

... and fires are nipped
in the bud.

Gas extinguishing systems

Safe for certain.

MINIMAX

PRODUCT

EXTINGUISH FIRES WITHOUT LEAVING A TRACE

A fire often spells ruin, especially if valuable equipment, goods and machinery are damaged. The earlier a fire is detected and extinguished, the smaller the consequential damage, including forced standstill of your operation.

Our stationary fire-fighting systems based on extinguishing gases protect life and property without damaging the environment. They offer several advantages over conventional extinguishing methods, as extinguishing gases leave no traces behind once the fire has been extinguished and do not in any way affect the protected goods, equipment and buildings.

Minimax has developed three different fire protection concepts based on extinguishing gases. All systems are tailor-made to suit the actual situation on site and your safety needs:

Fire fighting by means of displacement of oxygen with inert gases such as argon, nitrogen and carbon dioxide

With this method, fires are extinguished by displacing the oxygen at the seat of the fire. The fire is thus simply suffocated. The inert gases also absorb some of the heat generated by the fire, further limiting the damage. Carbon dioxide, argon and nitrogen are commonly available inert gases and can be purchased virtually everywhere at any time.

Argon and nitrogen are natural gases and their handling and use is basically unrestricted as regards emission limits. As these substances are stored as gases, there is no drop in temperature that could damage equipment when they are

released. The density of argon is similar to that of air, so that an effective and homogenous gas mixture can be achieved within the entire protection area, reaching from the floor to the ceiling. Nitrogen is particularly suitable for the extinction of liquids on fire, as already low gas volumes are effective. The extinguishing capacity of carbon dioxide has been proven over many decades. As the gas is liquid under pressure, it can be easily stored even where space is limited. Carbon dioxide is the preferred extinguishing gas for the protection of outdoor facilities and rooms that are not frequented by people or where persons can easily escape before the gas is applied. In order to protect the environment, Minimax favours the use of naturally occurring gases from the air.



Fire fighting with hydrofluorocarbons (HFCs)

HFCs are synthetic extinguishing agents and have both chemical and physical fire-fighting properties. These protection systems are particularly suitable for facilities where short gas release periods are of the essence. They provide excellent protection for valuable and delicate goods and buildings where fires could spread very quickly. The agents are stored in liquid form in pressurised cylinders,

and only a very small gas volume is required to reach the effective extinguishing concentration. We generally recommend the use of HFCs only in connection with facilities where a fast response is required, while space is restricted and a lightweight solution must be found.

Preventive fire fighting by means of permanent inertisation with nitrogen

In a permanently inerted environment, it is physically

impossible for fires to start. By increasing the nitrogen concentration in the ambient air, the oxygen content is permanently lowered to a limit that is in line with the actual fire risk. This method is particularly effective and economical for the protection of closed rooms that are only rarely accessed by people.

APPLICATION

VERSATILE

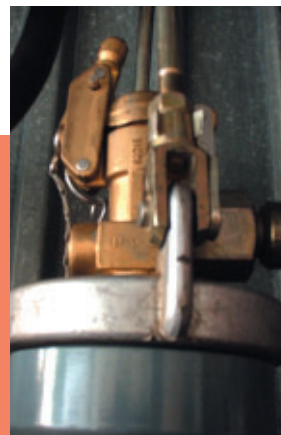
Minimax gas extinguishing systems are typically used for the protection of high-value electrical and electronic equipment such as

- ▶ IT and telecommunications systems
- ▶ Switching and control units
- ▶ Transformers

and special risk areas, e.g.

- ▶ Storage facilities for hazardous goods
- ▶ Dye and foam production plants
- ▶ Hydraulic units
- ▶ Silos and dust filters
- ▶ Printing presses
- ▶ Turbines
- ▶ Archives

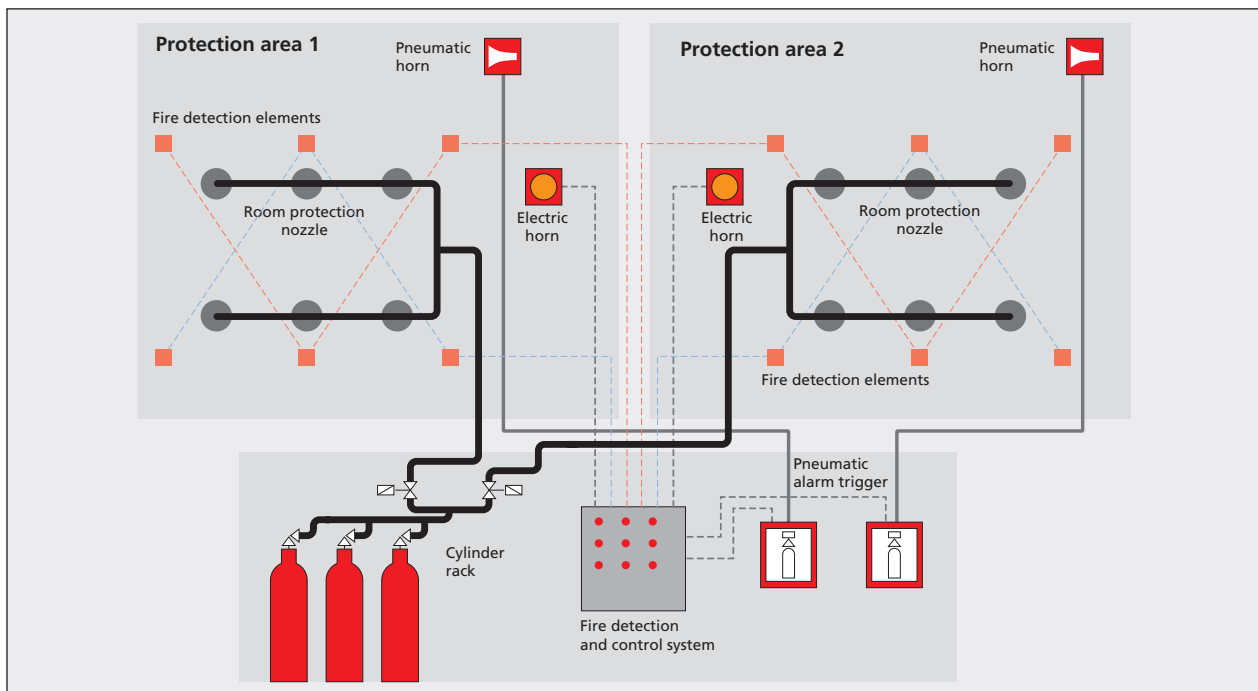
Minimax has over 100 years of experience in the development, production, installation and maintenance of fire protection solutions.



Please take note of the country-specific delivery programme.

FUNCTION

GAS EXTINGUISHING SYSTEM



Minimax gas extinguishing systems meet the highest standards as regards availability, effectiveness in the event of a fire and reliability. In order to achieve this, the control system, tripping devices and gas cylinders are in a separate room where they are fully protected against fire. Sensors continuously monitor the availability and the status of the various components. The fire detection devices are specifically chosen and tuned to suit the actual fire indicators and disturbance variables.

The nozzles installed in the protection areas are optimised to ensure that the fire extinguishing gas is evenly distributed and that the necessary concentration is built up in a minimum of time. The system is triggered and controlled manually, or automatically by the fire detectors.

Prior to the release of the gas, people are urged by a visual and audible alarm to evacuate the building. All ventilation and air-conditioning systems are automatically switched off, while air flues and doors

are shut and locked. The extinguishing gas is stored in high-pressure steel cylinders held in a rack. The automatic weighing unit continuously monitors the available quantity of extinguishing agents. Our 300-bar cylinders for argon and nitrogen allow you to save up to 30 % of space compared with conventional storage systems. For large volumes of carbon dioxide, we recommend installing low-pressure tanks, as they tend to be more economical.

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For detailed information, please refer to the Minimax product sheets.

GAS EXTINGUISHING SYSTEM
INERT GAS



Argotec®
with carbon dioxide

Safe for certain.

MINIMAX

APPLICATION

VERSATILE

Reliable extinguishing

Fighting fires quickly and effectively is the strong point of Argotec® extinguishing systems with carbon dioxide. The extinguishing effect of carbon dioxide is due to the fast displacement of oxygen from the source of the fire – the fire is smothered suddenly. The high heat binding capacity of the carbon dioxide causes the withdrawal of energy from the source of the fire, which enhances the extinguishing effect.

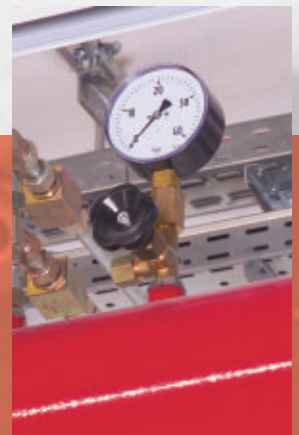


Possible only with carbon dioxide

Argotec® extinguishing systems with carbon dioxide are especially well-suited for high risk areas, where in case of a fire it is necessary

- ▶ to keep the protected objects available and functioning,
- ▶ to minimize operational interruptions after a fire,
- ▶ to prevent reactions between the burnt material and the extinguishant,
- ▶ to prevent damage from the extinguishant itself and
- ▶ to ensure effective extinguishing for objects in areas with difficult access (3-D extinguishing effect).

Argotec® extinguishing systems with carbon dioxide, due to their special extinguishant properties, feature advantages over other inert gas extinguishing systems: Even free-standing objects in a room can be protected. The liquefied carbon dioxide forms a thick aerosol cloud in the flooding zone. Special local application nozzles put the extinguishant precisely at the object to be protected.



Due to its outstanding properties, the Argotec® extinguishing system with carbon dioxide is the ideal fire protection solution for many areas of application.

Typical areas of application for the Argotec® extinguishing system with carbon dioxide are:

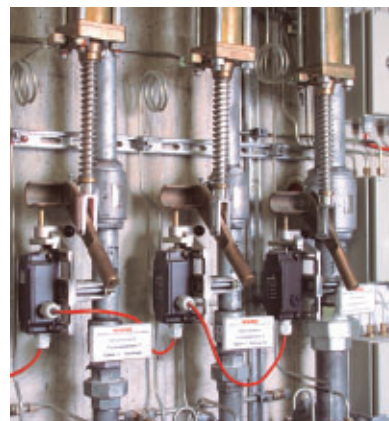
- ▶ switching and control systems
- ▶ turbines
- ▶ transformers and substations
- ▶ warehouses for hazardous materials
- ▶ machine tools and special metal processing systems
- ▶ paint and varnish manufacturing and processing areas
- ▶ painting and powder-coating booths (ESTA)
- ▶ hydraulic systems
- ▶ false floors and cable shafts
- ▶ silos and dust filters
- ▶ printing machines

- ▶ engine test benches and ship engine compartments
- ▶ computer and telecommunication systems and facilities
- ▶ medical facilities
- ▶ control rooms
- ▶ data archives
- ▶ art objects

Optimized and individually customized

The required quantity of extinguishant depends on the volume and surface of the protection zone, the quality (e.g. gas impermeability) and the type of assets to be protected. The size of the pipe network and the location of the extinguishing nozzles are based on the risk area, while the extinguishing nozzles themselves are evenly distributed throughout the entire flooding zone. For the protection of special facilities, the nozzles are installed directly within the object, such as in electric switching cabinets, false floors for cables or machine tools.

If several flooding zones are connected to a common extinguishant supply, the gas is released for each zone via selector valves.



With more or less pressure

The carbon dioxide is supplied in high-pressure cylinders or low-pressure vessels. The optimum supply method depends on the quantity of extinguishant required and the particular circumstances.



STORAGE

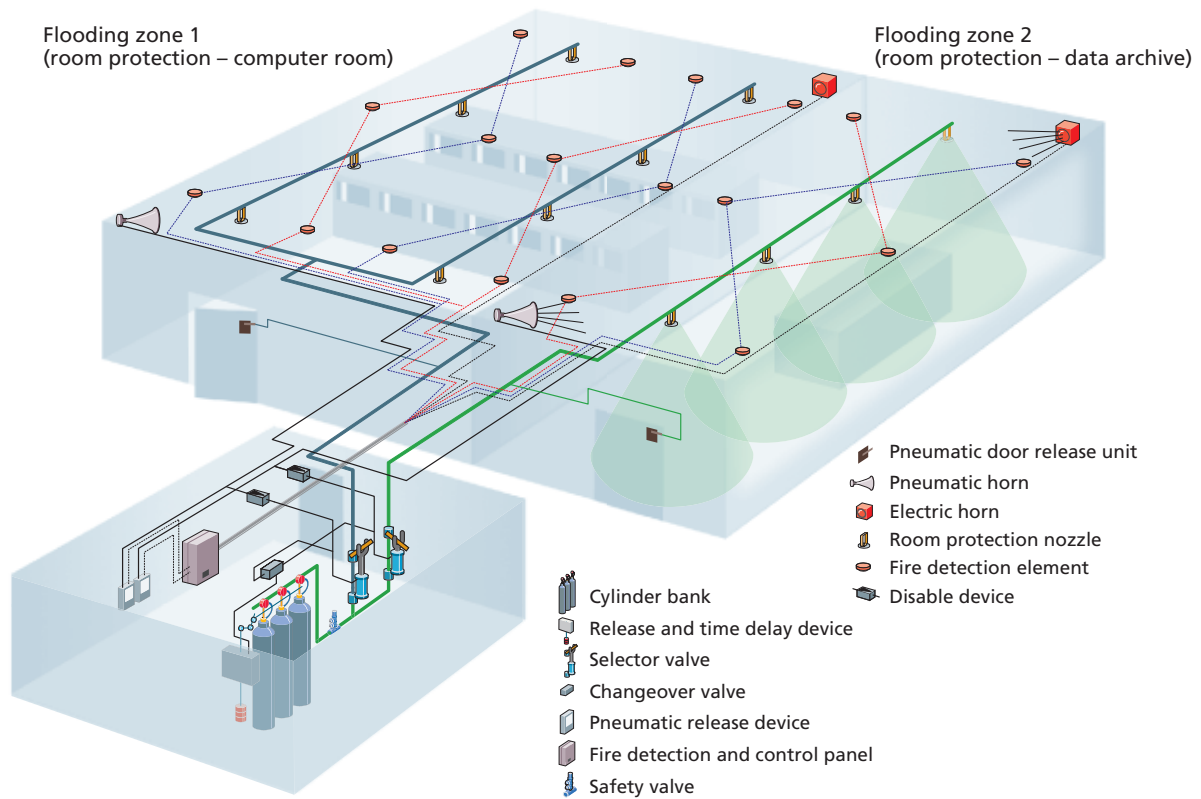
ALWAYS STAND-BY

Supply of extinguishant in high-pressure steel cylinders

The high-pressure steel cylinders are consolidated into one cylinder bank at the installation location in special frames with independent suspension.

Arranged in one or more rows, surprisingly large supplies of extinguishant can be stored in a very small space. The special frames can easily be adapted for extended protection zones or quick replacement of individual cylinders.

Each cylinder suspension is also a weighing unit, which automatically indicates minimum leakage of extinguishant.

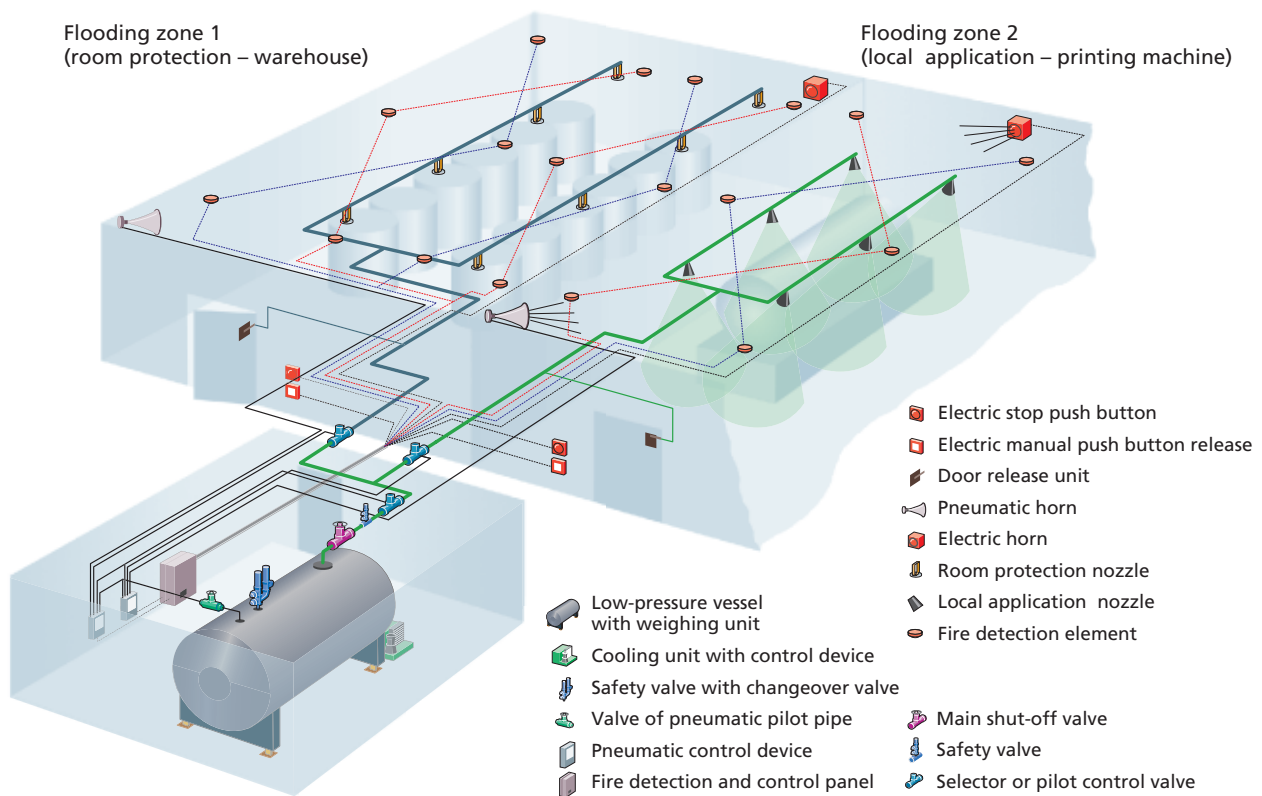


Supply of extinguishant in low-pressure vessels

If large quantities of extinguishant are needed for the overall safety concept, a low-pressure vessel is recommended – especially on grounds of economy.

The liquefied carbon dioxide is stored in this vessel at a temperature of approx. $-20\text{ }^{\circ}\text{C}$ and at an operating pressure of approx. 20 bar. A cooling unit provides for a constant low temperature. The operating costs are minimized by an optimum insulation design.

The supply vessel is mounted on a calibratable electronic weighing unit, which constantly displays the actual weight and therefore any potential loss of extinguishant due to leaks.



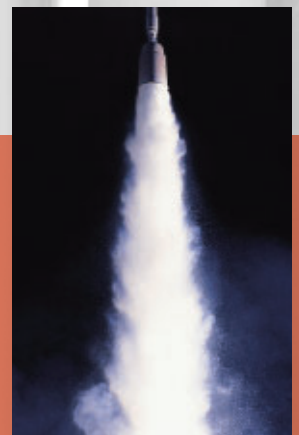
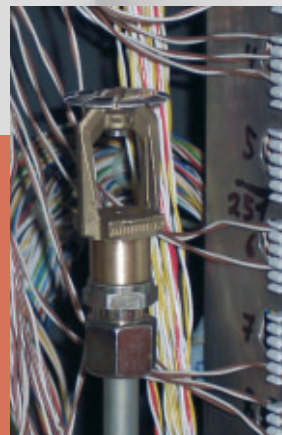
BENEFITS

NATURALLY FREE OF RESIDUE

Numerous advantages

- ▶ Suitable both for the protection of rooms and of free-standing objects.
- ▶ Carbon dioxide is a natural component of the ambient air and is therefore readily available.
- ▶ Extinguishes without residue and without affecting the protected objects.
- ▶ Chemical reactions as a result of extinguishing are practically impossible.
- ▶ The extinguishant is electrically nonconductive and is therefore suitable also for protecting electric system components.
- ▶ The homogeneous distribution of extinguishant and the fast concentration buildup provide for optimum effectiveness.
- ▶ After a fire, there is no extinguishant residue and therefore no cleanup expense.
- ▶ The extinguishing effect is ensured even at low ambient temperatures.
- ▶ Documented reliable extinguishing provides maximum protection of assets.
- ▶ The system technology for the components has been tried and tested for decades.
- ▶ The modular, multi-zone system can easily be adapted for nearly any renovation or expansion measures.
- ▶ Argotec® systems with carbon dioxide allow particularly space-saving extinguishant storage, especially with low-pressure vessels.
- ▶ After a fire, the extinguishing system is soon ready for operation again, at a low cost.
- ▶ Approvals by certified test authorities and the compliance of the design with national standards ensure acceptance by insurance companies and building authorities.
- ▶ If installed, insurance companies grant rebates on fire and fire business interruption insurance.

Minimax is fully certified: including the components, systems, production and quality management system, in addition to the company itself as the installer of fire protection systems.



Danger detected

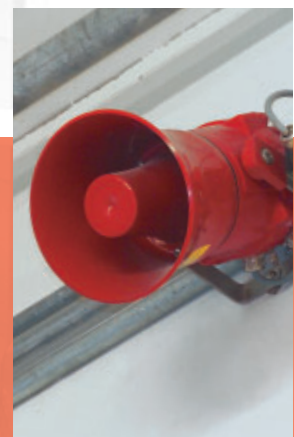
The control and monitoring of the Argotec® extinguishing system with carbon dioxide is achieved by the Minimax fire detection system. Fire detectors monitor the protected zone. If the system detects smoke, an excessive rise in temperature or flames, the fire detection control panel initiates the extinguishing process.

Safe is better

The extinguishing process with carbon dioxide reduces the oxygen in the air in the protected zone significantly below the natural level of 21 Vol.-%. Carbon dioxide in concentrations that can extinguish fires can be harmful to life, and therefore special safety measures are installed. The extinguishing process will not start until after a pre warning time, so that there is sufficient time to leave the room. All warning components are provided twofold and are connected to different power sources.



Minimax inert gas extinguishing systems are designed, produced and installed in compliance with national and international guidelines and standards – a guarantee for quality and your safety.



SYSTEM

ARGOTEC®

The compact solution: The compact extinguishing system for local application

In compact extinguishing systems, all function-relevant components are combined with various functions in a single unit and accommodated in a protective cabinet, where they are protected from dust, moisture and mechanical damage.

A compact extinguishing system consists of a frame with freely suspended extinguishing gas cylinders, which are connected via pressure-proof hoses with the manifold, including weighing units with electronically monitored leakage indicators and an electromagnetic extinguishant release. A fire detection control panel integrated in the

front door is connected with the detectors, which react to heat or smoke, and activates the extinguishing unit in the event of a fire.

The Minimax compact extinguishing system can be placed in the immediate vicinity of the object to be protected and can quickly be connected with the cable and pipe network via standard connections. The high degree of pre-fabrication and the simple and fast installation make the Minimax compact extinguishing system an interesting and cost effective alternative to conventional systems for many objects, such as machine tools, switching cabinets or server cabinets.

Functional readiness and operational safety

Neuralgic functions and components of the extinguishing system, such as the extinguishant quantity, shut-off, release and distribution units, are monitored to ensure the constant functional readiness of the extinguishing system.

The Minimax service department checks the operability of the extinguishing system at regular prescribed intervals and restores the operational readiness of the system after a fire without delay.



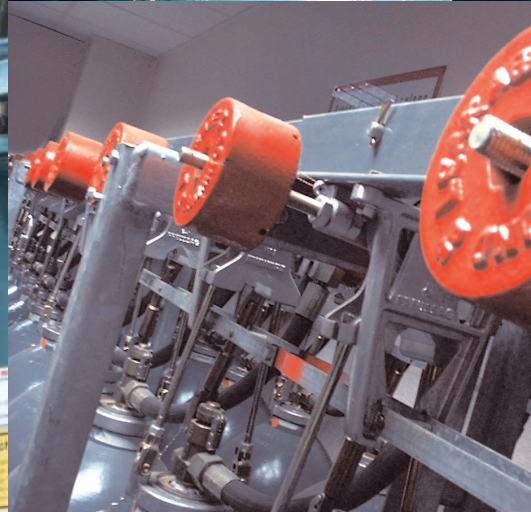
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GAS EXTINGUISHING SYSTEM
INERT GAS



Argotec®
with Argon and Nitrogen

Safe for certain.

MINIMAX

PRODUCT

NATURAL

Argon and nitrogen extinguish a fire by oxygen displacement. When heat falls below the specific limit required for combustion, the fire suddenly chokes.

Both extinguishing gases are natural, gaseous components of ambient air and thus, do not have adverse effects on the atmosphere. There is no other gas used as an extinguishant that has such an excellent environmental track record. Argon and nitrogen are not toxic and non-conductive.

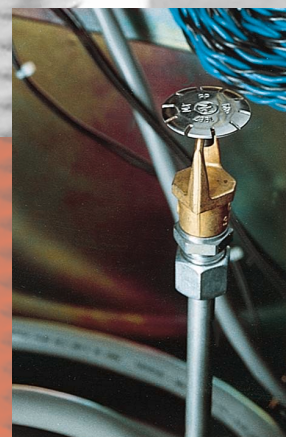
Application

Fire extinguishing systems with argon and nitrogen as extinguishants are particularly suitable for a number of specific risk areas; in case of a fire, they need to ensure the following:

- 1) maintain availability and functionality of the objects to be protected and optimise down-time, for e.g. IT installations and systems, control rooms of telecommunication systems, data archives, switch and control centres, medical facilities, control rooms;
- 2) take into account chemical and physical processes as well

as environmental conditions during extinction, e.g. areas with flammable liquids and other substances with similar fire behaviour used for the production and processing of paints and varnishes, hazardous goods ware-houses, varnishing and powder coating cubicles, magnesium processing and the protection of artefacts;

- 3) effective extinction at shielded objects or hardly accessible areas such as tool-making machines, hydraulic facilities, silos and dust filters, printing machines, turbines, transformers, textile machines, engine test beds, engine rooms on ships.



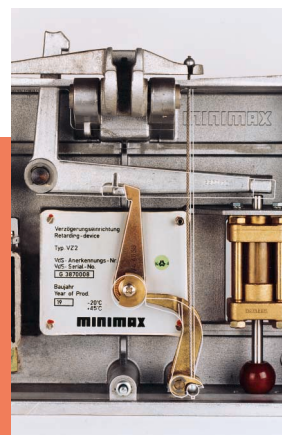
Argotec® extinguishing systems with argon and nitrogen offer a number of benefits.

- ▶ They extinguish a fire without leaving residues or having adverse effects on the objects to be protected.
- ▶ They are also suitable for enclosures where people are staying.
- ▶ Harmful reaction compounds generated during extinction can be avoided.
- ▶ Optimum efficacy as a result of homogeneous distribution of the extinguishant and rapid concentration build-up.
- ▶ During discharge, visibility is still ensured as there is no condensation.
- ▶ Extinction is possible without interrupting operation.
- ▶ Saving of disposal costs when extinguishing gases are used.
- ▶ Effective extinction can be ensured even at low ambient temperature.

BENEFITS

FUNCTIONAL

- ▶ The Argotec® System with its modular and multi-purpose architecture can be reengineered or extended to suit any operational change.
- ▶ Quick and cost-efficient restoration of availability as the gases argon and nitrogen are available almost everywhere.
- ▶ Licensing by renowned certification authorities and design in line with international standards increase acceptance by insurance agencies and for permit procedures.
- ▶ Insurances against fire and interruption of operation due to fire award discount on premiums upon installation of a gas extinguishing system.
- ▶ Compared to liquefied inert gas systems, the Argotec® 300bar System requires 30 % less space for storage of extinguishant given the same extinguishing efficacy, which saves space and costs.



ARGOTEC®

Once the fire is detected by the fire detection system, the extinction process is initiated and controlled.

An acoustic alarm is activated prior to discharge. Once the pre-warning period has elapsed, the actual extinction starts. The extinguishing gas is fed into the discharge area by means of a pipe system; it is sprayed through nozzles and displaces oxygen from the seat of fire. The volume of extinguishant required is determined on an

individual basis; it depends on the volume of the enclosure, its surface and quality (gas tightness) as well as the combustible material to be protected.

The size of the pipe system and the positioning of the spray nozzles depend on the risk to be prevented. In the case of enclosure protection, extinguishing nozzles are spread evenly over the entire extinguishing area; in enclosures with high ceilings the system may even consist of multiple

levels. In case several extinguishing areas are connected to one extinguishing system, extinguishing gas is released through range valves.

The extinguishant is stored in high-pressure cylinders which are lined-up in racks that ensure compact and expandable storage. The weight of each cylinder is monitored, displayed and gathered by a central control room, ensuring permanent control of the extinguishing volume available.

	Argon	Nitrogen
ODP value (global depletion potential)	0	0
GWP value (global warming potential)	0	0
Nominal volume of the cylinder	80 l	80 l
Filling level	40.5 kg	24.6 kg
Max. protection volume of a cylinder filling in line with VdS 2380 for IT rooms	35 m ³	35 m ³
Total weight of steel cylinder	160 kg	145 kg
Maximum permissible overpressure of the filling	300 bar at 15 °C	300 bar at 15 °C
Surface	Cylinder shoulder RAL 6001 – emerald green Cylinder frame RAL 7037 – dust grey	Cylinder shoulder RAL 9005 – black Cylinder frame RAL 6001 – emerald green
Labelling 300 bar system	Colour ring RAL 4006 – purple	Colour ring RAL 4006 – purple
Rack for steel cylinders	2,200 x 350 mm (W x H) Number of cylinders in a row: 2 to 16 Length: 1,130 mm to 5,330 mm Multiple-row line-up	2,200 x 350 mm (W x H) Number of cylinders in a row: 2 to 16 Length: 1,130 mm to 5,330 mm Multiple-row line-up
Temperature range	-20 °C to +50 °C	-20 °C to +50 °C

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Compact extinguishing systems
for protecting equipment

Safe for certain.

MINIMAX

PRODUCT

COMPACT FIRE PROTECTION

Risk

Many production plants, information and communication facilities give rise to an increased level of fire hazard. An example is the metal processing sector, where oil is used as a cooling agent or lubricant, and particularly in companies that process light metals such as magnesium, which are fire risks. If the flakes and dust in such areas catch fire, the result can easily become a disastrous fire with serious consequences.

No less dangerous are fires, which develop in electrical and electronic control, computer and communication installations. When these begin to spread and get out of control, the consequences are very likely involve expensive down times and the loss of customer and market shares.

The protection of people and equipment therefore calls for a reliable fire protection system.

Solution

Compact fire protection

Self-activating fire extinguishing systems are now available to control fire hazards. These continuously monitor the object to be protected and in the event of a fire starting, extinguish it immediately. The best solution for the protection of single objects is the use of a compact extinguishing system.

In contrast to conventional gas extinguishing systems, a compact extinguishing system combines all the relevant operating components in one, single unit. This can be placed right next to the object to be protected, and can be rapidly connected to the cable and piped mains networks through standard connections.

The inert gases carbon dioxide (CO₂) and Argon (Ar) are normally used as extinguishing agents, since they do not leave any residues behind, are not electrically conductive, and do not lose their extinguishing effect even at high temperatures. There is also the advantage that these extinguishing gases offer an environmentally friendly type of fire protection and are available practically everywhere and at all times.

Use

Versatile

Compact fire protection is most suited to cases where fire protection measures are required for specific objects or units, and where an area protection system cannot guarantee the desired level of monitoring and immediate extinguishing of individual risk areas.



Typical examples of use include:

- ▶ Computer and communication installations
- ▶ Server rooms
- ▶ Patch panels

- ▶ Metal processing equipment e.g.
 - grinding and honing machines
 - CNC-processing stations (including magnesium processing!)
 - eroding machines

- ▶ Paternoster racks
- ▶ Electrostatic paint shops

ADVANTAGE

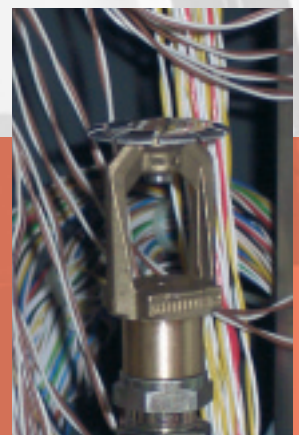
INSTALL IT, CONNECT IT UP – READY TO EXTINGUISH FIRES

An overview of the advantages

- ▶ Cost-savings through prefabrication and rapid installation.
- ▶ “Just in time” delivery and assembly.
- ▶ Fire protection to suit specific objects or units: Installed directly at the place of use.
- ▶ Short installation paths, since the extinguishing system is situated directly at the area to be protected.

- ▶ If the protection tasks change, the system can be easily moved to another location.
- ▶ The extinguishing system and the control unit are protected from dirt and from mechanical damage.
- ▶ All the Minimax detectors can be directly connected to the system using standard interfaces.

- ▶ Can be integrated into a series of switch cabinets.
- ▶ The components used have all been tested and approved by the VdS.



FUNCTION

ALL THE FUNCTIONS ARE CONTAINED IN ONE UNIT

The compact fire extinguishing system comprises a skeleton framework with free-hanging extinguishing gas cylinders, including a weighing device, electronically monitored loss indication, and electro-magnetic release device.



The fire detection and extinguishing control panel is integrated in the front door of the compact extinguishing system. Detectors monitor the object being protected. Should the slightest indication of a fire be detected, the panel de-energises the object at risk and releases the extinguishing unit.

Possible extensions

Where larger areas have to be protected then similar cabinets which are simply equipped with additional supplies of extinguishing agent can be set up with the compact extinguishing system and can be networked with a higher-level system. In this way the availability of all systems can be monitored from a central point.

From small to large – variations in the compact extinguishing system

The 19" FLA – a special solution for protecting control cabinets

The 19" FLA compact extinguishing system provides fire protection for individual network and server cabinets, production control units, tele-



phone distribution cabinets, and for switch cabinets which are accommodated inside 19" system carriers.

Compact extinguishing container

For larger objects to be protected, such as temporary construction sites, or when there is no suitable room available for the extinguishing system, then an alternative solution is the use of compact extinguishing systems in modified standard containers.



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For detailed information, please refer to the Minimax product sheets.



MX 200 fire extinguishing system
with the extinguishing agent HFC-227ea

Safe for certain.

MINIMAX

EFFICIENT +

FAST AND SMOOTH

Lost data, the breakdown of machines and equipment, on which enterprise-critical business processes are proceeded, or a total breakdown of operations – those are risks, which represent a concrete existential threat for every company. Companies with unique and high-value technical equipment and central IT systems are dependent on the high availability of these critical operating resources. This is inevitably leading to growing expectations concerning fire protection.

Here fire extinguishing systems are in demand, which detect a developing fire in its initial stage and extinguish it in an exceptionally fast and protective manner so that even sensitive components are not damaged e. g. by residues of extinguishing agent. This is why Minimax has developed the MX 200 fire extinguishing system with the fire extinguishing agent HFC-227ea. It is characterised by its highly effective and fast extinguishing action (< 10 seconds). The extinguishing agent itself is toxicologically harmless; it extinguishes without leaving any residue and gets along with a small storage volume. The extinguishing agent acts both physically and chemically.

Extinguishing agent approved throughout the world

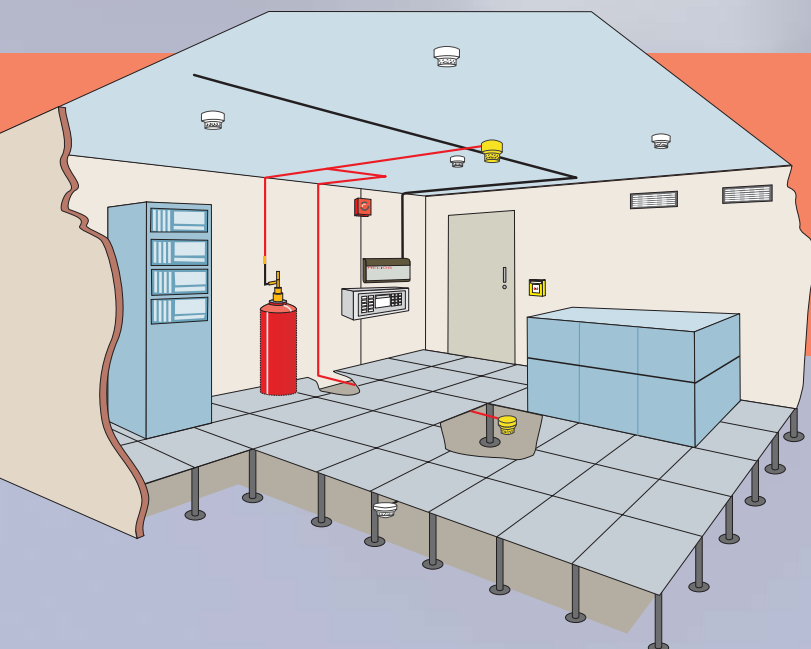
The fire extinguishing agent treated in the ISO 14520-9 under the designation HFC-227ea is widely used throughout the world. Thanks to its environmental properties and good price/performance ratio it has become established in many countries as the extin-

guishing agent for manageable IT and electrical risks. In Europe its use is regulated by the F-Gases Directive (Regulation (EU) No. 842/2006 on certain fluorinated greenhouse gases).

The MX 200 fire extinguishing system can be individually adapted to suit nearly every area. Nozzle holes and container fill volumes are the result of object-specific design calculations and characterise a system optimised down to the smallest detail. The charging pressures of up to 50 bar mean that multi-zone systems and longer pipeworks can be designed. No separate space is needed for the supply of extinguishing agent, it can be located in the protected area itself.

Mode of operation

When a starting fire is detected by one of the automatic fire detectors or when a push button is activated, the fire detection control panel sets off a fire alarm. After an object-related delay time the pressurised extinguishing agent cylinders are opened either electrically or pneumatically. The extinguishing agent, still liquid at this point, flows to the extinguishing nozzles where it vaporises and rapidly and effectively floods the room.



MX 200 fire extinguishing systems – efficient fire protection for electrical and electronic installations

CLEAN

EXTINGUISHES WITHOUT LEAVING ANY RESIDUE

The extinguishing agent HFC-227ea

HFC-227ea is suitable for class A and class B fire and is used as total flooding agent. The gas pressure of 3.91 bar at 20 °C favours a rapid vaporisation at the nozzles and speedy distribution throughout the room. HFC-227ea is neither corrosive nor electrically conductive and therefore causes no damage through short circuits or through residues left on sensitive components. It is colourless and almost odourless and is in gaseous form at room temperature. Its molecules consist of carbon, fluorine and hydrogen. HFC-227ea deprives the flames of heat, thus interrupting the combustion reaction.

HFC-227ea

Chemical formula	CF ₃ -CHF-CF ₃
Chemical name	Heptafluoropropane
ISO designation	HFC-227ea
Specific weight (20 °C)	1.41 kg/l
State of aggregation	gaseous (at 20 °C/1.013 bar)
Boiling point	-16.5 °C (at 1.013 bar)
Environmental properties	No ozone depletion potential (ODP 0) global warming potential (GWP 3500)

Safety of persons

Due to its worldwide use HFC-227ea has become one of the most studied synthetic extinguishing agents so that has been assessed as safe for use in rooms where persons are present. The design concentration for IT rooms is between 7.9 and 8.5 % and thus lies below the NOAEL value.

Safety factor at the design concentration

- ▶ NOAEL 9 % by volume
(no observed adverse effect level)
The highest extinguishing gas concentration in % by vol., at which no detriments to health have been observed.
- ▶ LOAEL 10.5 % by volume
(lowest observed adverse effect level)
The lowest extinguishing gas concentration in % by vol., at which detriments to health have been observed.



ADVANTAGES

MX 200 FIRE EXTINGUISHING SYSTEM

- ▶ Excellent price/performance ratio
- ▶ Robust design, so low maintenance costs
- ▶ Rapid extinguishing effect
- ▶ Safe for use in occupied areas
- ▶ No extinguishing agent residues, neither corrosive nor electrically conductive
- ▶ Simple design and hydraulic calculation by using professional MX 200 software
- ▶ Higher operating pressure possible than comparable systems, so
 - longer pipeworks and
 - multi-zone systems can be achieved
- ▶ Compact and space-saving
- ▶ Approvals : VdS, FM, UL and CE marked
- ▶ Worldwide recognised and approved extinguishing agent



Example of a multi-cylinder system

What you're looking for: system types from A to Z

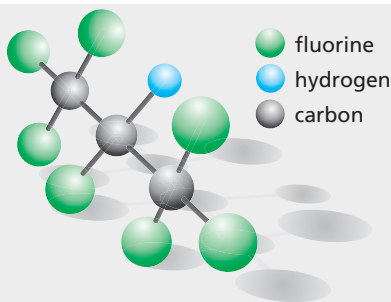
- ▶ Available cylinder sizes:
22, 25, 40, 50, 80, 100, 140, 180 litres
- ▶ Pressure stages available: 25, 42, 50 bar
- ▶ Single- or multi-cylinder systems
- ▶ Single- or multi-zone systems

Example of use EDP

Design concentration*	Minimum usage quantity
7.9 % by volume	62.5 kg/100 m ³

*(ISO 14520-9) / EN 15004-5 (draft)

HFC-227ea molecule



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MX 1230 Fire Extinguishing System using
3M™ Novec™ 1230 Fire Protection Fluid

Safe for certain.

MINIMAX

EFFICIENT +

FAST AND SMOOTH

Lost data, the breakdown of machines and equipment, on which enterprise-critical business processes are proceeded, or a total breakdown of operations – those are risks, which represent a concrete existential threat for every company. Companies with unique and high-value technical equipment and central IT systems are dependent on the high availability of these critical operating resources. This is inevitably leading to growing expectations concerning fire protection. Here fire extinguishing systems are in demand, which detect a developing fire in its initial stage and extinguish it in an exceptionally fast and protective manner so that even sensitive components are not damaged e.g. by residues of extinguishing agent. This is why Minimax has developed the MX 1230 fire extinguishing system using 3M™ Novec™ 1230 Fire Protection Fluid. It is characterised by its fast flooding of the room (< 10 seconds) and its highly extinguishing effectivity. The extinguishing agent itself is toxicologically harmless; it extinguishes without leaving any residue and gets along with a small storage volume.

A well thought-out system

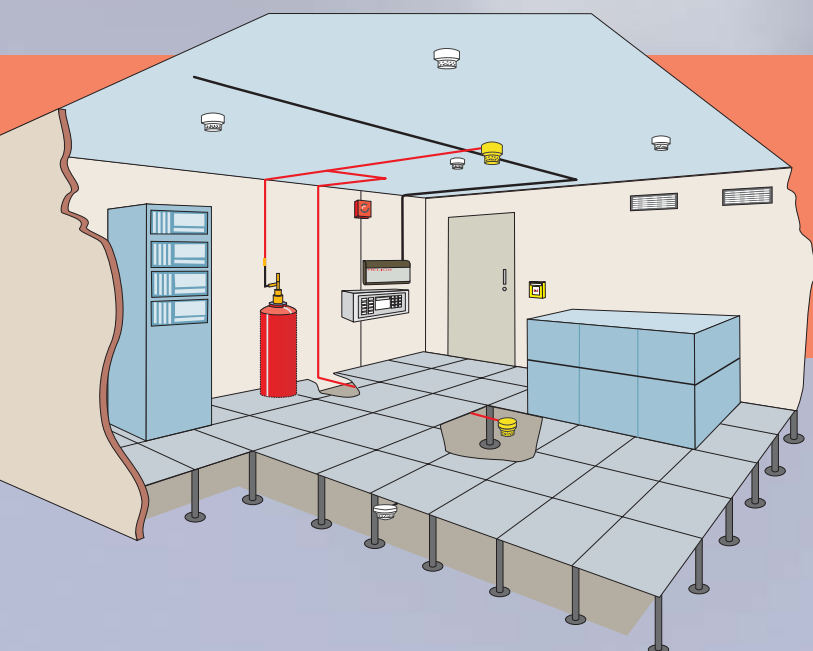
The MX 1230 fire extinguishing system can be individually adapted to suit nearly every area. Nozzle holes and container fill volumes are the result of object-specific design calculations and characterise a system optimised down to the smallest detail. The charging pressures of up to 50 bar mean that multi-zone systems and longer pipeworks can be designed. No separate space is needed for the supply of extinguishing agent, it can be located in the protected area itself.

Mode of operation

When a starting fire is detected by one of the automatic fire detectors or when a push button is activated, the fire detection control panel sets off a fire alarm. After an object-related delay time the pressurised extinguishing agent cylinders are opened either electrically or pneumatically. The extinguishing agent, still liquid at this point, flows to the extinguishing nozzles where it vaporises and rapidly and effectively floods the room.

The extinguishing agent Novec™ 1230

The fire extinguishing agent Novec™ 1230 extinguishing agent acts both physically and chemically. Novec™ 1230 is widely used throughout the world and thanks to its environmental properties it has become established in many countries as the extinguishing agent for manageable IT and electrical risks. Novec™ 1230 is suitable for class A and class B fire and is used as total flooding agent. It is neither corrosive nor electrically conductive and therefore causes no damage through short circuits or through residues left on sensitive components. It is colourless and almost odourless and is in gaseous form at room temperature. Its molecules consist of carbon, fluorine and oxygen. Novec™ 1230 deprives the flames of heat, thus interrupting the combustion reaction.



MX 1230 fire extinguishing systems – efficient fire protection for rooms with electrical and electronic installations

CLEAN

EXTINGUISHES WITHOUT LEAVING ANY RESIDUE

A guaranteed future-safe extinguishing agent

As manufacturer of the extinguishing agent Novec™ 1230 the company 3M™ came up with the idea of the "3M Blue Sky Warranty" for the extinguishant: If in the future the extinguishing agent is banned or its use restricted because of its ozone depletion potential or global warming potential then 3M will refund the purchase price.

Novec™ 1230 of 3M™

Chemical formula	$\text{CF}_3\text{CF}_2\text{C}(\text{O})\text{CF}(\text{CF}_3)_2$
Chemical name	Dodecafluoro-2-methylpentane-3-one
ISO designation	FK-5-1-12
Specific weight (20 °C)	1.6 kg/l
State of aggregation	Liquid (at 25 °C /1.013 bar)
Boiling point	49.2 °C (1.013 bar)
Environmental properties	No ozone depletion potential (ODP 0) Low global warming potential (GWP 1) Atmospheric lifetime <5 days

Safety of persons

Novec™ 1230 has an outstanding safety factor, reaching the NOAEL value (No Observed Adverse Effect Level) of 10%. When used to protect IT rooms this safety factor is 78% – measured for the release concentration of 5.6% in accordance with DIN ISO 14520-5. This is another reason why the fire protection working group of the Employers' Liability Insurance Associations confirms that Novec™ 1230 is a safe extinguishing gas, particularly when used for areas frequented by persons. In its plan for new alternative extinguishing agents (SNAP Program = Significant New Alternatives Policy Program), the USA's EPA (Environmental Protection Agency) certifies Novec™ 1230 as harmless when used as an extinguishing agent for flooding areas where people are present.

Safety factor at the design concentration

NOAEL 10% by volume

(no observed adverse effect level)

The highest extinguishing gas concentration in % by vol., at which no detriments to health have been observed.

LOAEL >10% by volume

(lowest observed adverse effect level)

The lowest extinguishing gas concentration in % by vol., at which detriments to health have been observed.



ADVANTAGES

MX 1230 FIRE EXTINGUISHING SYSTEM

- ▶ Very high environmental compatibility
- ▶ An extinguishing agent where its use in the future is protected by the 3M™ "Blue Sky Warranty"
- ▶ Optimised system design by using professional MX 1230 calculation software
- ▶ Robust design, so low installation and maintenance costs
- ▶ Rapid extinguishing effect
- ▶ Exceedingly safe for use in occupied areas
- ▶ No extinguishing agent residues, neither corrosive nor electrically conductive
- ▶ Higher operating pressure possible than comparable systems, so
 - longer pipeworks and
 - multi-zone systems can be achieved
- ▶ Compact and space-saving
- ▶ Approvals : VdS, FM, UL and CE marked
- ▶ Worldwide recognised and approved extinguishing agent



Example of a multi-cylinder system

What you're looking for: MX 1230 system types from A to Z

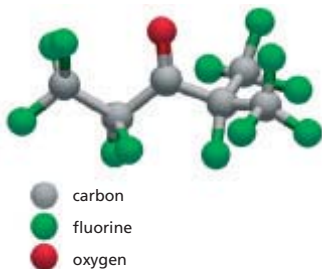
- ▶ Available cylinder sizes:
22, 25, 40, 50, 80, 100, 140, 180 litres
- ▶ Pressure stages available: 25, 42, 50 bar
- ▶ Single- or multi-cylinder systems
- ▶ Single- or multi-zone systems

Example of use EDP

Design concentration*	Minimum usage quantity
5.6 % by volume	82.5 kg/100 m ³

*(ISO 14520-5) / EN 15004-2 (draft)

Novac™ 1230 molecule



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