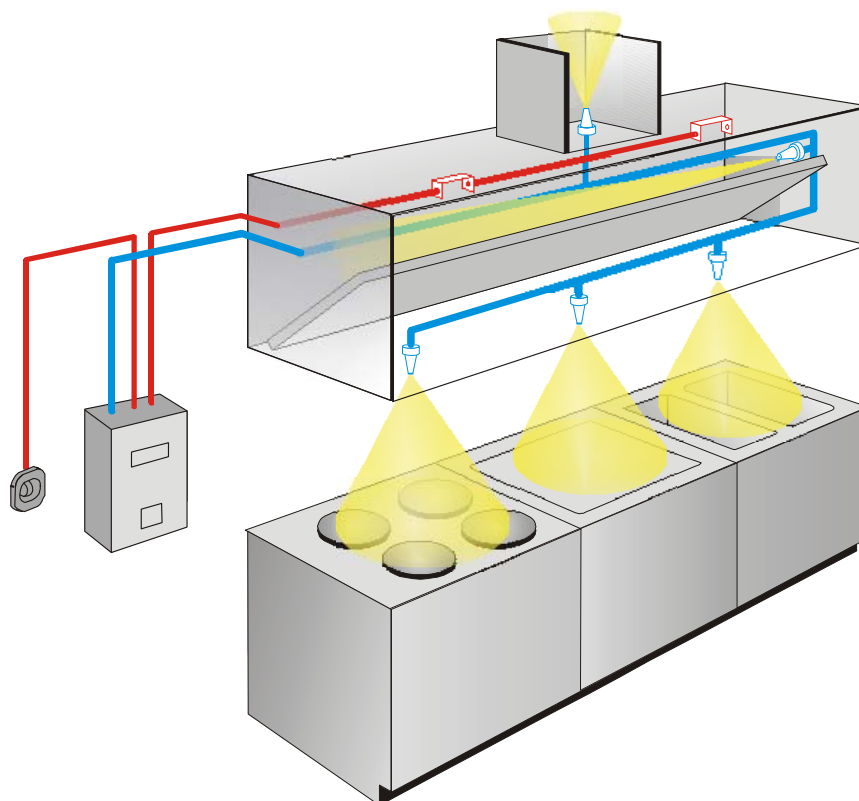


ANSULEX[®]

FIRE SUPPRESSION SYSTEM FOR RESTAURANT KITCHENS



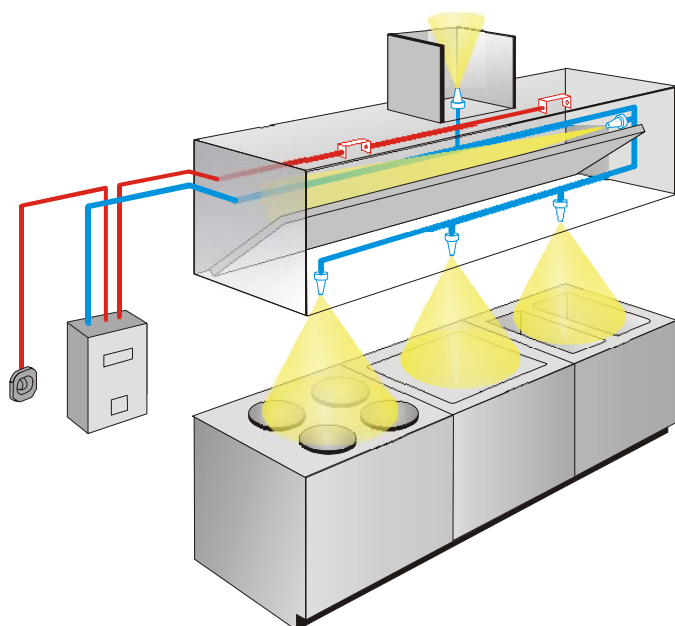
USER MANUAL

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Art. nr 89-6010-02

PRODUCT DESCRIPTION



Structure

The Ansulex system has four main components, a central unit with a tank and an actuation mechanism, a pipe system with nozzles, a detection system and a manual actuation system

The system is automatic, but it can also be actuated manually using a cable from a pull handle. It is entirely mechanical and works independently of the water and power supplies.

The system can also be adapted for the smallest hot dog stand to the biggest restaurant kitchen. The fire suppression agent tank is no bigger than a standard hand-held fire extinguisher, and if necessary you can easily connect two or more together to cover all kinds of kitchens.

The system has been designed to merge neatly into a modern restaurant environment. The central unit with the tank and actuation mechanism is built into a stainless cabinet. The equipment takes up little space and can normally be located immediately below the ceiling or even above a suspended ceiling in order to save floor and worktop space.

The nozzles are located over the filters in the ventilation hood and by the outlet ducts, as well as over the kitchen equipment to be protected, e.g. deep fat fryers, griddles, ovens and grills. The flow and spray profile of the nozzles are dimensioned with reference to the objects protected.

A fire in a deep-fat fryer, grill, griddle or other kitchen equipment is always dangerous. It can spread incredibly quickly in the large volumes of fat and oil that are stored in filters, hoods and ventilation ducts. There is a major risk of a total fire.

It is often impossible to use a carbon dioxide extinguisher, the usual first line of protection in kitchens, as hot fat and hot metal surfaces cause repeated re-ignition.

There is now a fixed fire suppression system – Ansulex – that has been developed specially to deal with fires in kitchens. The fire suppression agent is a liquid that quickly extinguishes the fire and emulsifies with the fat to form a dense layer of foam that prevents re-ignition.

Detection and automatic actuation

The automatic actuation of the system is applied using reliable mechanical detectors with fusible links, connected in a cable system to the actuation mechanism.

In the event of fire, the cable control activates a nitrogen gas cartridge, which pressurises the tank and forces the fire suppression agent through the nozzles.

Shut-offs for gas and electricity can be controlled from the system. However, any fans in the ventilation system must not be switched off in the event of fire. The fans help to draw up the fire suppression agent into the exhaust air duct and prevent the spread of fire. They also cool down filters and hoods after the fire has been extinguished.

Ansulex - special liquid for fat fires

Ansulex is a potassium-based saline solution with unique properties, developed specially for fat-related fires. The nozzles with different flows and spray patterns cover the protected areas with a fine spray jet. The agent extinguishes the fire in the following way:

- The water in the agent evaporates and cools the fat and metal surfaces
- Additional cooling is achieved when the salt in the agent reacts with the hot fat and forms CO₂
- When the carbon dioxide and the water vapour evaporate, the Ansulex agent saponifies and a foam-like blanket is formed over the fat

The fire is quickly extinguished and the blanket of foam effectively prevents re-ignition.



The Ansulex nozzles are fitted with filters and protective caps to prevent them from becoming blocked by dried fat or other particles of dirt.

Easy to clean - quick to reload

As the agent turns to foam when it comes into contact with the hot fat, it does not burn onto the surface. Cleaning after a fire is therefore simple. All you have to do is wipe down the surfaces with hot water and a normal detergent.

Reloading can be carried out on site and does not take long. You refill the new fire suppression agent and change the gas cartridge, as well as the fusible link in the detector, if the system was actuated automatically.

Approvals and references

The Ansulex system was developed in the 1980s and is now the most widely used fire suppression system in the world for restaurant kitchens.

It has been tested and approved in accordance with the American NFPA standard for fire suppression systems in restaurant kitchens. It is also approved by bodies including VDS, Germany and by Germanischer Lloyd, the US Coast Guard and Det Norske Veritas for use on ships.

The Ansulex system is also approved in Sweden by fire authorities, insurance companies and the Swedish Maritime Authority.

Ansulex is standard equipment all over the world at major hamburger chains such as McDonald's and Burger King.

It protects kitchens on passenger ferries, merchant ships and warships. In Sweden there are more than 1,000 Ansulex systems installed in restaurants, staff canteens, hot dog stands, etc.

If fire breaks out

1. A fire quickly actuates the fusible link in the nearest detector.
2. The detector cables activate the nitrogen gas cartridge, pressurising the tank. Shut-offs for gas and electricity are activated via a microswitch on the actuation mechanism.
3. The fire suppression agent is sprayed over drying and grilling surfaces, and into fat filters and exhaust air ducts.

4. The fire is extinguished within a few seconds. A chemical reaction with the hot fat creates a dense foam, which stops the combustible gases and prevents re-ignition.



The system can be actuated manually with a cable or via detectors. The detector system operates using fusible links and cables, and works independently of the power supply.

Better than CO₂ systems

The Ansulex system has many advantages compared with the carbon dioxide systems formerly used.

- Ansulex fire suppression agent has been specially developed for fat-related fires. Compared with CO₂ it extinguishes more quickly and effectively.
- The agent remains in place after the fire has been extinguished and effectively prevents re-ignition.
- The system is both manual and automatic. CO₂ systems are usually only manual because of danger to life when inhaling carbon dioxide.
- The fire suppression agent tanks take up little space and are fitted in stainless protective cabinets that are installed in the ceiling to free up space on the floor and worktops.
- The Ansulex fire suppression agent is not hazardous for staff and can easily be wiped clean after the fire is extinguished.

The actuation cabinet is fitted with fire suppression agent tanks and the actuation mechanism.

If fire breaks out, the nitrogen gas cartridge is activated and the Ansulex tank is pressurised via the reducer valve.

The pressure in the tank remains constant at 7 bar during discharge, which provides the correct spray pattern and flow in all spray nozzles.



The fire suppression agent tanks take up little space and are fitted in stainless protective cabinets that are installed in the ceiling to free up space on the floor and worktops.

ANSUL MANUAL

We strongly recommend that all personnel concerned are instructed in the current safety procedures and operation of the system. This manual must accompany every Ansulex fire suppression system that is installed.

This manual has been produced to provide the owner with an understanding of:

- how the Ansulex fire suppression system works.
- the owner's responsibility for service and maintenance.
- action in the event of a fire.

It is not the intention of this manual to reproduce all of the information contained in the full documentation entitled "Installation, Operation, Recharge, Inspection and Maintenance Manual", Ansul art. no. 418087. The aim is to provide the owner with a general overview of the system as well as knowledge of necessary action in the event of a fire.

If more detailed information is required about the Ansulex Fire Suppression System for Restaurant Kitchens, your authorised Ansul distributor can provide a complete, detailed "Installation, Operation, Recharge, Inspection and Maintenance Manual".

THE OWNER'S ROLE IN PROVIDING EFFECTIVE FIRE PROTECTION

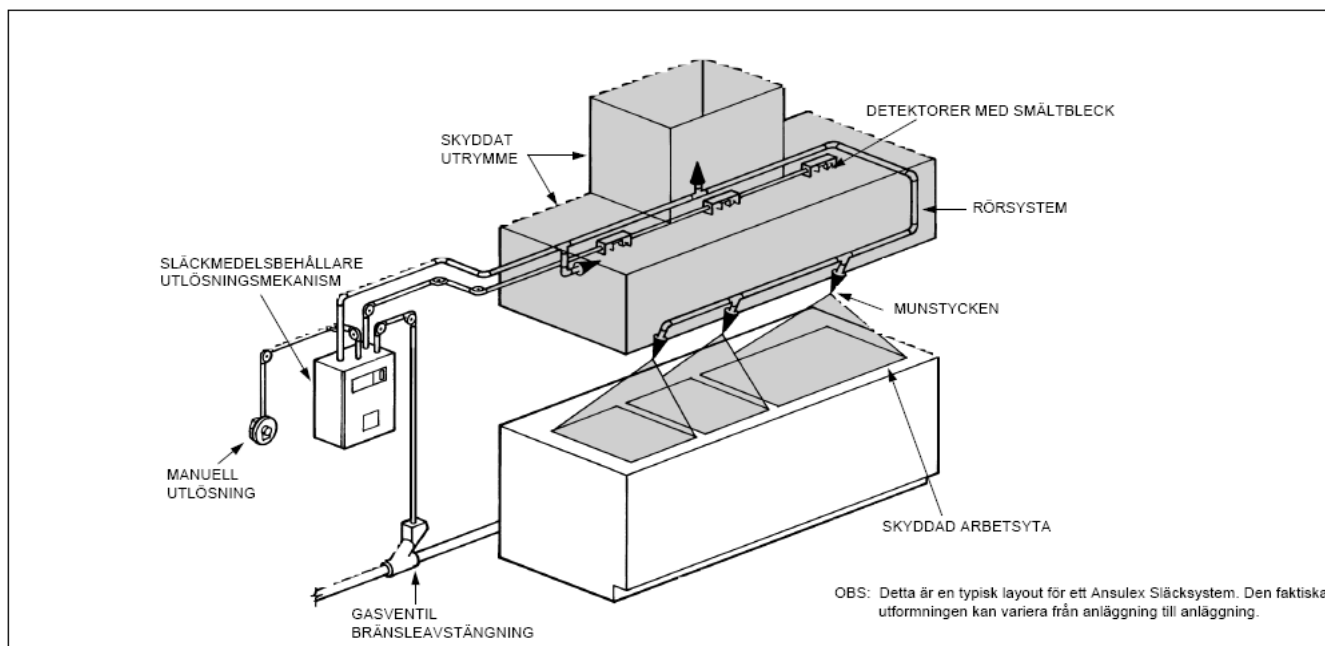
The fire suppression system installed is of very high quality. It has been designed to be extremely reliable and has been built in accordance with stringent quality standards. The technology is based on more than 30 years' experience of systems in operation, and the system has been customised for the application in question.

Managed correctly, the system will provide effective fire protection for many years. In this manual, however, we would like to mention additional measures that can reduce the risk of fire. By bearing in mind the following points, the owner himself can significantly reduce the risk of extensive damage.

1. Keep all kitchen equipment clean and free of fat deposits.
2. Never use combustible degreasing agents or detergents. Remnants from these can cause ignition.
3. Make sure that the ventilation is always operating when kitchen equipment is switched on and while it is cooling down. This prevents an unnecessarily high level of heat collecting beneath the ventilation hood and reduces the risk of incorrect activation.
4. Never work beneath kitchen hoods fitted with filters when the filters have been removed. This can result in fat collecting in hoods and ventilation hoods. Only use original filters.

5. Never block the supply air, as this can seriously reduce the effectiveness of the ventilation system.
6. If a fat removal system is used, follow the manufacturer's instructions carefully to ensure that fat is removed effectively.
7. Never try to move, remove or in any other way affect the system and/or its component parts, e.g. nozzles, detectors, tanks, etc.
8. Always contact your authorised Ansul distributor before making any changes or renovations that might affect the kitchen and its design. The Ansulex Fire Suppression System is customised for the application in question in accordance with the guidelines and rules issued by the manufacturer. These guidelines are based on extensive testing and research. Any deviations may seriously compromise the performance of the fire suppression system.
9. Service must be performed by your authorised Ansul distributor or by a service company licensed by them. Service must be performed in accordance with the manufacturer's guidelines twice a year and after actuation or renovation of the system. It is extremely important that service is performed correctly and within the prescribed time.
10. Make sure that instructions and other documentation are easily accessible and that all employees are very familiar with action in connection with a fire.
11. Make sure that an adequate number of hand-held fire extinguishers are available and that these are at suitable locations in the premises. Your authorised Ansul distributor can help you to optimise your fire protection.

HOW YOUR ANSULEX FIRE SUPPRESSION SYSTEM WORKS



1. A fire starts in the protected area.
2. The fusible links detect the fire and actuate the system.
3. The kitchen equipment is switched off immediately. Depending on the kind of equipment, this can be achieved in different ways and varies from one system to another.
4. The fire suppression agent is released and distributed with the aid of nozzles in filters, ventilation ducts and kitchen equipment.
5. The fire suppression agent reacts with the hot fat and forms a blanket of foam, which captures the combustion gases and prevents re-ignition. This blanket must be left untouched.

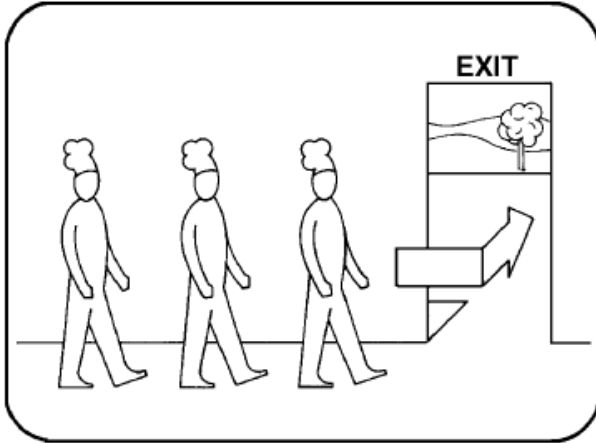
INSPECTION OF YOUR ANSULEX FIRE SUPPRESSION SYSTEM

Your Ansulex fire suppression system should be inspected at least once a month. If you discover any deviations or faults, contact your authorised Ansul distributor at once.

1. Never use aggressive detergents on fusible links or cables. Check that fusible links and cables are totally free of corrosion and any other damage or contaminants. Certain basic detergents can cause corrosion.
2. Make sure that all fusible links are replaced at least once a year. Old fusible links can cause faulty actuations or malfunction in the event of a fire.
3. Check that the cabinet with the actuation mechanism is free of any visible marks or damage, and that all seals are intact.
4. Perform daily checks to ensure that no visible pipe parts are loose. Make sure that the nozzle heads are in place and that they are not covered with fat. Remove the nozzle heads and feel them to make sure they are not brittle, and then re-attach the nozzle heads.
5. Check metal nozzle heads by turning them around the nozzle, which should be achieved easily.
6. Inspect the actuation cabinet at regular intervals and make sure that the system is primed.
7. Arrange for your authorised Ansul distributor to perform an inspection and service every six months, and also after every major cleaning and/or renovation of hoods and kitchen equipment. The detectors may have become blocked during work to prevent accidental actuations, which will mean that the system can no longer be actuated automatically. There is also a risk that your system has been damaged or disconnected, or has accumulated so much fat that the system no longer works.
8. Check that the manual actuator is free of any damage and has not been blocked.
9. Make sure that the fire suppression agent tanks are stored in an area where the temperature never falls below 0°C or rises above 54°C.
10. Make sure that the fire suppression agent tank cannot be heated to temperatures any higher than 54°C because of nearby heat sources or other circumstances that might cause the fire suppression agent tank to be heated to temperatures in excess of 54°C.

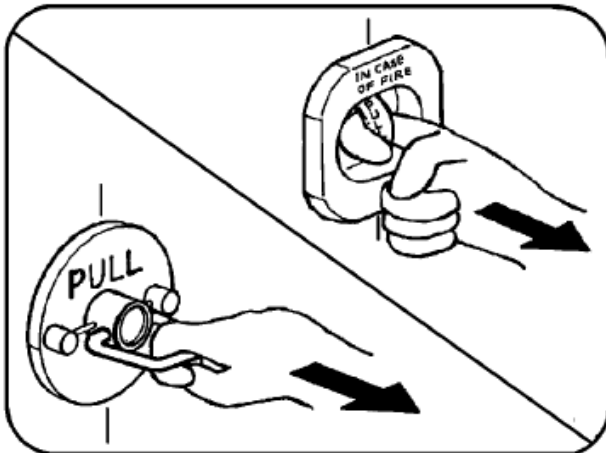
IN THE EVENT OF A FIRE

1. Evacuate everyone. Announce in a loud, clear voice: "FIRE. PLEASE LEAVE THE BUILDING QUICKLY, BUT IN AN ORDERLY MANNER."



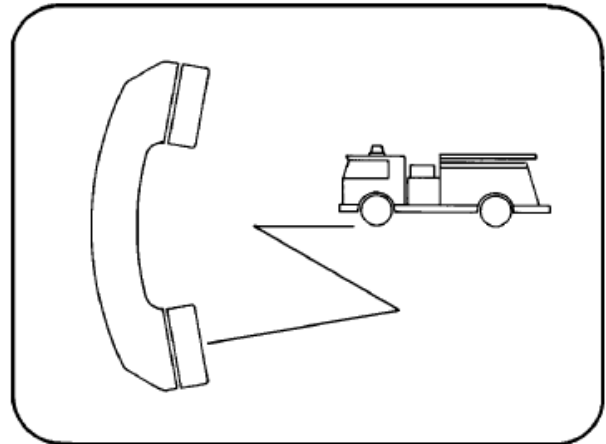
2. If the automatic control has not actuated the system, activate the system as follows:

Pull the handle on the manual actuator straight out, with sufficient force to brake the seals and actuate the system.



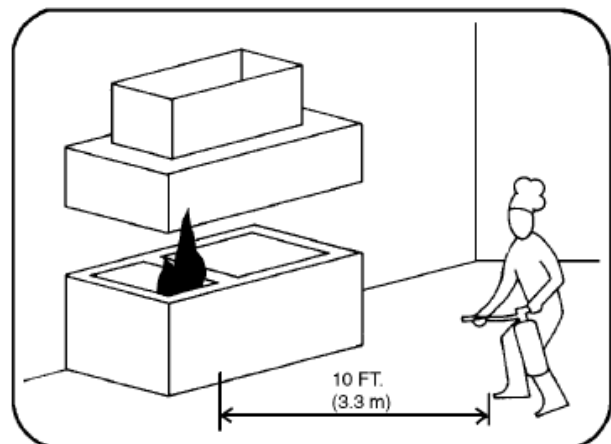
As soon as the fire suppression system is activated, the kitchen equipment connected to the system will be switched off.

3. Call 112 and contact the fire brigade.



4. Be prepared with hand-held fire extinguishers in case additional extinguishing action becomes necessary. If additional extinguishing action proves necessary:

- a. Pull out the pin from the hand-held fire extinguisher.
- b. Maintain a distance from the fire of at least 3.3 metres
- c. Aim at the base of the flames, actuate the extinguisher and let the spray sweep from side to side.



WARNING

Do not attempt to fight the fire with a hand-held fire extinguisher before the fire suppression system has been activated automatically or has been activated using the manual actuator.

BEFORE YOU CAN RESUME OPERATIONS

1. Contact your authorised Ansul distributor immediately after the system has been actuated, so that the system can be reloaded and rectified as required.
2. Have your authorised Ansul distributor confirm the reason why the system was actuated.
3. The equipment must be cleaned using soap and hot water within 24 hours of the system having been actuated.

CLEANING

ANSULEX and ANSULEX LpH fire suppression agents do not require any special cleaning methods. However, because of their basic properties it is extremely important that cleaning takes place within 24 hours of the system have been actuated. When the fire suppression agent reacts with hot fats or oils, a soapy by-product is formed, which can be wiped away using a cloth or sponge. When cleaning, the following procedure must be observed:

WARNING

Before any cleaning activity starts, all power sources for equipment to be cleaned must be switched off. Make sure that fans, dampers, kitchen equipment, etc. are switched off and that the power is disconnected so that there is no risk of electric shock caused by the cleaning process and/or electrically conductive basic agent or residues of this.

Make sure that all surfaces to be cleaned have cooled to room temperature.

Do not use water to clean equipment containing hot fats or oils, as this can result in significant steam generation and/or splashing.

1. Even though the Ansulex fire suppression agent is not toxic, fats, oils and food products that have come into contact with the fire suppression agent are not usable as food and must therefore be discarded.
2. Wipe off as much of the fire suppression agent as possible using a sponge or clean cloths. Used cloths and sponges must be handled in accordance with the instructions issued by local cleaning and environmental authorities.

NB:

Use rubber gloves while cleaning, as skin irritation can occur. Rinse generously with clean water if any of the fire suppression agent or residues of it come into contact with the skin or eyes.

3. Use a clean cloth or sponge and a hot soap solution to remove the soapy residues. Clean all surfaces that have come into contact with the fire suppression agent with care. NB: Use rubber gloves while cleaning, as skin irritation can occur. Rinse generously with clean water if any of the fire suppression agent or residues of it come into contact with the skin or eyes.
4. Once all surfaces have been carefully cleaned, rinse and allow the equipment to dry properly before reconnecting the power/gas.

WARRANTY

A. Ansul Products

The ANSULEX fire suppression system is guaranteed for the original buyer for a period of five years, with the exceptions described under item B below, in respect of defects in material and/or design. Ansul Inc. ("ANSUL") will replace or repair any metal part that ANSUL considers to be defective and that has not been manipulated or subjected to misuse, vandalism or highly corrosive substances.

B. Products from secondary suppliers

The following products, which were not manufactured by ANSUL but were purchased from secondary suppliers, are guaranteed in respect of faults caused by the manufacturer's production, design and/or components for a period of one year: detectors, electrical actuators, time relays, thermostats, solenoids, switches, fuel shut-off valves and pressure relief valves. An assessment of any claim under warranty for such components that have been returned to ANSUL will be performed by the relevant secondary supplier's representative, and their assessment will be final.

- C. In addition to what is stated in A and B, ANSUL offers no further guarantees, either express or implied, relating to this system. There are no guarantees in respect of, BREAKDOWN SHUTDOWN or LOSS OF INCOME, and ANSUL shall not be held liable for such or similar damage.

For repairs, spare parts or service for your Ansulex fire suppression system, please contact your Ansul distributor or Ansul Inc. Marinette, Wisconsin 54143-2542; 800-TO-ANSUL (862-6785).

IN CONNECTION WITH MAINTENANCE

Applicability

These instructions apply in general for all fire suppression systems for restaurant kitchens of the make Ansul model R-102.

Depending on how the system is designed, non-applicable parts are removed.

The system is structured in accordance with NFPA 17A (Standard on Wet Chemical Extinguishing Systems).

Time intervals

A functional check must take place at least every six months. An audit inspection must be performed at least every ten years. The propellant gas cartridges must be pressure-tested every ten years, ideally in connection with the audit inspection.

Authorisation

The inspection must be performed by Dafo or by a service company authorised by Dafo.

Read the safety regulations.

Read the safety regulations carefully before any work is carried out on oven hoods, e.g. renovation, soot removal, etc.

Safety regulations

Propellant gas cartridge

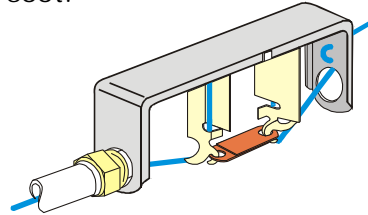
The propellant gas cartridges are loaded with nitrogen gas, N₂.

The pressure in the cartridge is high, normally approx. 145 bar. Which provides a very strong reaction time when activated. The cartridge may therefore only be opened when it is mounted in the actuation mechanism and all connections and hoses are fitted. A loose cartridge must therefore always be handled with care and with the cover nut mounted.

Detection and automatic actuation

The automatic actuation of the system is applied using mechanical detectors with fusible links, connected in a tightened cable system for the actuation mechanism in the actuation cabinet. If fire breaks out, the fusible link breaks and the cable control activates the propellant gas cartridge, which in turn pressurises the fire suppression agent tank and forces the fire suppression agent through the nozzles.

The fusible links are fitted in detector loops that are located behind fat filters and next to exhaust air ducts. If the fusible links are damaged, there is a risk that the system may be actuated by accident or not actuated at all in the event of a fire. The fusible links must be kept clean of fat and soot.



Before works

- Unscrew the cover from the actuation cabinet. Position the lock key as shown in Figure 1.

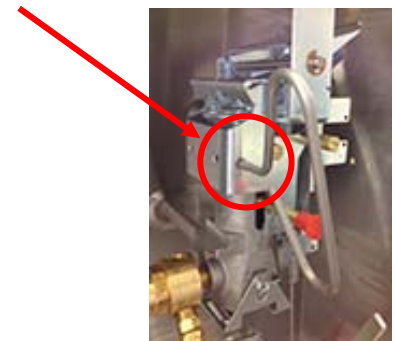
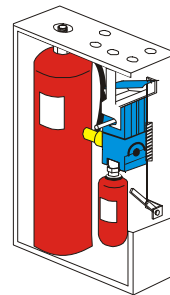


Figure 1. Lock key installed in actuation mechanism.

- Lift the spring tightener to the upper position so that the detector cable becomes slack. See Figure 2.

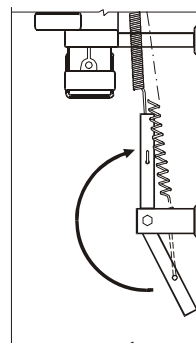


Figure 2. Spring tightener in upper position with slack detector cable.

- Unscrew the propellant gas cartridge and fit the cover nut. Store the cartridge in a safe place.
- The system has now been taken out of operation and work can commence.

After works

- Check that the fusible links are undamaged and that they are in the same position as before.
- Remove the cover nut and screw in the propellant gas cartridge. Tighten firmly by hand.
- Move the spring tightener to the lower position so that the detector cable is tightened.
- Check that the lock latch is loose. The tensioning shaft (with the red plastic cap) must be hooked onto the actuation loop. See Figure 1, lower edge.
- Carefully remove the lock latch.
- The system is now in operation.
- Screw the cover back onto the actuation cabinet.

SERVICE AGREEMENT FOR FIRE & RESCUE EQUIPMENT

Customer

Invoicing address _____

Service address (if other than invoicing address) _____

Customer: _____

Building/shop/ship/
machine, etc.: _____

PO Box or street address: _____

Postal address: _____

Street address: _____

Corporate ID number: _____

Place/home port _____

Reference: _____

Contact person: _____

Tel.: _____

Tel.: _____

Service object and scope of the work

This agreement covers all fire protection equipment of the following kinds:

- Fire extinguishers..Number when agreement signed.....
- Fire hydrantsNumber when agreement signed.....
- Fire suppression system Number when agreement signed.....
- Emergency light luminaires Number when agreement signed.....
-

Time interval for service: Regular service month:.....

Notification: yes no

A separate register of fire-fighting equipment, including location, extinguisher numbers (if relevant) or similar is drawn up after the first service.

Inspection performed once every six months. This inspection does not replace the regular check that the owner or user should perform at least once a month.

The inspection must be performed no earlier than two months before and no later than two months after the regular service time.

Charges

Billing takes place as follows:

- Cost per unit when the agreement is concluded SEK.....
- Total cost of servicing all fire & rescue equipment under this agreement. Cost when agreement concluded SEK
- Ongoing billing of hours worked and travel expenses in accordance with separate price list.

Cost of equipment and any repairs is not included in the price of the service.

When billing per service object, there is an additional basic charge, currently SEK 225, to cover items such as travel expenses.

These prices are adjusted once a year according to the SCB labour cost index for the industry.

VAT is added.

Comment:

In return for the specified charge, Dafo Brand AB undertakes to perform inspection and service of fire-fighting equipment in accordance with the terms and conditions of this agreement. See also page overleaf. The agreement is valid for two years and is renewed automatically for one year at a time, unless written notice to terminate is served in writing by either party no later than two months before expiry of the agreement period.

The agreement has been produced in two copies, of which each party has received one.

Place and date: _____

Place and date: _____

Service company: _____

Customer: _____

Signature: _____

Signature: _____

Name (block capitals): _____

Name (block _____

Mobile tel.: _____

Direct tel./
Mobile tel.: _____

Contract terms

Applicability

These terms and conditions of the agreement apply for the signed service agreement between Dafo Brand AB and the customer, specified overleaf. The terms and conditions only apply for inspections and repairs of fire-fighting equipment and for the sale of spare parts for fire-fighting equipment. They do not apply for new sales.

Service object and workplace

The work covers inspection, service and repairs of fire-fighting equipment in accordance with the register in the agreement.

Inspection and service normally take place at the customer's premises. Re-filling and audits of gas canisters and the reloading of pressurised fire extinguishers take place in the workshop, which is why in the first instance a replacement system is applied.

Service work

Inspection and service take place in accordance with the provisions and instructions of Swedish authorities, Swedish standards, the relevant manufacturer's instructions and the industry's guidelines and recommendations.

If the customer so requests, the work includes issuing instructions about the handling and care of the equipment, and the performance of a general assessment of fire protection and the issuing of suggested improvements.

Work that is not included in the service agreement includes, for example, training of the customer's personnel. This can be provided for an additional charge.

Service date and notification

The inspection must take place at specific intervals and during the month specified overleaf. The inspection must be performed no earlier than two months before and no later than two months after the regular service month.

Notification before the inspection only takes place if specified separately in the agreement.

If the service company attends the customer and work cannot be performed, or if the customer declines to have the work performed, the service company is entitled to compensation for actual costs of working hours and travel. This does not apply if the service company has failed to notify the customer and the agreement specifies that notification must take place.

Approvals and authorisations

Dafo Brand AB undertakes to maintain the authorisations and approvals required for the performance of the work.

Billing

Billing of regular inspections takes place in accordance with one of the following three principles, as agreed overleaf:

1. Price per service object – A fixed price is billed per service object. Price per unit is applied to fire extinguishers, fire hydrants and bucket sprays. Fire suppression systems, fire suppression units and fire hydrants with parallel hoses are billed at a different price. A basic charge is added to cover travel expenses, etc.
2. Total price - A fixed price for all fire-fighting equipment in accordance with the agreement. Basic charge, travel time or travel expenses not added.
3. Open account – Actual costs of hours worked, travel time and travel expenses are billed.

In all billing options, the costs of equipment, reloading and other repairs, as well as any audit inspection of gas canisters, are billed additionally.

Fixed prices as described in items 1 and 2 assume that the date for the inspection can be decided by the service company. If the customer wishes the work to be carried out at another time that does not correspond with the service company's planning, costs of hours worked and travel will be added.

If work is carried out at times other than during the regular inspection, e.g. reloading and repairs, the actual costs of hours worked and travel are billed.

Prices

Prices shall correspond with the price list in force on the delivery date or confirmed by separate agreement. For services not covered by the current price lists, Dafo reserves the right to change the price in accordance with SCB's labour cost index for the engineering industry incl. labour tax.

Payment

Payment terms are 30 days net against invoice.

Warranties

A one-year warranty is provided for work carried out and equipment supplied. Defects are rectified during the warranty period at no cost to the customer.

The warranty provisions are regulated in accordance with the terms and conditions in the general delivery provisions.

Liability

Product liability is regulated in accordance with the rules of the Swedish Product Liability Act.

Insurance

Dafo Brand AB undertakes to maintain a liability insurance policy.

Terms of delivery

In addition to the terms and conditions in this agreement, the current version of the general terms of delivery of the Swedish Firefighting Equipment Association, SVEBRA L-92, apply.

Transfer

The agreement may not be transferred to a third party without the consent of both parties.

Termination

Notice to terminate the agreement may be served in writing by either party no later than two months before the expiry of the agreement period.

The agreement may be terminated without notice in the following instances:

- a) by the customer, if
 - Dafo does not have authorisation issued by an authority or insurance company for work under this agreement
 - or if Dafo Brand AB in any other way is in breach of the agreement and fails to fulfil its obligations.
- b) by Dafo Brand AB, if
 - the customer's payment is not received, is delayed or if it may be expected on reasonable grounds that the customer is having difficulties with payments
 - the customer does not follow official instructions and ordinances with regard to fire protection equipment
 - or if the customer is in any other way in reach of the terms and conditions in this agreement.

If the customer fails to serve notice on the agreement in connection with another service company taking over and performing service, Dafo Brand AB is entitled to claim compensation for actual costs of hours worked and travel incurred by Dafo.

TYPE APPROVALS OF THE ANSULEX® FIRE SUPPRESSION SYSTEM



DET NORSKE VERITAS
TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. F-17677
This Certificate consists of 3 pages

This is to certify that the
Fire-extinguishing system for protection of galley extract ducts
with type designation(s)
Ansul R-102

Manufactured by
Ansul Incorporated
Marinette, WI 54143-2542, United States

is found to comply with
Det Norske Veritas' Rules for Classification of Ships
Det Norske Veritas' O'Labore Standards
Det Norske Veritas' Interpretation of SOLAS 1974 Convention as Amended

Application
Approved for use as a fixed fire fighting system in galley ventilation ducts

Place and date
Havik, 2004-12-10
for DET NORSKE VERITAS AS



Kristin Urdahl
Head of Section




This Certificate is valid until
2008-12-31



Kathrine Ilje
Surveyor

Local Office
DNV New York

Notice: This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.



Cert. No.: F-17677
File No.: 474 47

Product description

Ansul R-102 is a wet chemical fire suppression system for protection of galley ventilation ducts. The system consists of liquid agent storage tank, pressure cartridges, nozzles, piping and a release system.

Application/Limitation

The enclosed part of the duct between the lower damper (SOLAS Ch.II-2, Reg.16.7.2) and the first fire damper in duct outside galley should be protected as follows:

Diameter of duct	Nozzle	Material	Flow Number per nozzle
220 mm or less	1W	Chrome Plated	1
220 mm - 610 mm	2W	Chrome Plated	2

Maximum distance between nozzles should not exceed 2.5 m. If automatic release of the extinguishing media is provided, the fire dampers in above defined duct should be closed before the system is activated. The system may also be used for protection of other areas (galley hoods, deep fat fryers, etc.) if no specific requirements apply to the areas in question.


ANSULEX units should be provided as follows:


Flow no.	Foam tanks	Release Cartridge Options (either N ₂ or CO ₂)	
		Nitrogen	CO ₂
1 - 5	1.5 Gal (5.7 l)	LT-20-R (7032)	101-10 (15850)
6 - 11	3.0 Gal (11.4 l)	LT-30-R (5373)	101-20 (17492)
11 - 16	3.0 Gal + 1.5 Gal	Double (73022)	101-30 (15851)
16 - 22	Two 3.0 Gal	Double (73022)	101-30 (15851)

Any combination of the above foam tanks to provide larger protection arrangement is accepted. Release cartridge options for such units larger units see Ansul system documentation.

Maximum pipe length and rise should not exceed the limitation in the type approval documentation (12 m horizontal + 2 m rise for supply line, 2.5 m horizontal + 1.2 m rise for duct branch line). Ambient air temperature should be between 0 °C and 54 °C. Heating or cooling facilities will be required for areas where these temperature limits may be exceeded. Pressure containers are to be manufactured and designed according to a recognised standard.

Each product is to be supplied with its manual for installation/application, use and maintenance.





Cert. No.: F-17677
File No.: 474 47

Product description

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SAFETY DATA SHEET – ANSULEX FIRE SUPPRESSION AGENT

1. PRODUCT AND COMPANY**1.1 Product identification**

<i>Name</i>	<i>Version/packaging</i>	<i>Article number</i>
Ansulex fire suppression agent.....	5.7 litre can	55-1619-01
Ansulex fire suppression agent.....	11.4 litre can	55-1619-03

Usage

Fire suppression purposes

1.2. Company information*Distributor:*

Name: Dafo Brand AB
Address: Box 683
SE-135 26 Tyresö
Tel.: +46 (0)8 506 405 00
Fax: +46 (0)8 506 405 99
Email: info@dafo.se

1.3 Emergency phone numbers

Poisons Information Centre (emergency): 112

Poisons Information Centre (non-emergency): 31 (0)8-33 13 46

2. COMPOSITION AND COMPONENT PARTS

<i>Substance</i>	<i>EU no.</i>	<i>CAS no.</i>	<i>Content</i>	<i>Risk classification *</i>
Potassium nitrite.....	231-832-4	7758-09-0	0.05%	R8, R25; R50
Flourescein - Potassium .	208-255-0	518-47-8.....	0.011%	

* See section 16 for the full wording of the R-phrases.

3. HAZARDOUS PROPERTIES

Labelling not mandatory. It is forbidden to heat this agent to higher than +60°C.

4. FIRST AID

Eye contact..... Rinse with plenty of water for at least 15 minutes. Keep eyes wide open and remove contact lenses (if relevant). Contact a doctor if irritation persists.

Skin..... Wash with soap and water. No serious risk or effect. In the event of contact with clothes, these must be removed and washed before they are reused.

Inhalation..... Make sure that the person gets fresh air. If irritation persists, contact a doctor.

Ingestion..... Rinse mouth with water and drink plenty of water.
It is recommended that medical advice be sought. Always contact a doctor if larger amounts are ingested or if discomfort persists.**5. WHAT TO DO IN THE EVENT OF FIRE**

The product does not burn. The liquid combined with water is a suppression agent.

Special risks..... After the fire has been extinguished, the agent should be removed from equipment that is sensitive to corrosion.

Unsuitable methods of extinguishing:

There are no fire suppression agents that cannot be used for safety reasons.

6. WHAT TO DO IN THE EVENT OF ACCIDENTAL LEAKAGE

Personal protection ... Protective glasses and rubber gloves should be worn. In the event of major exposure, boots and other protective clothing should be used.

Environment No environmental impact is expected in connection with intentional discharges.

Cleaning Collect small amounts using an absorbent.
Larger amounts should be pumped into a waste container.
Wipe and rinse with water.

Electrical safety Switch off power sources in the immediate vicinity.

7. HANDLING AND STORAGE

Handling Avoid contact with eyes and skin. Protective glasses and rubber gloves must be used. Make sure there is good air circulation in enclosed rooms.

Storage Store in closed original packaging or in designated tank or other vessel.

8. LIMITATION OF EXPOSURE/PERSONAL PROTECTION

Ventilation Good general ventilation.

Eye protection Protective glasses are recommended if there is a possibility of splashing.

Hand protection Use suitable protective gloves when handling.
Protective gloves in the following materials are recommended: Butyl rubber

Skin protection Protective clothing is recommended if there is a risk of skin contact.

Respiratory protection Respiratory protection is recommended in small rooms with poor air circulation, if there is a risk that mist/spray/steam may be formed. Suitable respiratory protection device: Half-face mask for organic vapours with pre-filter for dust/spray.

Hygiene Do not eat, drink or smoke when handling this product. Wash exposed area carefully with soap and water. Wash hands after handling and before meals.

9. PHYSICAL AND CHEMICAL PROPERTIES

Product description.... liquid

Odour weak

Colour light yellow/green

Boiling point 113°C

Density 1.33 g/ml

Solubility in water 100%

10. STABILITY AND REACTIVITY

Stability and reactivity:

The product is stable in normal storage and use.

Hazardous transformation products:

In the event of fire, the following products may be formed: carbon monoxide, carbon dioxide.

Substances that should be avoided:

Metals that react with water.

The substance conducts electricity and can cause a risk of personal injury when used close to electrically conductive equipment.

11. TOXICOLOGICAL INFORMATION

- Eye contact Can cause irritation. No chronic effect known.
- Skin contact Can cause mild irritation. No chronic effect known.
- Inhalation Irritates mucous membranes. No serious or chronic effect known.
- Ingestion Ingestion of large volumes can cause pain and vomiting, and can have a narcotic effect or cause unconsciousness. No chronic effect known.

12. ECOLOGICAL INFORMATION

- Biodegradability Not confirmed.
- Bioaccumulation Not confirmed.
- Acute eco-toxicity Not confirmed.
- Mobility The product is soluble in water and thus moves easily in watercourses and ground/surface water.
- Other information There is no ecological data for the product as such.

13. WASTE MANAGEMENT

- Disposal Large volumes should be pumped or poured into a waste container for disposal by a cleaning contractor in accordance with authority regulations.
- Neutralisation Not needed.
- Waste Small volumes, up to a couple of litres, can be rinsed down the drain. Large volumes should be incinerated or composted. The method and contractor must comply with current regulations. Not hazardous waste.
- Suggested EWC code. 07 01 99; Other waste
- Packaging Rinse empty vessel with water and reuse or handle as plastic waste.
- Otherwise, apply local authority regulations and the cleaning contractor's rules.

14. TRANSPORT INFORMATION

There are no special transport restrictions. The product is not classified as hazardous goods according UN rules. Take care not to damage the storage vessel.

15. CURRENT REGULATIONS

- The product is classified as an irritant.
- Marking hazard symbol Xi (irritant).
- Risk phrases R36/37/38- Irritates the eyes, respiratory organs and skin.
- Protection phrases S26- In the event of contact with the eyes, rinse at once with plenty of water and contact a doctor.
S36- Use suitable protective clothing.



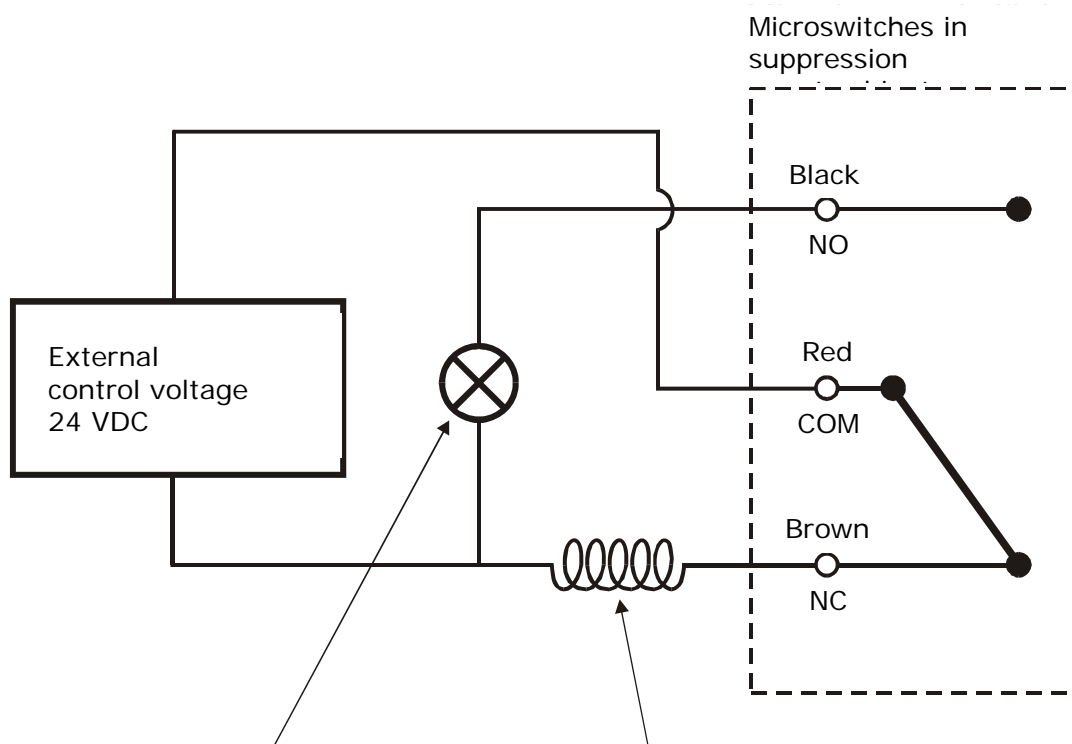
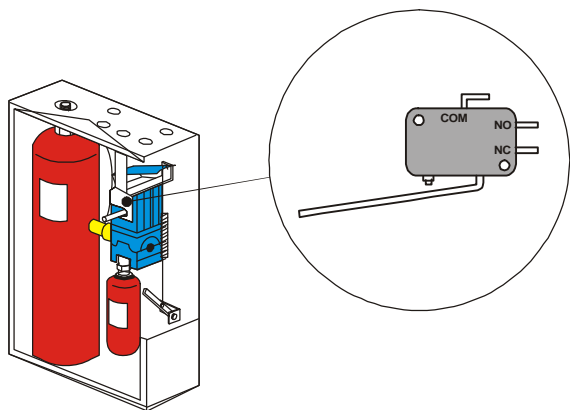
Irritant

16. OTHER INFORMATION

- R8 – Contact with combustible material can cause a fire.
- F25 – Toxic when ingested.
- R50 – Highly toxic for aquatic organisms.
- The product is a fire suppression agent. No other use is permitted.
- The information in this document is based on the manufacturer's information and our current knowledge. This information is a supplement to other information. The user must decide for himself whether this information is sufficient. Dafo Brand AB is responsible for product safety and facts.

CONNECTING MICROSWITCHES

CONNECTING OF POWER SHUT-OFF VIA MICROSWITCHES.



Connection of external alarm (if relevant).
NB: Must have same voltage as external control voltage.

Relay/Contactor coil adapted to relevant control voltage.
 Kitchen equipment must be connected to that the voltage is connected in drawn mode.
 Relay/Contactor coil must be adapted to power supply of connected kitchen equipment.

AUTHORISED SERVICE PROVIDERS FOR THE ANSULEX[®] FIRE SUPPRESSION SYSTEM

We have authorised service providers all over Sweden.

See our website www.dafo.se for further information.

