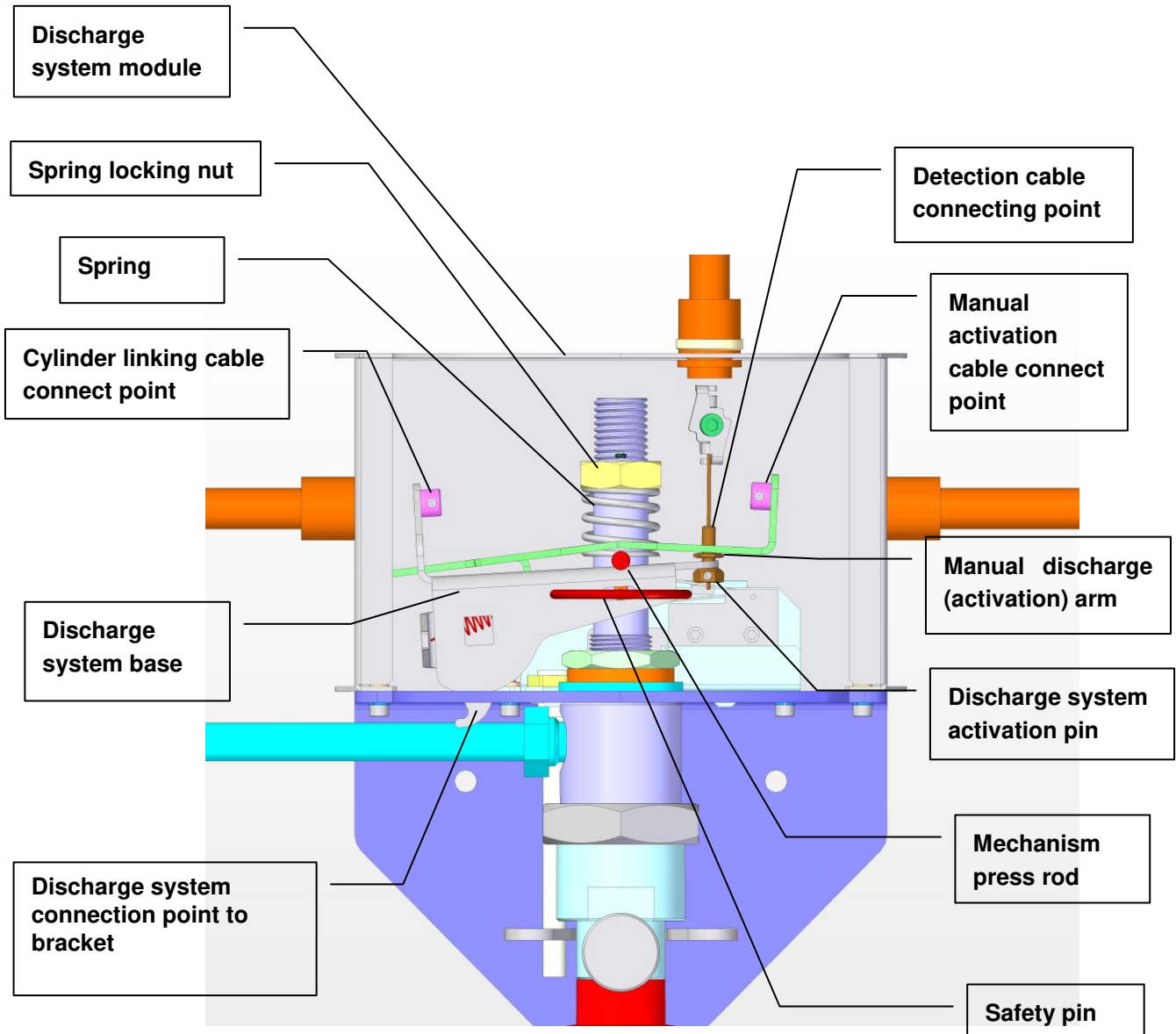


Typical installation plan for single cylinder system

5.5 MRM ADJUSTMENTS

The LEHAVOT WCK MRM can be directed as desired to hook up to the location of the manual pull station, detection network, and cylinders network. After determining the location of the cylinder bracket and the manual pull station, it needs to be determined if one wants to connect to the mechanical manual pull station system from the left or right. In order to change the direction of the discharge system, follow these steps:

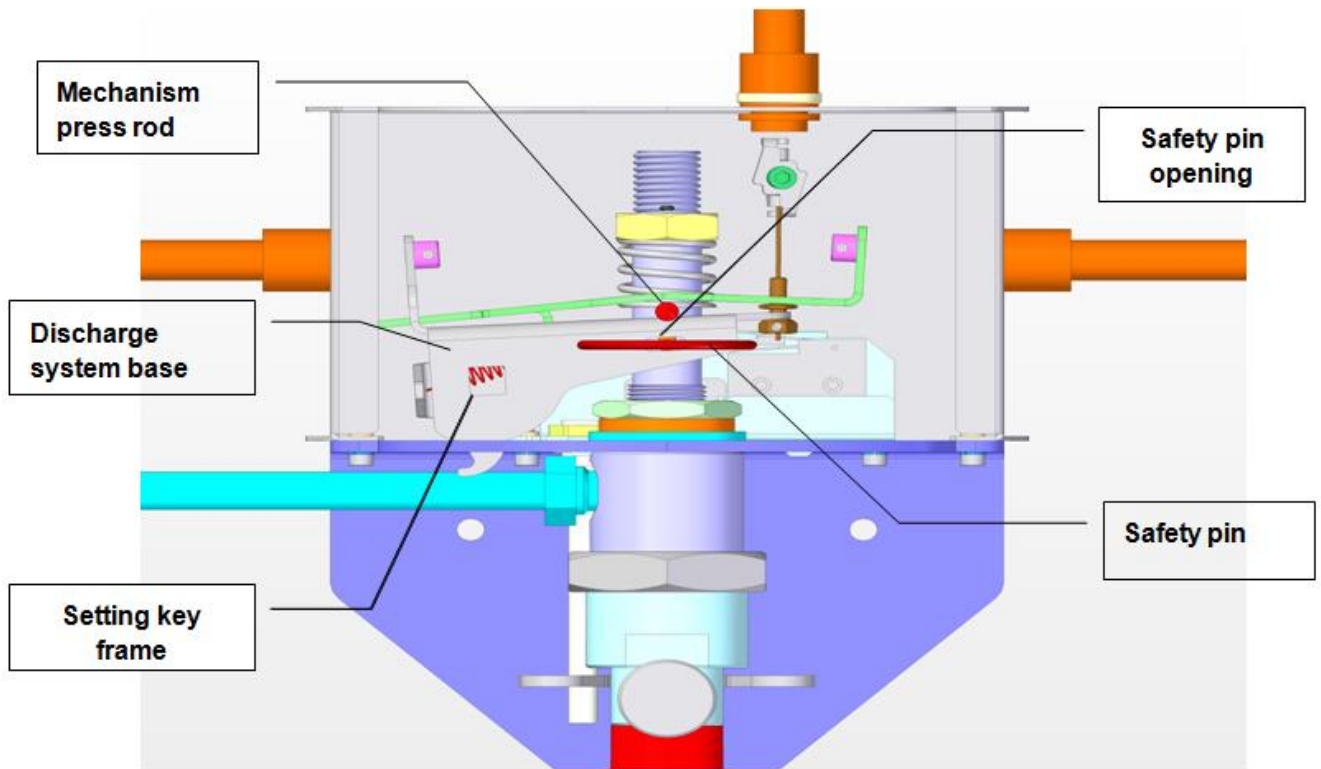
1. Release the security pin
2. Release the spring locking nut until the threading end
3. Remove the safety ring and the mechanism press rod from their place.
4. Lift up the discharge mechanism until the base is loose from the bracket
5. Turn the discharge mechanism base by 180° to the desired direction and reinstall the mechanism base into its grooves in the bracket. Verify that it is secure.
6. Tighten the spring locking nut until past the hole for the spring locking pin.
7. Insert the spring locking pin into its hole on the threaded rod.



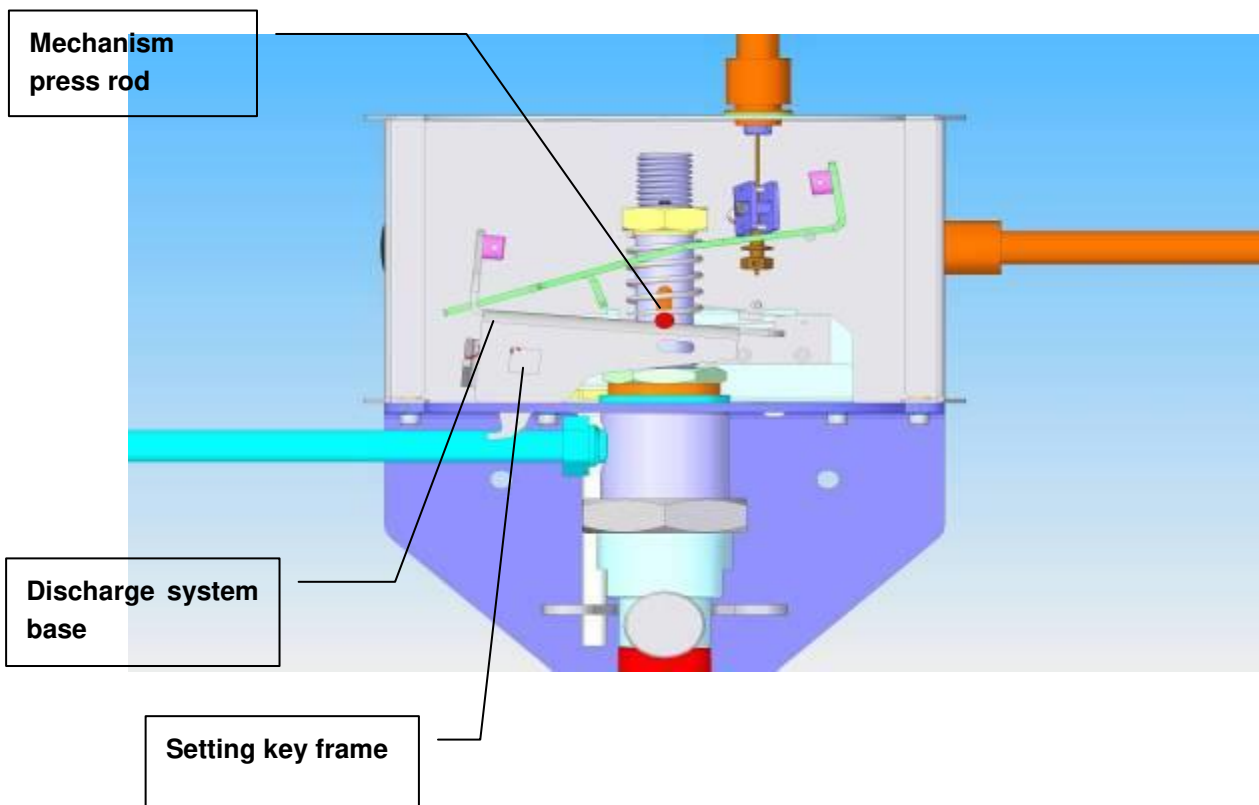
5.6 MRM COCKING

After completing the MRM Adjustment process, take a 1/2" drive ratchet, insert it into the frame of the arming key at the discharge system's base, and verify that the mechanism press rod is in place. Turn the arming key anti-clockwise until the safety pin sits in place. After the mechanism is set and held by the safety pin, proceed to the installation of the detection network (5.7).

SYSTEM SETTING BEFORE DISCHARGE



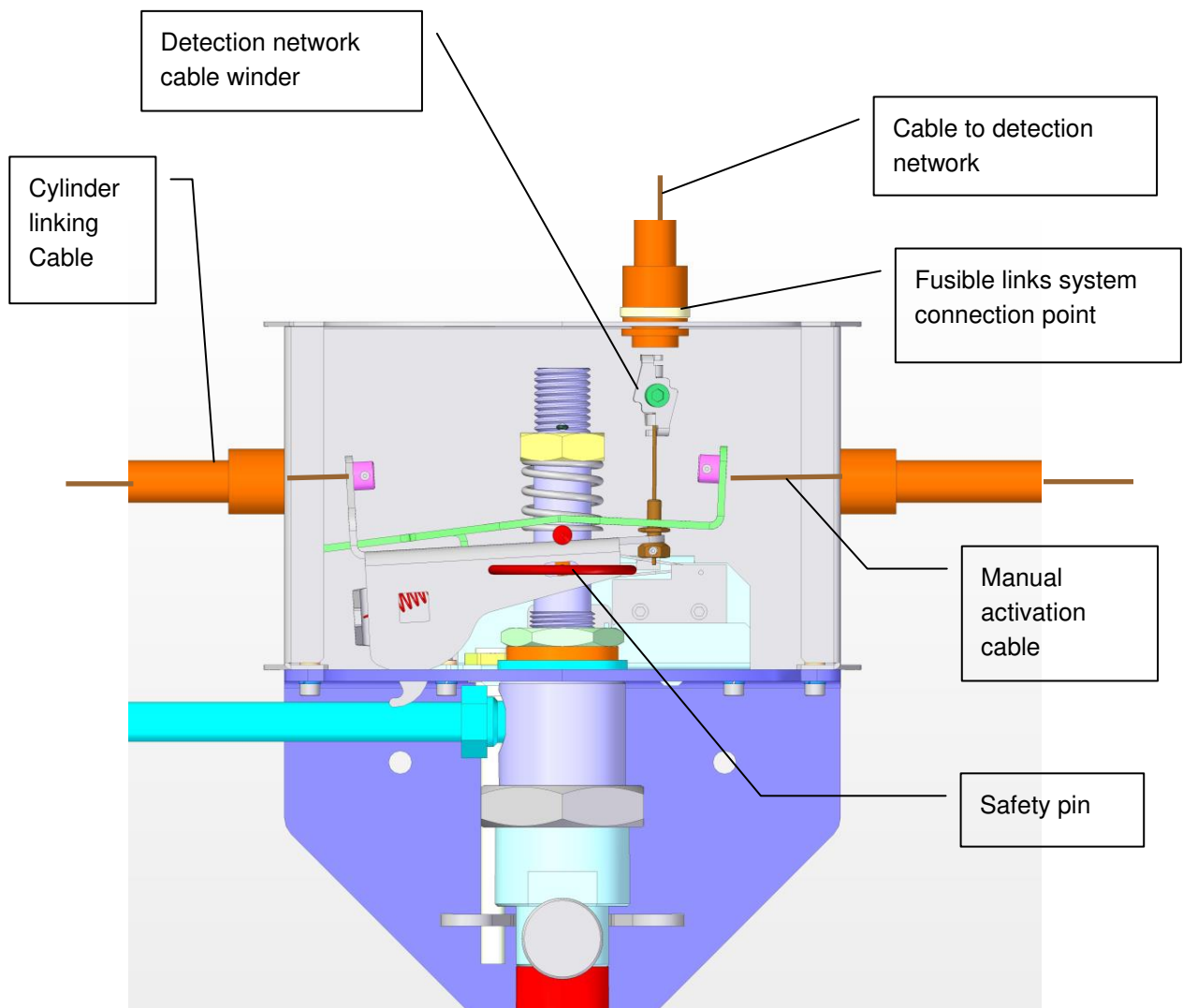
SYSTEM SETTING AFTER DISCHARGE



5.7 DETECTION NETWORK INSTALLATION

Review the detection network's limitations in chapter 4.18.2.

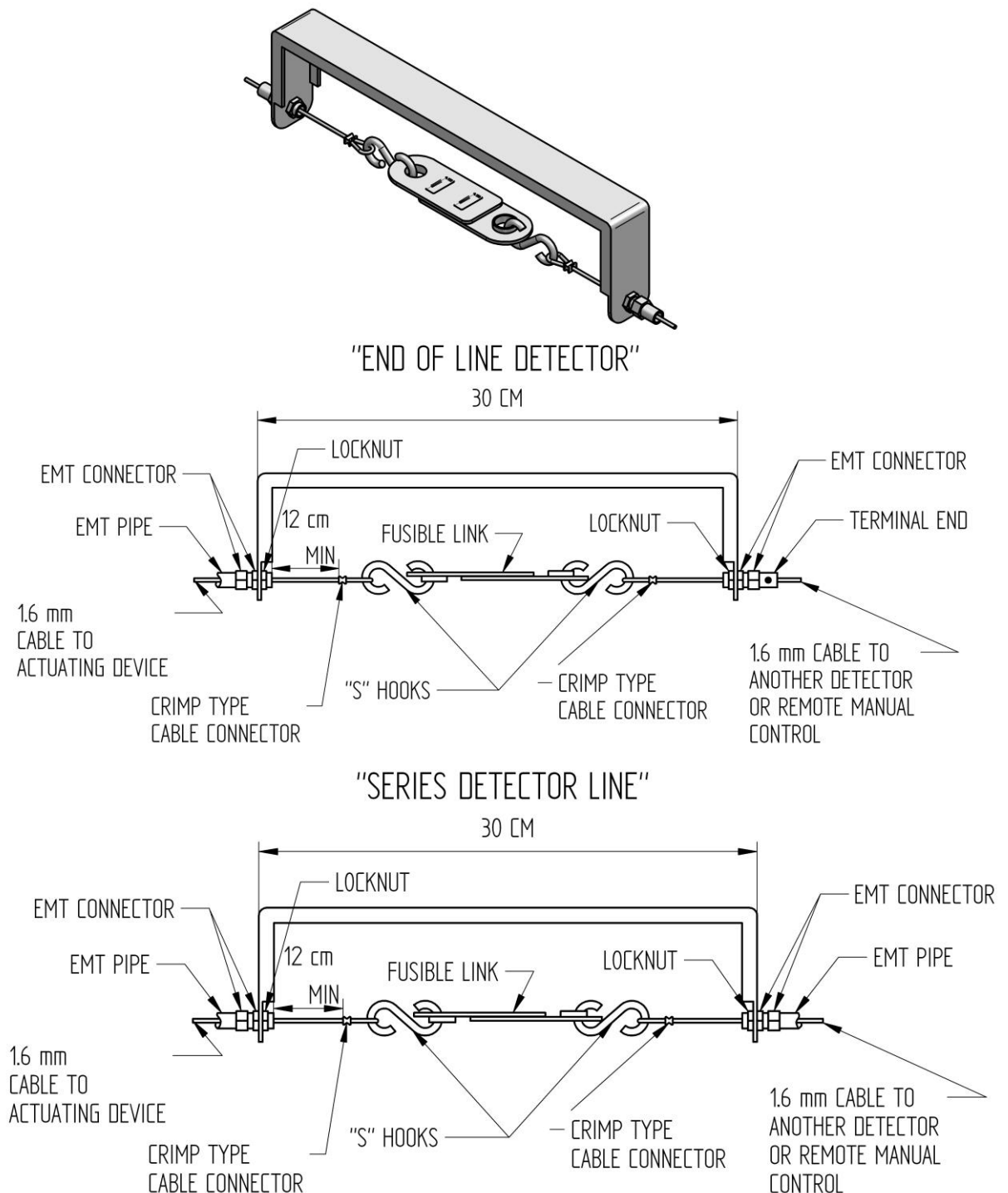
There is only one type of detector frame and connector in this system. There are two types of detectors used, a Series detector and an End detector. The End detector is the detector located at the end of the detection cable farthest away from the MRM. A Series detector is any detector that is located between the MRM and the End detector on the detection network. Begin installation with the EMT piping from the MRM (at the point that is marketed as the connection point for the fusible detection network -see drawings) to the hood. Any change in direction of the EMT requires a corner pulley. Wind the EMT from the first detector to the last one. Any detector above an appliance or inside a duct shall be firmly attached to a firm surface above the appliance or inside the duct or hood, note the limitations in Chapter 4 – System Design. (The cable to the fusible links shall be threaded along the pipes and into the detector during EMT winding).



Note: It is strictly prohibited to bend the EMT pipe

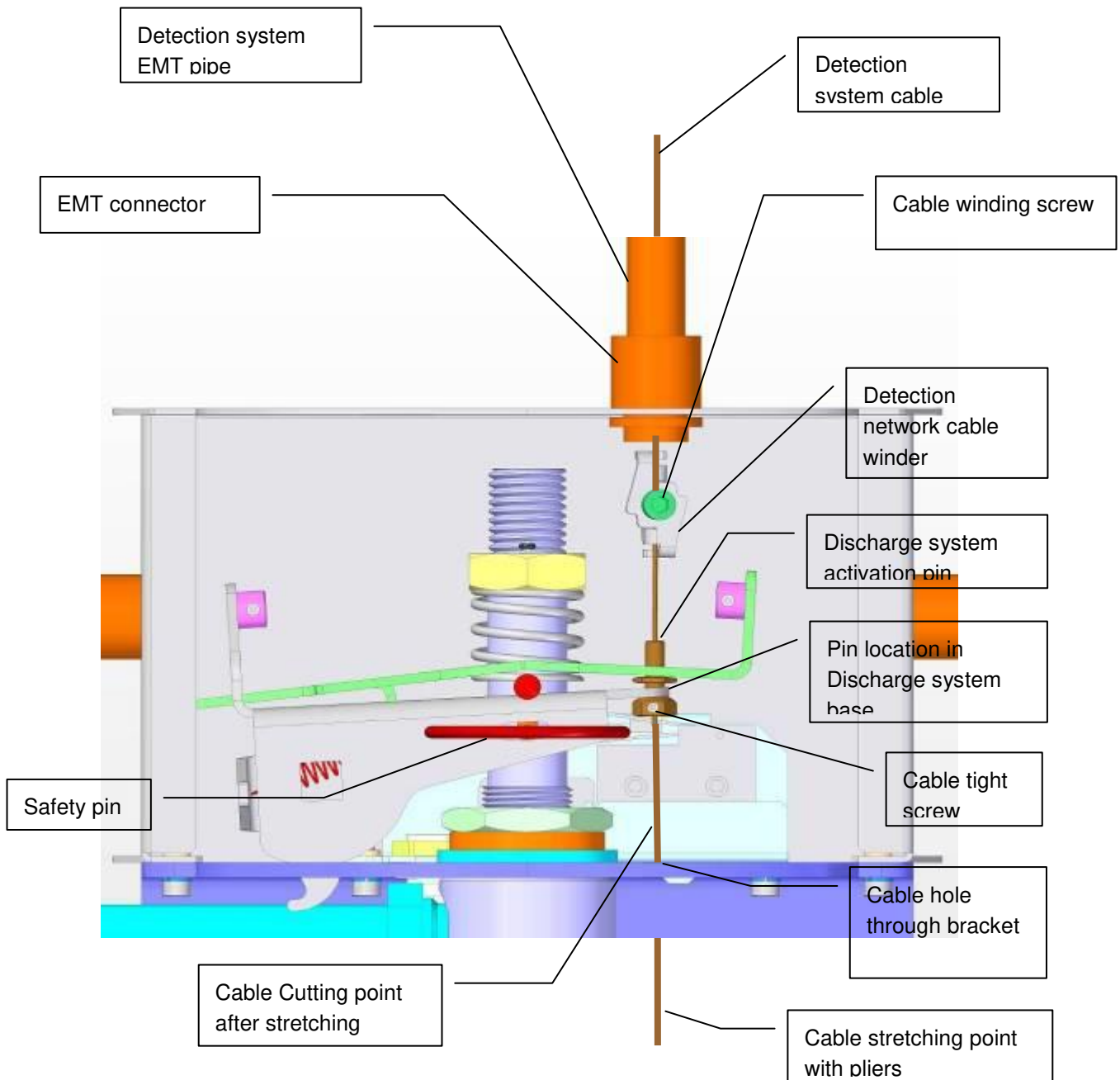
After the cable is wound along the pipe and in the detector frame, start the detector installation from the End detector by connecting the tip of the cable to the terminal end connector. Insert the cable locking to the EMT connector; connect the "S" hook to the cable using a Cable clasp and the fusible link to the "S" hook (see the drawing below). Another "S" hook will be connected to the other side of the fusible link, and the cable to it also using a cable clasp. Continue with the Series detector installation, until the first Series detector in the system.

Note: The cable clasp will be tightened with a special device.



From the first detector of the system continue to the MRM. At the MRM feed the cable through the Detection network cable winder, and through the Discharge system activation pin. Return the pin to its place in the base of the discharge system; pull the cable through its hole in the base of the module where it meets the bracket. Thread the cable through its hole in the bracket and by using pliers pull tight (see drawing). Tighten the Allen screw on the Discharge system activation pin (see drawing), stretch the detection network cable using the Detection network cable winder until the safety pin is loose in its hole (do not remove safety pin at this point). Cut the cable 4 cm (1.5") under the Discharge system activation pin.

Note: The fusible link will be positioned in the center of the detector or far from the MRM



5.8 MANUAL PULL STATION INSTALLATION

5.8.1 Single station installation

Refer to the manual pull station limitations in Chapter 4, System Design. The local authorities shall give authorization for the location of the manual pull station.

According to the standards the manual pull station will be installed at a height of 1.06 - 1.2 meters (42" - 48") from the floor.

Once the location for the manual pull station has been determined, an EMT pipe is led from the MRM to the manual pull station on the wall. The manual pull station can be

installed in any direction (note that any change in direction of EMT piping requires a corner pulley). Pipes and corner pulleys in this system shall be fastened by proper hooks or clamps. The cable will be threaded when the pipes are being installed.

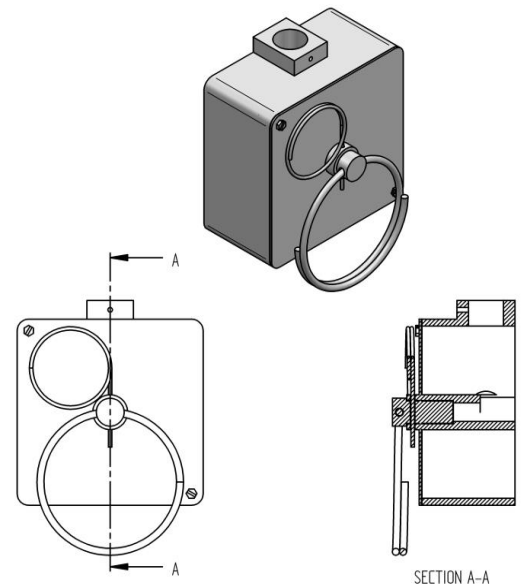
Note: Never bend EMT pipes.

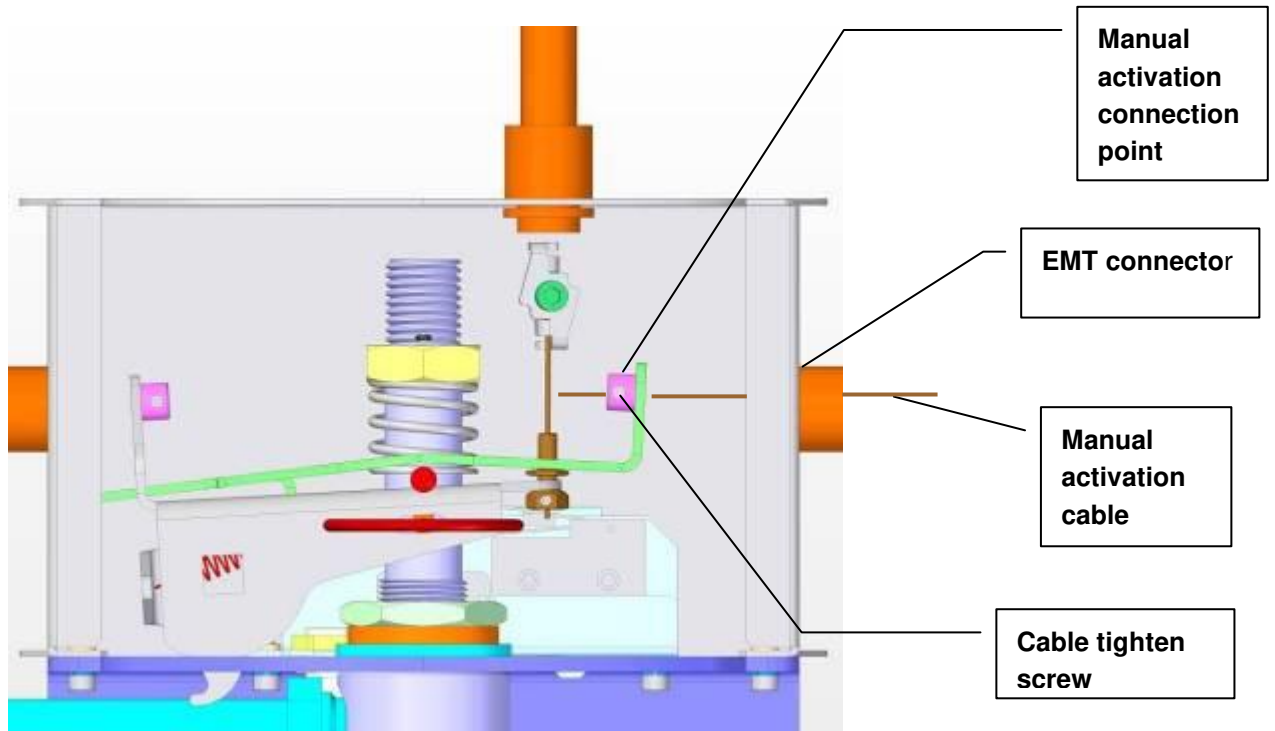
The cable installation in the discharge (activation) system starts at the manual pull station and continues to the MRM. After threading the cable through the EMT pipe, leave 20-25 cm (8"-10") of slack at the MRM end.

To install the manual pull station:

- Attach the cover to the manual pull station.
- Cut the cable.
- Attach the end of the cable to the manual pull handle as follows:
 1. Thread the tip of the cable through the hole in the pull handle
 2. Tighten the two screws.
 3. Pull the cable from the other end until the handle is in the correct position.
 4. Insert the safety pin of the pull handle into position and secure with seal.
 5. At the MRM (the other end of the cable) thread the cable through the connection point of the manual activation cable into the module and pull, fasten with an Allen wrench at the connection point (see the following drawing).
 6. Cut the excess cable 2 cm (1") past the connection point inside the module.

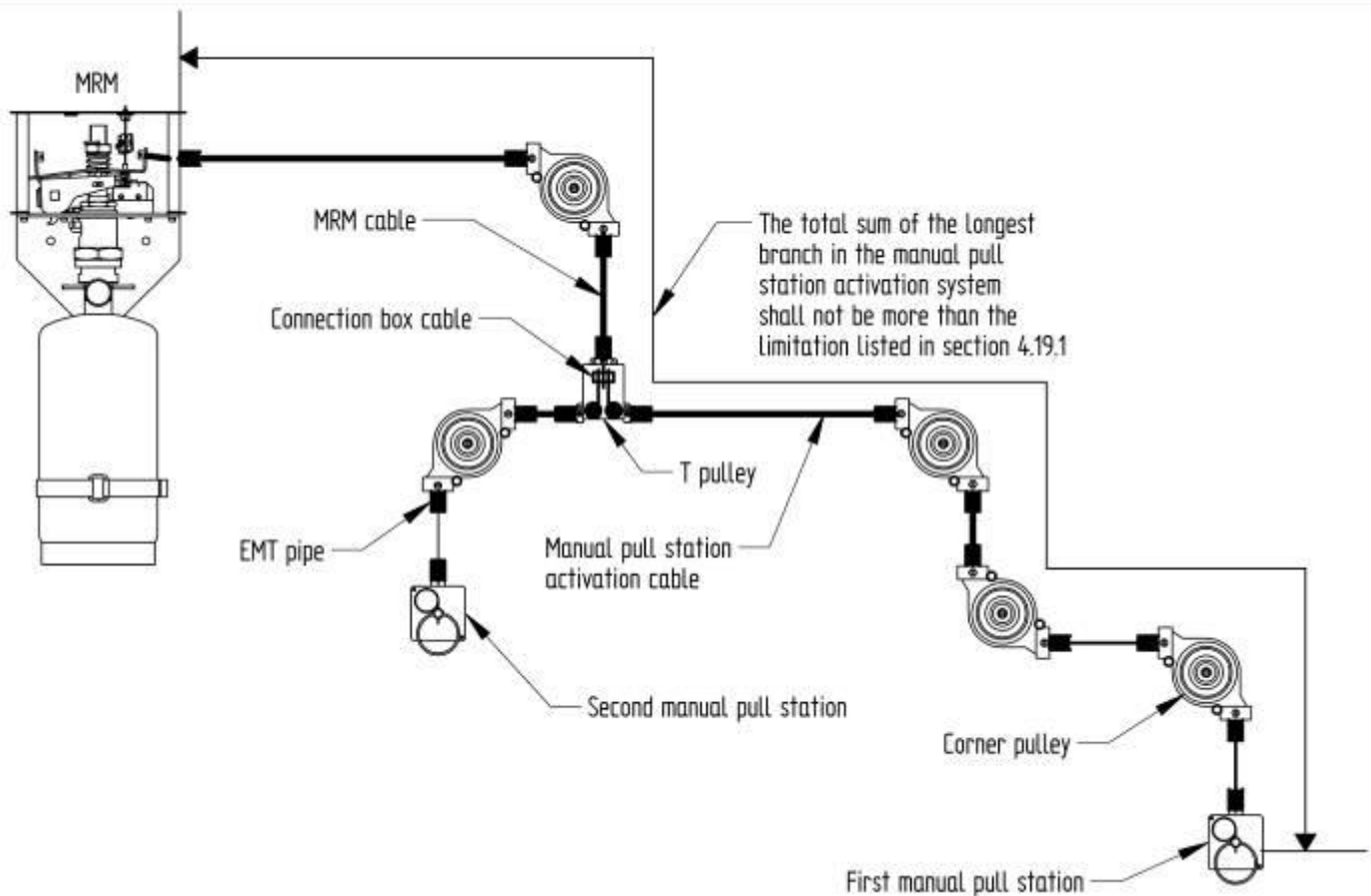
Note: The cable of the manual pull station is not required to be taut. In any Case, do not deviate from the limitations in Chapter 4.





5.8.2 Dual manual station installation

When installing an activation system with dual manual pull stations, use a "T" pulley



Connector for the cable and EMT pipes, The "T" pulley helps to split a manual activations system into two possible locations for manual pull stations.

The connection point of the "T" pulley plays a critical role in the Manual activation system's performance. In the manual system one shall start the pull cable's connection from the MRM, and connect the cable to the mechanism inside the mechanical activation system at its point of connection. The other end of the cable will be threaded into the main hole in the cable connection box inside the "T" pulley. The cable connection box should fit close to the cable entry point in the "T" pulley, pull tight the cable and fasten with the tightening screw (**Note:** The cable should never be loose).

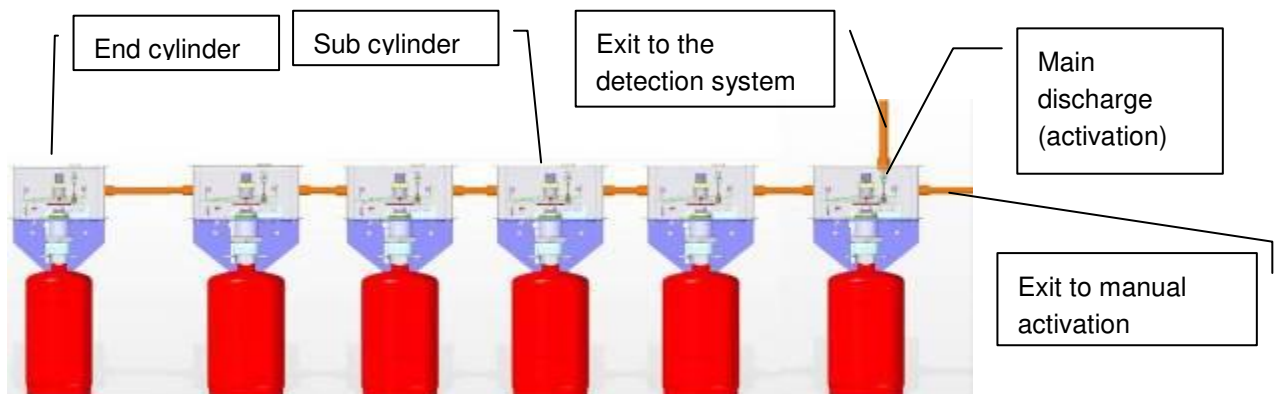
The two ends of the manual pull station cables (2 stations) will be inserted into the cable connection box and fastened with a tightening screw. **Note:** Cut all loose cable ends inside the "T" pulley housing. The other two ends of the manual pull station will be attached to the manual pull station's pull handle. After installing the cables into the manual pull stations insert each of the handles into their slot in the pull station's cover and secure them with a safety pin and plastic seal and close up the manual pull station's cover and "T" pulley's cover.

Note: In any case, do not deviate from the manual activation system's limitations in Chapter 4.

5.9 ACTUATION NETWORK INSTALLATION - LINKING CYLINDERS

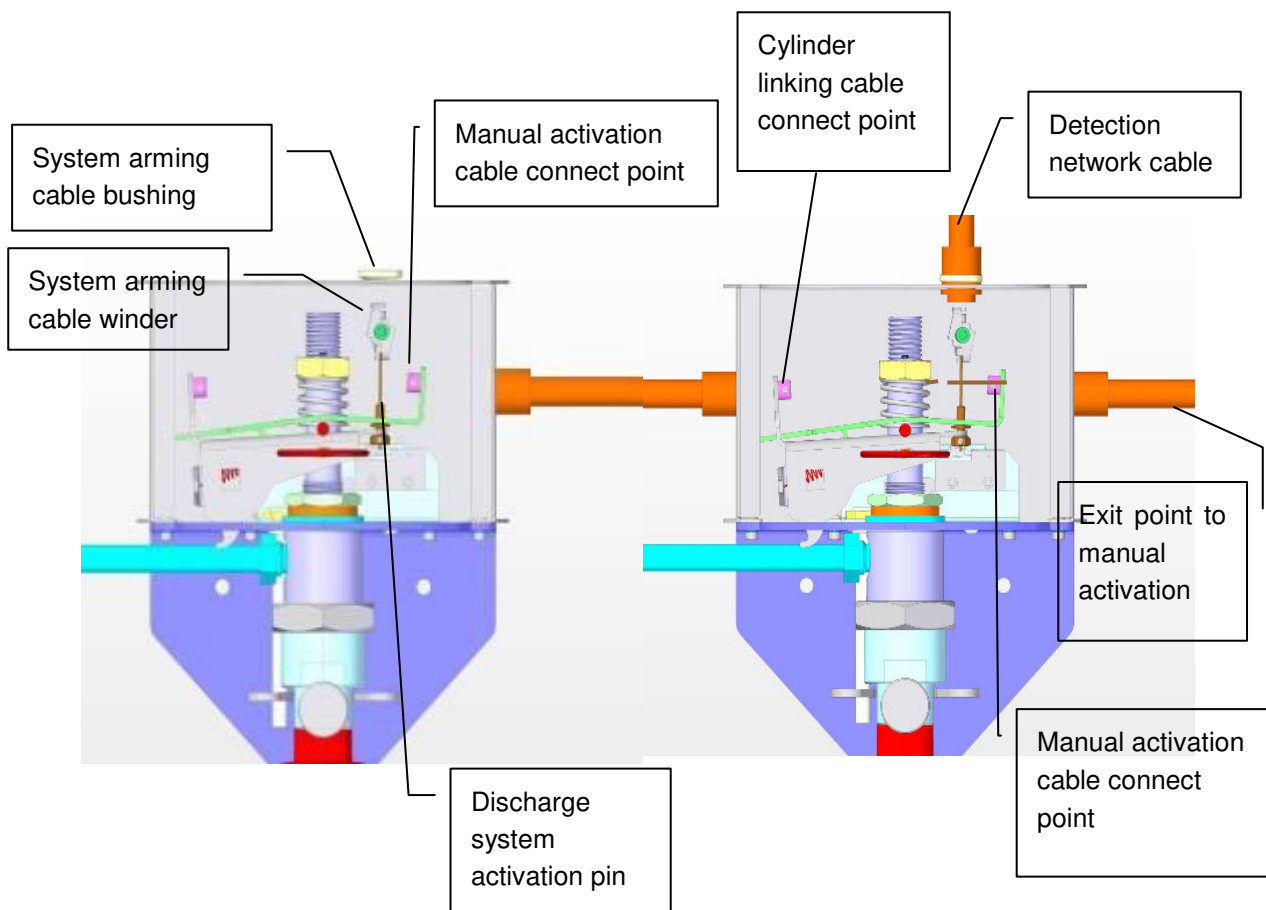
It is possible to link up to 6 cylinders in the WCK system. The purpose of linking the cylinders is for protection of the hood that requires a larger amount of extinguishing agent. Also for hoods that share the same common duct system standards require simultaneous activation of the fire suppression systems of all the hoods. It is possible to install a manifold of up to two cylinders of any size, and during linking install up to three couples in three separate hoods linked together, using the same fire detection system (See section 4.14.1 "System Types"). Linking cylinders in the WCK system is a mechanical procedure and can have some distance among them.

Note: Do not exceed the limitations in chapter 4.



The linking process will start with connecting all cables and EMT pipes to all the activation mechanisms of each cylinder. For arming (setting) the mechanisms start at the last cylinder that is the farthest from the main discharge (activation) module (the module connected directly to the detection system). In order to connect the linking cable between the different mechanisms (modules), one shall arm each mechanism (the main discharge mechanism (module) is already armed). Take a 20cm (8") long cable and connect one tip to the system cable bushing, fasten using the tightening screw, thread the other end of the cable to the system cable winder and through the Discharge system activation pin, position the pin in its base, and fasten the cable tightening screw. Cut any excess cable under the pin. Stretch the cable using the screw on the cable winder until the safety ring comes loose in its hole. Repeat this step in all the cylinders mechanisms. As mentioned before, start the linking of the cylinders from the last cylinder, connect the cable to the manual activation cable connection point, wind the cable to the next cylinder and insert the cable to the connection point for cylinder linking. Pull the cable taut and tighten with the tightening screw on the cylinder linking connection point. Repeat this step in all the mechanisms until the main module.

Note: Do not bend the EMT pipe. Any direction change will be done using a corner pulley (EMT angle). Do not deviate from limitations in chapter 4.



5.10 INSTALLATION OF THE ELECTRICAL MANUAL RESET RELAY (MRR)

After installing the MRR box, close as possible to the MRM; connect the power source to the No. 1 and No. 2 ports in the MRR. Connect the common wire (COM) to the No. 3 port in the MRR. Connect the normally open wire (NO) of the micro switch to the No. 7 port and the normally close (NC) to the No. 4 port.

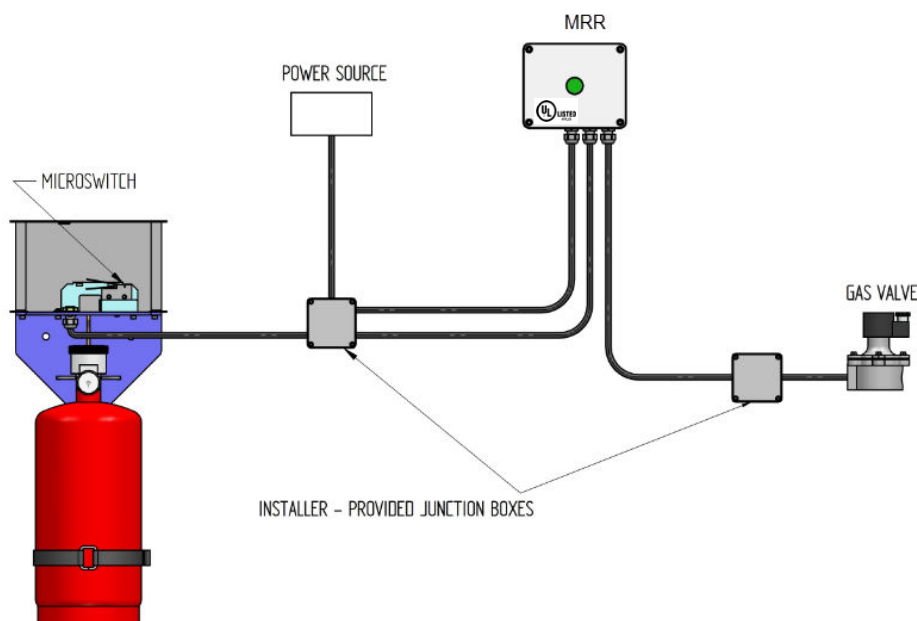
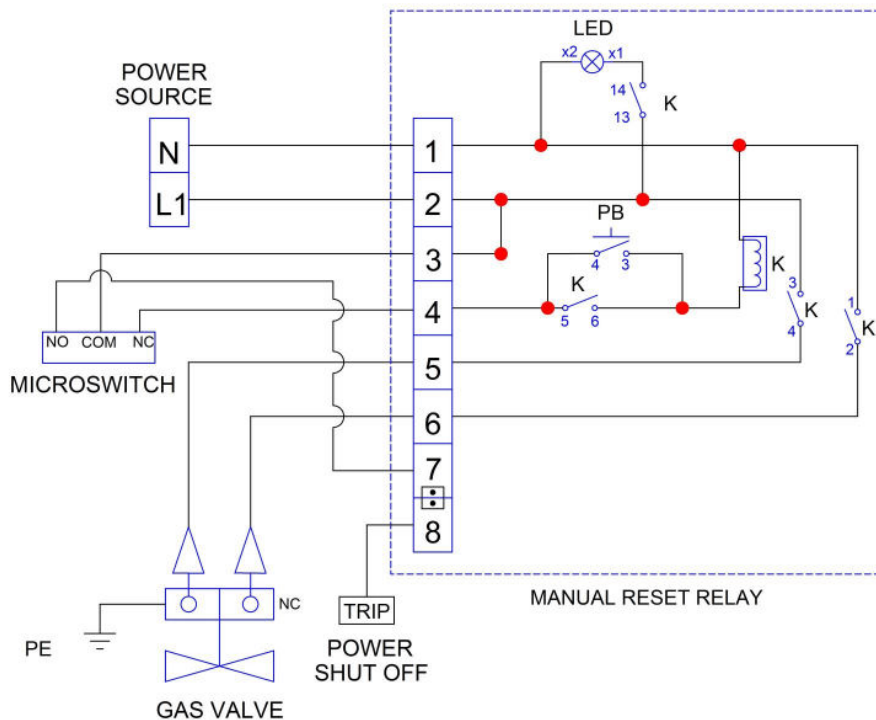
Connect the two wires that come from the gas vale to the No. 5 and 6 ports in the MRR. To trip the main electrical supply to the associated cooking appliances, connect the magnetic switch to the No. 8 port in the MRR.

Close the cover of the MRR box.

Note: 1. all connections are “Common” type connections

2. All the field wiring connections need to be identified as “Non-supervised”

WCK GAS VALVE ELECTRIC DAIGRAM



5.11 MECHANICAL GAS VALVE

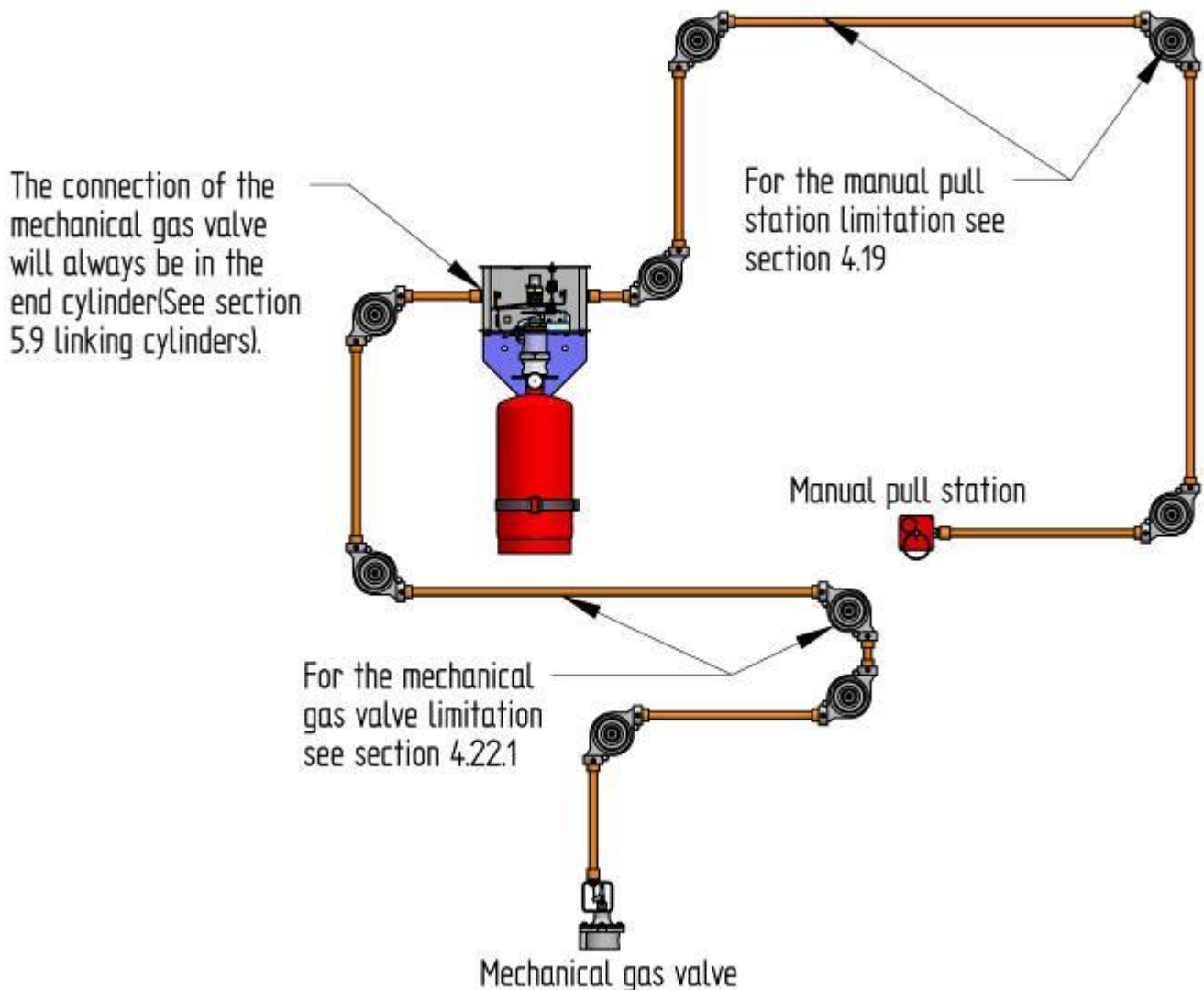
5.11.1 Single mechanical gas valve installation

(See section 3.18 for mechanical gas valve different sizes and Section 4.22 for mechanical gas valve limitation).

The position of the mechanical gas valve shall be approved by the Authority Having Jurisdiction.

After the location and the connection for the mechanical gas valve has been determined, install the EMT pipe from the MRM to the mechanical gas valve. It's permissible to install the mechanical gas valve in any direction. Before installing the EMT pipe make sure that the MRM is in cocking position. (MRM connection and End MRM linking cylinders situation, see section 5.9)

Mechanical gas valve general diagram



Remember: Use corner pulleys for any directional changes of the EMT pipe. Corner pulleys, EMT pipes shall be installed and positioned with compatible accessories. Insert the cable through the pipes.

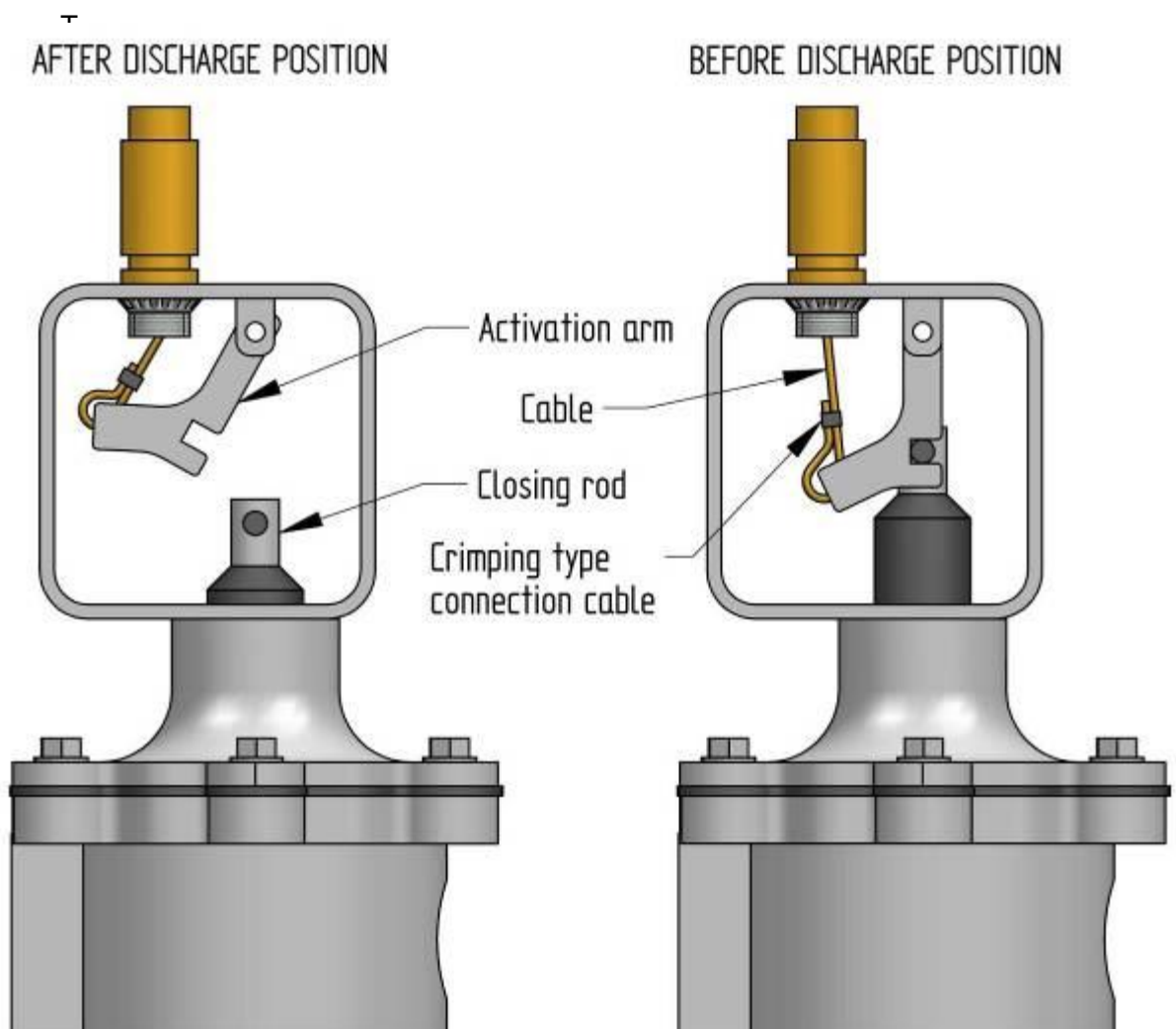
Warning: Never bend the EMT pipe.

Begin installing the cable through the EMT pipes from the mechanical gas valve to the MRM. After installing the cable through the entire EMT pipe, make sure that there is an extra cable of 20-25 cm (8-10") in the MRM. After this is done, move over to the mechanical gas valve, cut the extra cable and connect to the activation arm of the mechanical gas valve in this way:

Feed the end of the cable into the small hole on the activation arm of the mechanical gas valve, make a loop around the arm of the mechanical valve gas and insert it through the crimping type cable connection and tighten it with a special wrench.

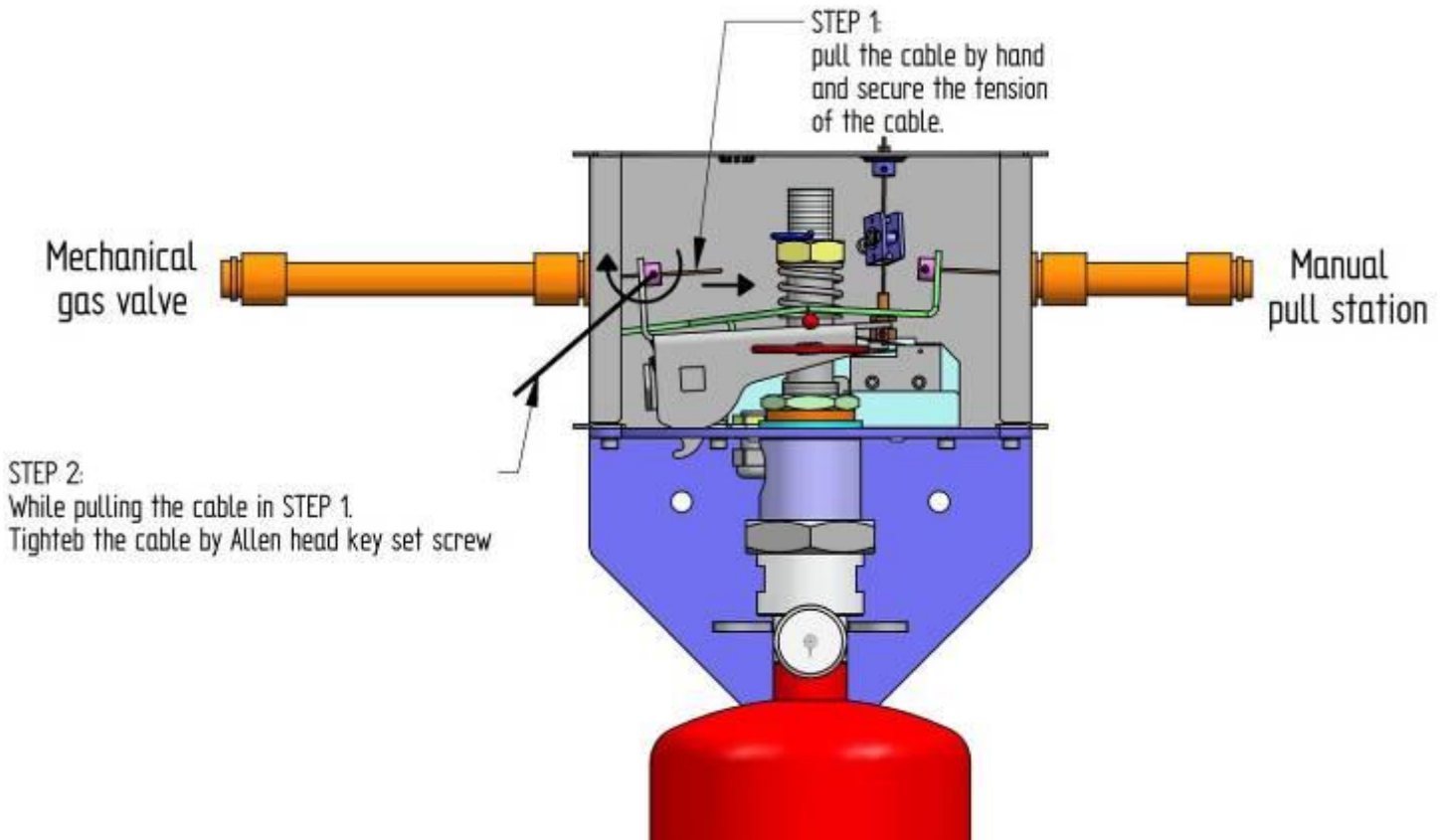
Lift the closing rod of the mechanical gas valve and lock it with the activation arm.

See drawing below: Now move over to the MRM.



Insert the cable through the connection point of the mechanical gas valve cable, pull the cable by hand until you will fill the tension in the cable and then secure it by tightening it with the Allen head key set screw while pulling the cable.

See drawing below:

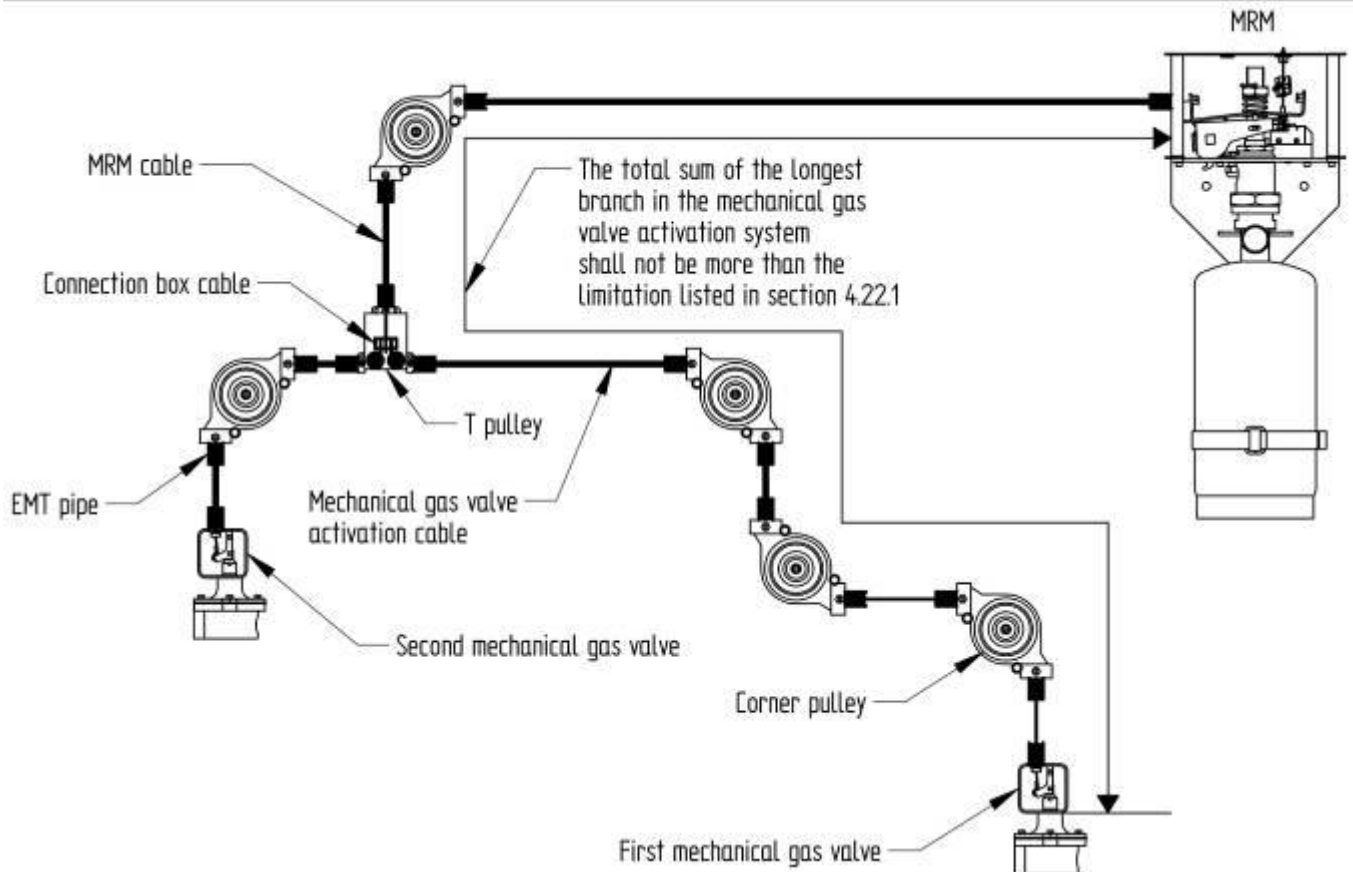


Notes:

1. In case there is more than one cylinder in the system, the mechanical gas valve will always be at the end cylinder, (see section 5.9 linking cylinders).
2. The cable in the mechanical gas valve system shall be in tension status, but in any case, not in over tension to avoid a coincidental activation and shut down of the gas.
3. After installing the cable in the MRM and in the mechanical gas valve, make sure to leave a surplus of 2-3 cm (1"-1.5") from the edge of the connection, and then trim the excess.

5.11.2 Dual mechanical gas valve installation

When installing an activation system with a dual mechanical gas valve, use a "T" pulley connector for the cable and EMT pipes. The "T" pulley helps to split the gas valve automatic activation system into two possible locations.



5.12 TESTING

At this stage a test needs to be run of all the mechanical systems (mechanisms) of the WCK system, including the detection network, manual activation (pull stations) and cylinder linking. See chapter 6 for testing and commissioning of the system.

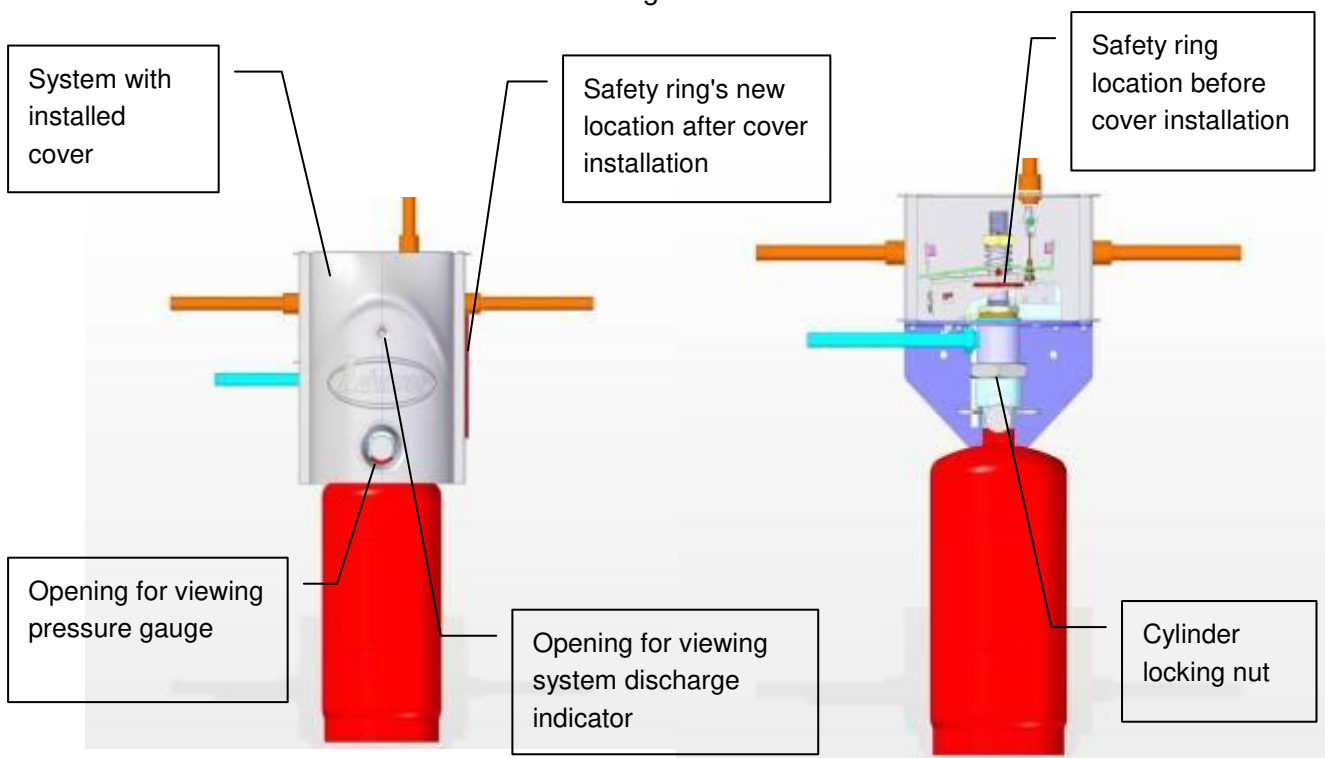
5.13 AGENT CYLINDER ASSEMBLING & MRM COVER

Before installing the cylinder, ensure that the testing process was successful and that all the discharge mechanisms of the modules are connected, armed, and in good working order, see Chapter 6. The cylinder and discharge valve assembly are attached as one assembly and delivered with a protective cover over the threading (the mechanical discharge module comes separately with the bracket and not with the cylinder).

After verifying that the mechanism is armed and the safety ring is in place, install the cylinder and tighten the locking nut with a wrench. Ensure that the pressure gauge is in front of the cylinder and by the opening of the module's cover.

Attach the cylinder to the bracket with a strap. Remove the safety pin from its location, shut the module cover, put the safety pin in its new location and secure with seals. Attach relevant stickers in the kitchen and on the cylinder.

Note: From the moment that the safety pin is removed the system is armed and ready for suppression. Therefore, verify again that all systems are properly linked and armed before final closing the cover.



CHAPTER 6

SYSTEM TESTING & COMMISSIONING

Instruction Manual No. 71-171

WCK- Kitchen Fire Suppression System

TESTED AND LISTED BY

UNDERWRITERS LABORATORIES

TO: ANSI/CAN/UL/ULC 300 Standard for Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking Equipment and ANSI/CAN/UL/ULC 1254 Standard for Pre-Engineered Dry and Wet Chemical Extinguishing System Units.



Advanced fire protection systems

6.1 GENERAL

After the LEHAVOT WCK Fire Extinguishing System has been installed, and before the installing the cylinder, do a complete functionality test on the system in order to confirm proper operation of the system

6.2 TESTING THE DETECTION NETWORK

The end of line detector shall have a test link. When the system is ready to work (and the safety pin is removed), cut the test link with shearing scissors, the actuator mechanical valve shall fire at this time. If the valve worked correctly, install the corresponding detector in place of the test link, then return to step 3 of the Assembling and Arming the MRM section in Chapter 5, to arm the actuator. If the device did not work, then check:

- Detector installation
- Cable clearance. Ensure that the cable is not obstructed in any of the conduits or corner pulleys
- Connections at S hooks and fusible links
- Anchorage of the conduit
- That the cable is at a proper tension

Once these items have been checked and resolved, return once again to the test of the Detection Network.

6.3 TESTING THE MANUAL PULL STATION

Following the detector test and before installing the cylinder, test the manual pull station. (Remove the safety pin of the MRM before testing)

- Pull the safety pin out of the manual pull station
- Pull the handle of the pull station

If the MRM worked properly return the pull handle in place, insert the safety pin and seal, then rearm the system. If the MRM did not work, check:

- Installation of the mechanical pull station
- Cable clearance in the EMT conduit, and at corner pulleys
- Cable connection at the actuator pin

Once these items have been checked and resolved.

Repeat the Manual pull station test

6.4 TESTING CYLINDER LINKING NETWORK

During the activation of either the fusible link or the manual pull station, the cylinder linking network should discharge all the cylinders in the system automatically.

If the MRM operated but one of the linked cylinders did not, check the following:

- The cable is pinched inside a pulley or pipe.
- The cable is not connected to the MRM properly.
- The cable is not stretched properly.

After checking the above, repeat the **Cylinder linking network test**.

6.5 TESTING DISTRIBUTION PIPING NETWORK

The LEHAVOT WCK Fire Extinguishment System is a wet chemical fire extinguishing system, using pre-engineered piping limitations that do not require balance or adjustments. As long as design limitations for the distribution piping network as stated in the design section have not been exceeded, there should be no concern regarding proper distribution of agent at each discharge nozzle.

To confirm that the distribution network piping is clean and intact a **puff test**, can be performed independently or as part of the **general performance test**

6.5.1 To performing the "Puff test" as part of a functionality test

All other components of the system are installed, including an agent extinguishing cylinder charged with Nitrogen at 11 bars (160 psi), (without the fire extinguishing agent).

Either a manual pull station is activated or a test link is cut. All system functions, including auxiliary outputs and discharge of air or nitrogen, through the distribution piping, should occur at this time. The entire test shall be documented. After the test completion, arm the system and assemble a new and proper extinguisher cylinder.

6.5.2 To perform the "Puff test" as an individual test

- Disconnect distribution pipe lines from the agent cylinder
- Connect the nitrogen or the compressed air adaptor to the pipe
- Connect the pressure supply device to the adaptor and open the valve (pressure shall be at least 11 bar (160 psi))
- Check that all caps of the nozzle are of and nozzles are clean

Once everything is checked and found in order, disconnects the adaptor from the distribution line and reattach the pipe to the cylinder outlet.

6.6 TESTING ELECTRIC GAS VALVE

(This test shall be performed only if the electrical gas valve is connected)

For this test, the gas valve shall be open and the cooking appliances working. To ensure that the shut-off device works properly, press (manually) the micro switch installed the MRM. The gas flow to the kitchen shall stop.

(To reactivate the gas valve, press the gas valve manual reset relay)

6.7 TESTING MECHANICAL GAS VALVE

When one of the operation systems operates, (the detector network or the manual pull station), the mechanical gas valve system will shut off automatically.

If the mechanical gas valve does not shut off, check for the following:

- The cable is stuck somewhere in the EMT pipes or corner pulleys.
- The cable is not connected correctly to the connection point of the mechanical gas valve.
- The cable's tension is too loose.

6.8 TESTING COMPLETED

After all testing has been completed, return to chapter 5.11, and cover the system. Prepare the system for turnover to kitchen managers.

Document all tests that were carried out. Update all installation drawings. Train kitchen managers on system performance, placement of the manual pull station and operation of the system. Provide the owner with Lehavot P/N 09020501 "Commissioning checklist".

Check all times that the discharge signal for the system does not appear on the window on the upper side of the MRM cover box.

CHAPTER 7

SYSTEM MAINTENANCE

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UNDERWRITERS LABORATORIES

TO: ANSI/CAN/UL/ULC 300 Standard for Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking Equipment and ANSI/CAN/UL/ULC 1254 Standard for Pre-Engineered Dry and Wet Chemical Extinguishing System Units.



Advanced fire protection systems

7.1 GENERAL

The LEHAVOT WCK Fire Suppression System shall be properly maintained at regular intervals of six months to ensure its proper function.

Maintenance to the system shall be performed by trained personnel certified by LEHAVOT Fire Protection. In multi cylinder systems, maintenance shall be performed for each cylinder to assure the whole system is in good working order. When conducting maintenance in multi cylinder systems, consider each cylinder a system of its own.

7.2 FIRST STEP

Ensure that the system discharged indicator is not visible in window.

7.3 MONTHLY INSPECTION (PERFORMED BY THE CUSTOMER / KITCHEN OWNER)

1. Verify that there aren't any obstructions for access to the cylinder/system.
2. Verify that there aren't any obstructions for access to the manual pull station.
3. Ensure that all plastic seals are whole and in place.
4. Verify that all labels and maintenance forms are present.
5. Visually inspect all nozzles for damages/ obstructions
6. Inspect all adaptors and fusible links for grease build up.
If fusible link cannot be seen clearly, call for maintenance personnel.
7. Check the pressure gauge, if low (out of green zone), the cylinder require charging by certified maintenance personnel. In case of damage/ malfunction immediate repairs are needed.

7.4 SEMI ANNUAL INSPECTION (BY CERTIFIED DISTRIBUTOR / PERSONNEL)

1. Check that the protected area hasn't changed and the cooking appliances are in their original positions.

2. Repeat the monthly inspection.
3. Check for pressure drop in cylinders; a drop indicates a leak.
4. Every fusible link is sensitive to its rated temperature. It is important to replace fusible links every six months or more often if covered in grease.
5. Rearm the system

7.5 **ANNUAL INSPECTION (BY SERVICE PERSONNEL, CERTIFIED DISTRIBUTER)**

1. Inspect according to instructions of the semiannual inspection.
2. Perform an inspection of the different networks and manual/mechanical actuations according to the Chapter 6 testing & commissioning.
Remember before starting the inspection removes the cover of the system, insert the safety pin into place in the actuation mechanism, release the locking nut of the cylinder and disconnect the cylinder from the system.
3. After the inspection, reconnect the cylinder to the system.
4. Verify that the sound warning and the micro switches reset themselves after rearming the system. At the end of the inspections of the networks, remove the safety ring and close the cover.
5. An inspection/ safety form (P/N 9020501) will be given to the customer/ kitchen Owner including comments and recommendations

Note: (will be performed by a certified distributor)

- Every time a fusible link will be changed for any reason, perform the following: Remove the cover, insert the safety pin into its slot in the actuation mechanism, release the cylinder locking nut, and disconnect the cylinder from the system.
- Clean the ducts of all grease, according to requirements in NFPA 96.

7.6 **HYDROSTATIC INSPECTION**

The LEHAVOT wet chemical containers shall be subjected to a hydrostatic pressure inspect at interval not exceeding 12 years.

7.7 CRITICAL COMPONENTS

1. Clean the ducts of all grease, according to requirements in NFPA 96
2. Verify that there aren't any obstructions for access to the cylinder/system.
3. Verify that there aren't any obstructions for access to the manual pull station.
4. Ensure that all plastic seals are whole and in place.
5. Verify that all labels and maintenance forms are present.
6. Visually inspect all nozzles for damages/ obstructions
7. Inspect all adaptors and fusible links for grease build up. If fusible link cannot be seen clearly, call for maintenance personnel for replacement.
8. Check the pressure gauge, if low (out of green zone), the cylinder require charging by certified maintenance personnel.
9. In case of damage/ malfunction immediate call certified distributor personnel to repair.

CHAPTER 8

SYSTEM RESET & RECHARGE

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WCK- Kitchen Fire Suppression System

TESTED AND LISTED BY

UNDERWRITERS LABORATORIES

TO: ANSI/CAN/UL/ULC 300 Standard for Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking Equipment and ANSI/CAN/UL/ULC 1254 Standard for Pre-Engineered Dry and Wet Chemical Extinguishing System Units.



Advanced fire protection systems

TO BE PERFORMED BY CERTIFIED PERSONNEL ONLY

8.1 GENERAL

After a system discharged for any reason, notify the fire authorities and a LEHAVOT certified technician to find out the reason for the discharge and to reset the system.

8.2 INSTRUCTIONS AFTER ACTUATION

Cleaning the protected area after a system discharge is not complicated. The wet fire suppression agent used by the system creates a protective layer of foam on grease and unless it is heavily contaminated with grease, it can easily be wiped off. The extinguishing agent is not toxic. However, any exposed food shall be discarded.

WARNING:

1. The liquid extinguishing agent can conduct electricity. To prevent shock or electrocution it is essential that all electric appliances be disconnected before any cleaning is done.
2. Do not clean before the area is cooled down.
3. Do not clean hot grease with water.
4. Do not leave the agent on kitchen surfaces for a long period, after all it is a chemical compound which may affect or stain the surface.

8.2.1 Cleaning the piping from agent residue

1. Verify that all electrical appliances are disconnected from electricity.
2. Disconnect the main supply line from the cylinder.
3. Connect a water hose to the main supply pipe with adaptor.
4. Flush the dispersion system pipes with water for about one minute.
5. Turn off water; disconnect the hose from the main supply pipe.
6. Connect to the main supply line a nitrogen or air cylinder. Force the pressurized nitrogen/air through the pipe until there is no water coming out the nozzles.
7. **Disconnect and replace all nozzles with the same model number.**
8. **Replace all fusible links, including the ones that were not used.**

8.3 RECHARGING OF SYSTEM

Before recharging the cylinder disconnect it from the system so as to avoid accidental activation and affecting the kitchen's operation. In order to preserve the system's functions replace the old cylinder with a new one.

8.4 SYSTEM DISASSEMBLY PERFORMED IN THE FOLLOWING STEPS

8.4.1 System shall be cock first

1. Remove the cover from the MRM.
2. Cock the MRM (without cocking the mechanism it is impossible to release the cylinder from the system).
3. Insert the safety pin to lock the activation mechanism (if system has not been activated).
4. Release the cylinder locking nut.
5. Loosen the cylinder from the bracket.

8.4.2 Cylinder disassembly

(To be performed by authorized LEHAVOT technicians only. Personal protection shall be worn including protective goggles and gloves!!!)

Cylinder disassembly will be performed by certified LEHAVOT workshop.

1. Attach cylinder to a bracket to immobilize it.
2. Verify that the cylinder is empty (pressure gauge should be in the red). In case of a full cylinder (gas), press the refill valve until empty, (make sure the pressure gauge is still attached).

WARNING: DO NOT STAND IN FRONT OF THE PRESSURE GAUGE DURING GAS RELEASE.

3. Before releasing the cylinder assembly, press on the activation piston to verify it is empty.
4. Release any pressure left by turning clockwise the cylinder mechanism one or two times.
5. Continue to turn the cylinder mechanism until detachment is made. Do not stand above the mechanism during opening.
6. Separate the siphon from the activation mechanism according sizes of the cylinders, 6, 9, 16, 20, or 26 liters.

8.5 CYLINDER

8.5.1 INSPECTION

Cylinder inspection will be performed by certified personnel and will report whether a cylinder can be used again or replace. Reject any cylinder with the following conditions:

1. Visual rust, peeling paint, especially on the bottom of the cylinder or around the assembly connection point.
2. Dents in the cylinder body.
3. Inside threads of the cylinder neck are stripped.

8.6 CYLINDER NEEDING MAINTENANCE

1. Expired inspection date (date stamped on cylinder base or tag. See NFPA 10).
2. Slight faults on cylinder body.
3. Superficial rust.
4. A complete checkup shall include all the operations listed in section 8.7.

8.7 CYLINDERS REQUIRING COMPLETE CHECKUP

Cylinders shall pass a hydrostatic pressure test according to NFPA 10. Cylinder is filled with water and closed. Increase pressure gradually to the desired pressure. Pressure is maintained for one minute to check for leaks. **Cylinders that fail shall be discarded.**

1. After the test, drain the water from the cylinder.
2. Stamp the date (month and year) at the cylinder.
3. Cylinders will be painted epoxy/polyester or polyester red.

8.8 CYLINDERS NOT REQUIRING A COMPLETE CHECKUP

1. Minor scratches and nicks requiring touch up paint, normal dirt or grease.
2. Threads need cleaning but are not damaged.
3. Reassembled, recharged and stamped.

8.9 PRESSURE GAUGES

Verify the pressure gauge and valve are whole with no mechanical defects – reject gauges with broken glass, warps, missing needle, etc.

Note: Only special gauges can be used in the system!

8.10 SIPHON TUBE

Reject any siphon tubes that have dents or cracks.

8.11 REPAIRING THE DISCHARGE VALVE:

1. Disassemble the discharge valve from the cylinder.
2. Disassemble the siphon from the valve.
3. Disassemble the piston from the valve.
4. Clean all valve parts thoroughly.
5. Pay attention to the following parts:
 - Piston rod shall be completely straight.
 - Seals base is clean and smooth.
 - Spring is working and clean.
 - Replace rubber seals and lubricate with silicone.
 - Disassemble rubber seals from the pressure gauge and reassemble (lubricate with silicone).

8.12 REPAIR OF MRM (ON SITE)

During repair inspect the following parts:

1. Spring locking nut
2. Main activation spring (verify the spring is in good condition)
3. Mechanism press rod
4. Manual activation arm
5. Manual activation arm spring
6. Activation mechanism base
7. Detection network cable winder
8. Activation mechanism pin
9. Activation mechanism rod
10. Safety pin.

8.13 MANUAL ACTUATION MECHANISM

Check that the manual activation mechanism is in good condition.

8.14 REASSEMBLY AND RECHARGING:

Remember to wear protective goggles and gloves while recharging a cylinder!!!

1. Install the correct siphon to the discharge valve of the cylinder.
2. Refill with the Wet chemical agent (use funnel).
 - 6.5 liters liquid chemicals for the WCK6.
 - 9.1 liters liquid chemicals for the WCK9.
 - 15.6 liters liquid chemicals for the WCK16.
 - 20.8 liters liquid chemicals for the WCK20.
 - 26 liters liquid chemicals for the WCK26.
3. Install the discharge valve into the cylinder head and tighten.
4. In case there is a threading problem examine threads, they may need to be rethreaded.
5. Apply small drop of LOCTITE 290 on the pressure gauge threads and screw the pressure gauge on until needle points up.
6. The pressure gauge attached to the extinguishing system should not be used to determine when the intended charging pressure has been reached the right pressure.
7. The pressure regulator shall be used when the pressure source is a tank of high pressure gas, that is, gas at higher than the charging pressure of the unit.
8. Charge the cylinder with pressurized nitrogen. Use the charging adaptor and pressurize to 15 bars (220) at 20 C° (70°F).
9. Install the protective cover over the discharge mechanism.

8.15 SEAL TEST

Turn cylinder upside down after the nitrogen recharge to release air bubbles from the siphon. Submerge the cylinder in water for 20 minutes checking for leaking bubbles. Pay particular attention to the areas surrounding the pressure gauge and the joint between the cylinder and the discharge valve. Upon successfully testing the cylinder, label the cylinder according to NFPA 10.

Note: Recharging and resetting shall be performed by certified technicians who have passed the LEHAVOT Fire Protection special training maintenance class.

8.16 CABLE AND FUSIBLE LINKS SYSTEM

1. Check the detector.
2. Replace all fusible links. Use same temperature fusible link as in original system.
3. Check all EMT pipes and corner pulleys.
4. Check the manual activation system.

IMPORTANT

To reinstall system in the kitchen, see section 5.5 "MRM adjustments", and then go to section 6 "System testing & commissioning", section 6.3 "Testing manual pull station" and section 6.6 "Testing electric gas valve". To complete the reinstallation perform section 5.11 "Agent cylinder assembling & mechanism cover".

Note: Remember to restart the gas valve Manual reset relay at end of installation.

8.17 REPLACEMENT PARTS LIST

For replacement parts list see parts book No. 09059011

CHAPTER 9

MSDS & WARNINGS

Instruction Manual No. 17-171

WCK- Kitchen Fire Suppression System

TESTED AND LISTED BY

UNDERWRITERS LABORATORIES

TO: ANSI/CAN/UL/ULC 300 Standard for Fire Testing of Fire Extinguishing Systems for Protection of Commercial Cooking Equipment and ANSI/CAN/UL/ULC 1254 Standard for Pre-Engineered Dry and Wet Chemical Extinguishing System Units.



Advanced fire protection systems

9.1 MSDS

Orchidee Europe BVBA

Safety Data Sheet

according to Regulation (EC) No 1907/2006

Revision date: 07.08.2017

Orchidex FX
Product code: 1.500.3.32

Page 1 of 5

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Orchidex FX

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture
extinguishing agent

1.3. Details of the supplier of the safety data sheet

Company name:	Orchidee Europe BVBA	
Street:	Brielen 2	
Place:	B 2830' Tisselt, Belgium	
Telephone:	+32 (0) 3 291 05 42	Telefax: +32 (0) 14 58 33 11
e-mail:	admin.sales@orchidee-europe.com	
e-mail (Contact person):	admin.sales@orchidee-europe.com	
Internet:	WWW.ORCHIDEE-EUROPE.COM	
Responsible Department:	Office Open Hours: 08:00-17:00	

1.4. Emergency telephone number:

+32 (0) 3 291 05 42

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

This mixture is classified as not hazardous according to regulation (EC) 1272/2008 [CLP].

2.2. Label elements

Regulation (EC) No. 1272/2008

Special labelling of certain mixtures

EUH208	Contains 1,2-benzisothiazol-3(2H)-one, 1,2-benzisothiazolin-3-one. May produce an allergic reaction.
EUH210	Safety data sheet available on request.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

Hazardous components

CAS No	Chemical name	Quantity
	EC No	
	Index No	
	REACH No	
	Classification according to Regulation (EC) No. 1272/2008 [CLP]	
7732-18-5	Water purified	60-70 %
	231-791-2	
866-84-2	tripotassium citrate	15-25 %
	212-755-5	
7758-11-4	Potassium dihydrogenorthophosphate	5-15 %
	231-834-5	

Full text of H and EUH statements: see section 16.

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Further Information

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

SECTION 4: First aid measures

4.1. Description of first aid measures

After inhalation

In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible). "If signs or symptoms occur, remove person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, get immediate medical attention."

After contact with skin

After contact with skin, wash immediately with plenty of water and soap. In case of skin irritation, consult a physician.

After contact with eyes

Immediately flush eyes with large amounts of water. Get immediate medical attention.

After ingestion

If accidentally swallowed rinse the mouth with plenty of water (only if the person is conscious) and obtain immediate medical attention.

4.2. Most important symptoms and effects, both acute and delayed

Irritation and etching

4.3. Indication of any immediate medical attention and special treatment needed

In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible).

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media

Product itself is fire extinguishing agent

5.2. Special hazards arising from the substance or mixture

At high temperature : concentrate gives toxic products. Thermal decomposition of usage concentrations does not present a hazard.

5.3. Advice for firefighters

Avoid contact with water reactive materials, burning metals and electrically energized equipment.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Wear personal protection equipment (refer to section 8). Use appropriate respiratory protection.

6.2. Environmental precautions

Do not allow to enter into surface water or drains.

Clean contaminated objects and areas thoroughly observing environmental regulations. Treat the recovered material as prescribed in the section on waste disposal.

6.3. Methods and material for containment and cleaning up

Soak up inert absorbent and dispose as waste requiring special attention. Use approved industrial vacuum cleaner for removal. Collect in closed and suitable containers for disposal.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

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Advice on safe handling

Keep container tightly closed and in a well-ventilated place.

Advice on protection against fire and explosion

No special handling advices are necessary.

7.2. Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels

Keep only in the original container in a cool, well-ventilated place.

Advice on storage compatibility

maximum storage temperature 50

minimum storage temperature -2

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

8.2. Exposure controls

Appropriate engineering controls

If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn.

Protective and hygiene measures

Avoid contact with skin, eyes and clothes. When handling with chemical substances, protective gloves must be worn with the CE-label including the four control digits. When using do not eat, drink, smoke, sniff.

Eye/face protection

"Avoid eye contact with vapour, spray, or mist. Wear vented goggles."

Hand protection

Wear appropriate gloves when handling this material. A pair of gloves made from the following material(s) are recommended: Butyl rubber.

Skin protection

Avoid skin contact.

Respiratory protection

Work in well-ventilated zones or use proper respiratory protection.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state:	liquid
Colour:	"Clear, colored liquid"
pH-Value (at 20 °C):	6-9.5
Changes in the physical state	
Melting point:	-5 °C
Initial boiling point and boiling range:	100 °C
Sustaining combustion:	Not sustaining combustion
Density (at 20 °C):	1.19+-0.02 g/cm ³
Viscosity / dynamic: (at 20 °C)	<20 mPa·s

9.2. Other information

Solid content:	30.40 %
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SECTION 10: Stability and reactivity

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10.1. Reactivity

none

10.2. Chemical stability

The study does not need to be conducted because the substance is known to be soluble in water to form a stable mixture.

10.3. Possibility of hazardous reactions

none

10.4. Conditions to avoid

none

10.5. Incompatible materials

none

10.6. Hazardous decomposition products

none

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity

Based on available data, the classification criteria are not met.

Irritation and corrosivity

Based on available data, the classification criteria are not met.

Sensitising effects

Based on available data, the classification criteria are not met.

Carcinogenic/mutagenic/toxic effects for reproduction

Based on available data, the classification criteria are not met.

STOT-single exposure

Based on available data, the classification criteria are not met.

STOT-repeated exposure

Based on available data, the classification criteria are not met.

Aspiration hazard

Based on available data, the classification criteria are not met.

SECTION 12: Ecological information

12.1. Toxicity

There are no data available on the mixture itself.

12.2. Persistence and degradability

There are no data available on the mixture itself.

12.3. Bioaccumulative potential

There are no data available on the mixture itself.

12.4. Mobility in soil

There are no data available on the mixture itself.

12.5. Results of PBT and vPvB assessment

There are no data available on the mixture itself.

12.6. Other adverse effects

There are no data available on the mixture itself.

Further information

Depending on local conditions and existing concentrations, in the case of discharge in biological sewage plants, problems in the decomposition activity of activated sludge are possible.

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SECTION 13: Disposal considerations

13.1. Waste treatment methods

Advice on disposal

Waste disposal according to official state regulations . Waste disposal according to EC Directives 75/442/EEC and 91/689/EEC on waste and hazardous waste in their latest versions

SECTION 14: Transport information

Land transport (ADR/RID)

Other applicable information (land transport)

Not classified for this transport way.

Inland waterways transport (ADN)

Other applicable information (inland waterways transport)

Not classified for this transport way.

Marine transport (IMDG)

Other applicable information (marine transport)

Not classified for this transport way.

Air transport (ICAO-TI/IATA-DGR)

Other applicable information (air transport)

Not classified for this transport way.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

EU regulatory information

Information according to 2012/18/EU (SEVESO III): Not subject to 2012/18/EU (SEVESO III)

National regulatory information

Water contaminating class (D): 1 - slightly water contaminating

15.2. Chemical safety assessment

For this mixture a chemical safety assessment has been carried out.

SECTION 16: Other information

Relevant H and EUH statements (number and full text)

EUH208 Contains 1,2-benzisothiazol-3(2H)-one, 1,2-benzisothiazolin-3-one. May produce an allergic reaction.
EUH210 Safety data sheet available on request.

Further Information

The above information describes exclusively the safety requirements of the product and is based on our present-day knowledge. The information is intended to give you advice about the safe handling of the product named in this safety data sheet, for storage, processing, transport and disposal. The information cannot be transferred to other products. In the case of mixing the product with other products or in the case of processing, the information on this safety data sheet is not necessarily valid for the new made-up material.

(The data for the hazardous ingredients were taken respectively from the last version of the sub-contractor's safety data sheet.)

Further Information

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

(The data for the hazardous ingredients were taken respectively from the last version of the sub - contractor's' safety data sheet.)

9.2 SAFETY PRECAUTIONS AND WARNINGS:

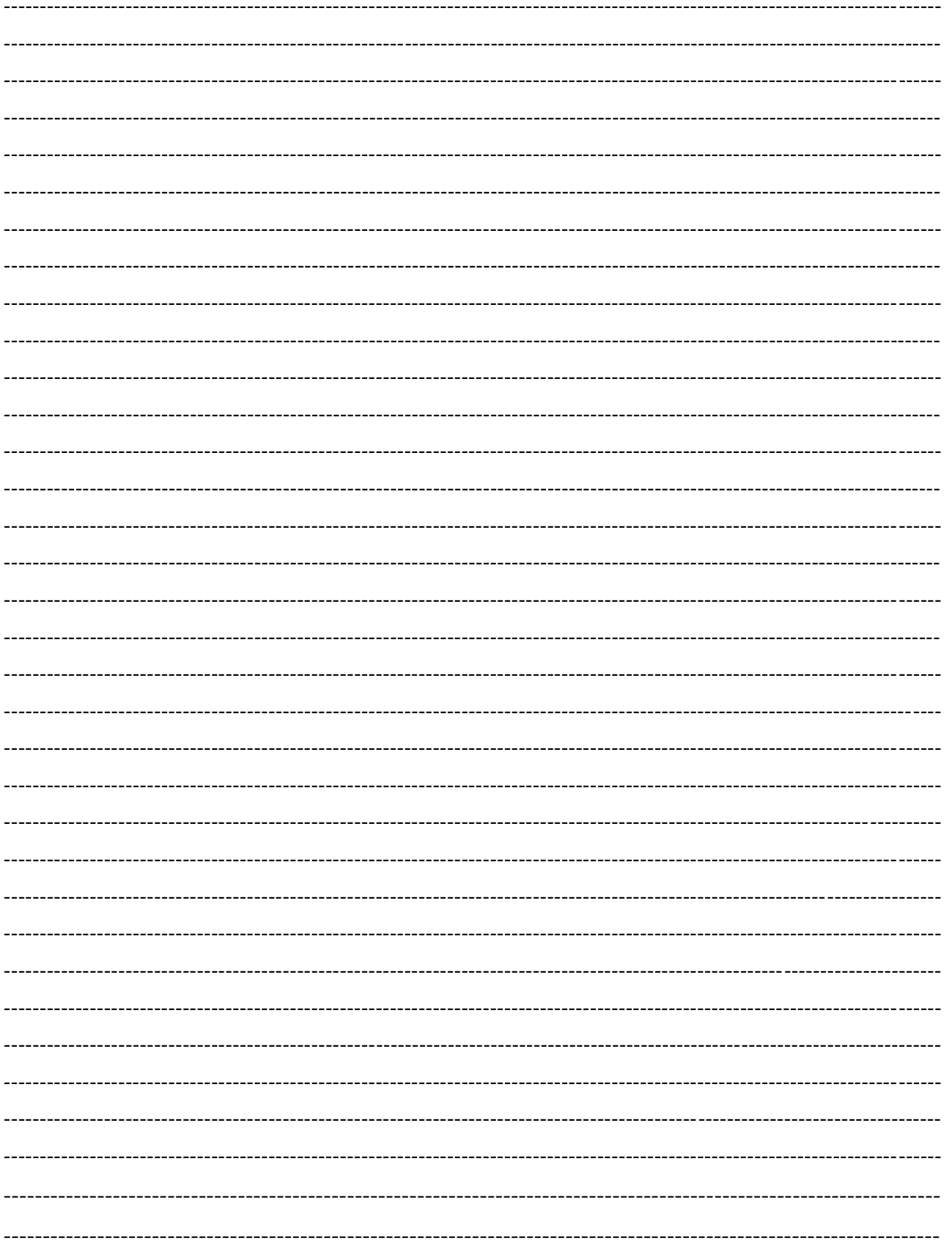
The fire suppression systems were manufactured for specific use, and are designed to provide protection during fires. Irresponsible use of the system may result in damages to health and property.

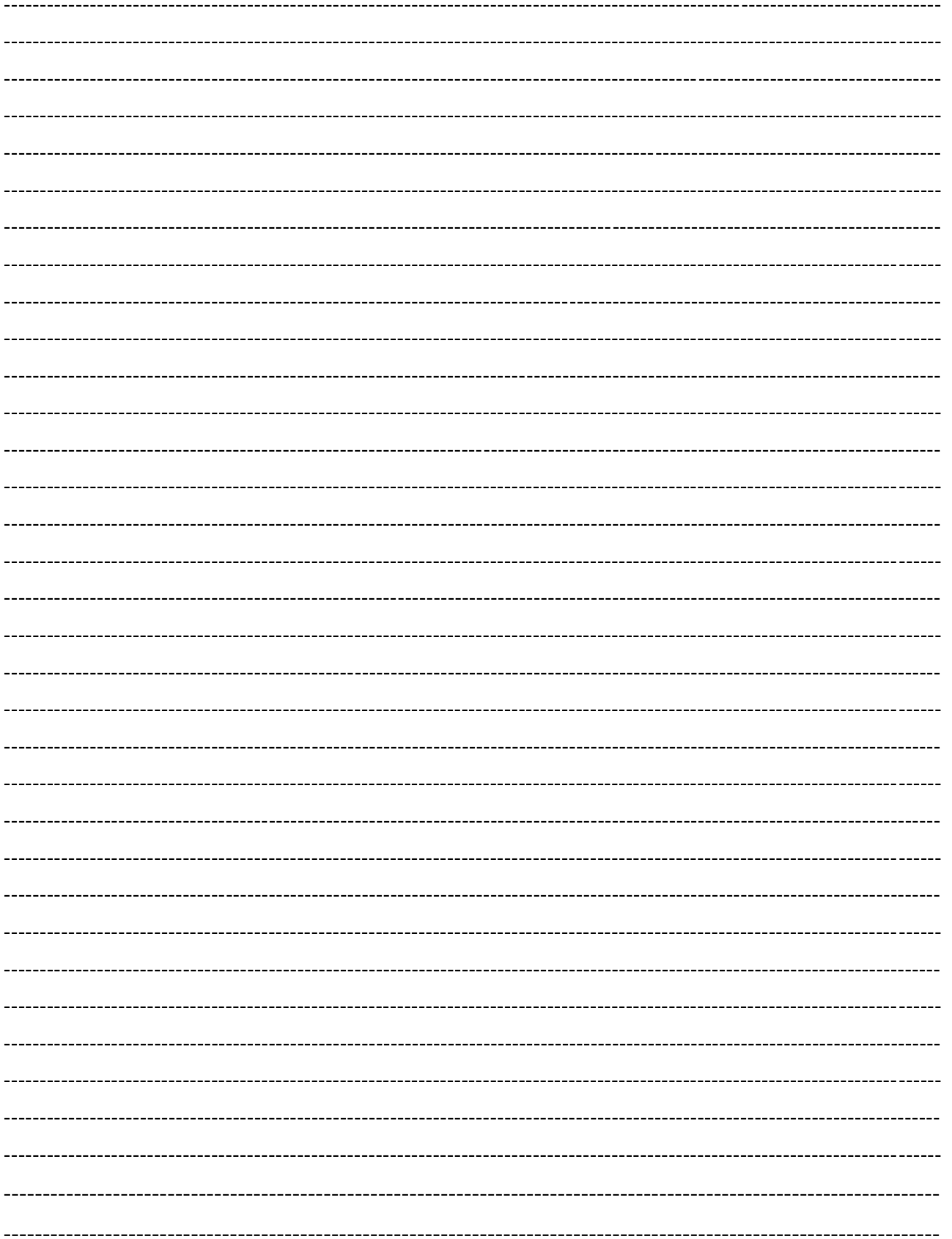
The cylinders are pressurized for discharging the agent to the source of fire.

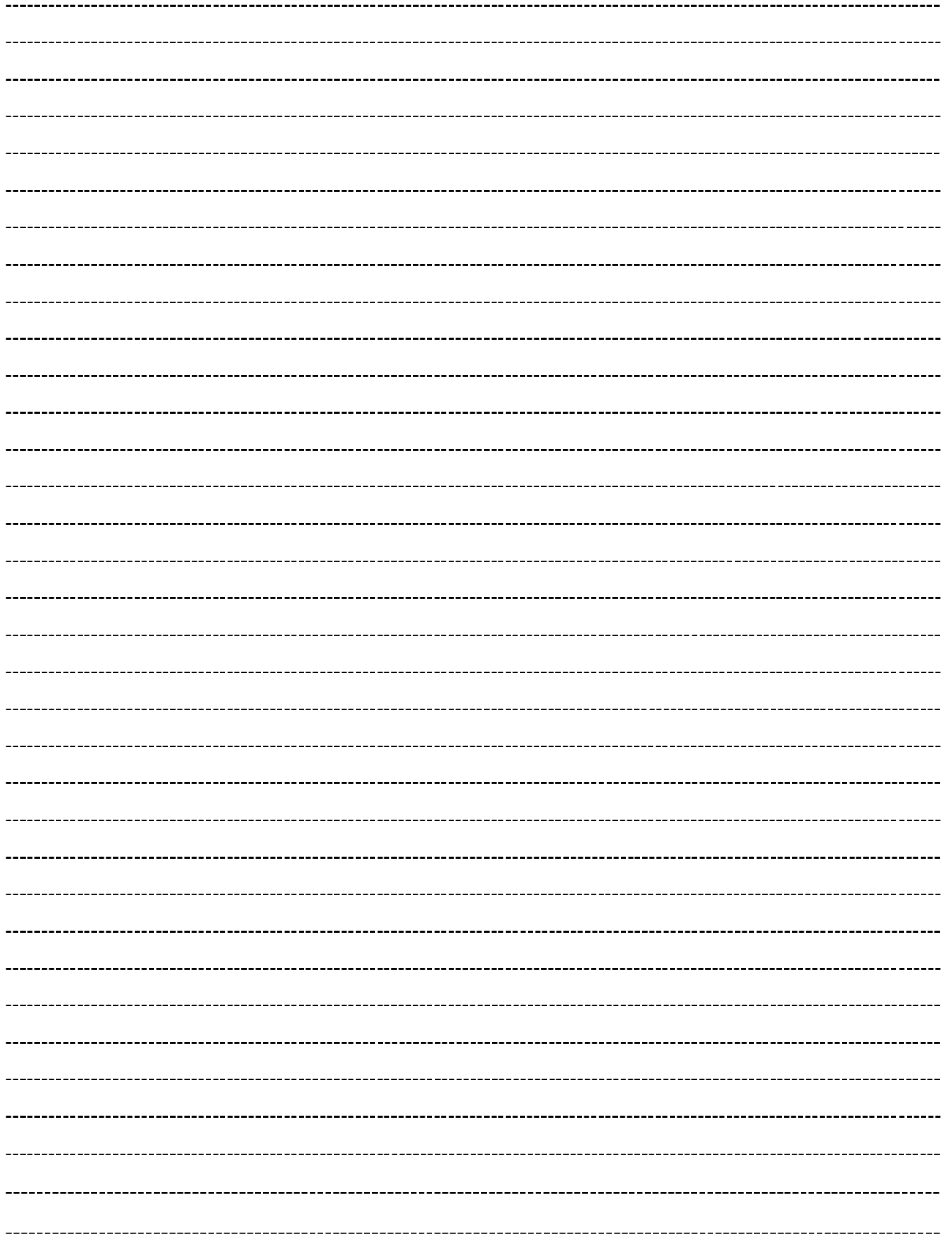
Note following warnings:

1. The agent cylinder is pressurized. Do not damage or perforate, keep away from flames, do not empty towards other persons.
2. Do not store the cylinder or agent in temperature exceeding 49°C (120°F).
3. Keep away from children
4. Do not use cylinder if damaged or rusted.
5. Avoid inhalation of the agent, or smoke or any toxic gas released during fire. Stay away from the fire zone after system discharge.
Evacuate the fire immediately and ventilate before reentry.
6. The agent is nontoxic, when used properly, but avoids contact with eyes, throat and nose or any other parts as agent may cause burning and irritation

Note: For any further references see MSDS of this specific agent.









EN 16282:2017



Advanced fire protection systems

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