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nature loves
a clean agent



Clean Agent Fire Suppression System



NOHMI
NOHMI BOSAI LTD.

ZERO OZONE DEPLETION POTENTIAL ZERO GLOBAL WARMING POTENTIAL

— A STANDARD FIRE SUPPRESSION SYSTEM IN THE NEW AGE

Today, global environmental protection is one of the most serious issues for survival of the human race. Fire suppression systems are also at a new stage where they must meet requirements from the perspective of global environmental protection and safety for human beings.

We, as a manufacturer of fire suppression systems, have made thorough efforts in the formation of an ideal fire suppression system that must have no adverse effect on the natural environment as well as having the affirmative capability of fire suppression. As a result, we have successfully developed the NN100 system, which employs nitrogen gas, an agent that occupies 78% of the air. The NN100 system has the capability for both environmental protection and fire suppression required for fire protection systems in this new stage.

Furthermore, the NN100 system has been provided with a high level of safety for human beings and a high cost-performance in accordance with our development concept. The NN100 system will be a 'standard' fire suppression system in the future since the NN100 system is friendly to both human beings and our planet.

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FEATURES

Zero ODP and zero GWP

The NN100 system has zero ozone depletion potential and zero global warming potential, since it employs nitrogen gas, occupying 78% of the air, as the fire extinguishing agent.

Not toxic to humans

The NN100 system employs no carbon dioxide and no halocarbon. There is no possibility of producing hydrofluorine, a toxic gas, even in contact with heat or flame.

Low refill cost

The NN100 system requires neither synthetic nor blended gas as a fire extinguishing agent. It requires only nitrogen gas commonly available for industrial use and refill poses no technical difficulties.

Cylinder-valve regulated discharge pressure

The valve on the nitrogen storage cylinder is fitted with a pressure-regulating mechanism. The nitrogen gas is stored at 30Mpa in the cylinder and can be discharged constantly at 10.8Mpa or less at the cylinder outlet. This functionality allows the NN100 to utilize typical pressure rating pipes for existing systems, such as a CO2 gas fire suppression system. This mechanism has been patented in the USA.

Clear view to exits

The discharge of nitrogen gas does not cause any problem with visibility necessary for occupants to access exits, since no condensation in the air takes place on discharge of the agent.

No residue after discharge

The NN100 system can be used to protect rooms containing precision instruments or fine arts, since there is no vaporization of the agent on discharge, and therefore no condensation in the air.

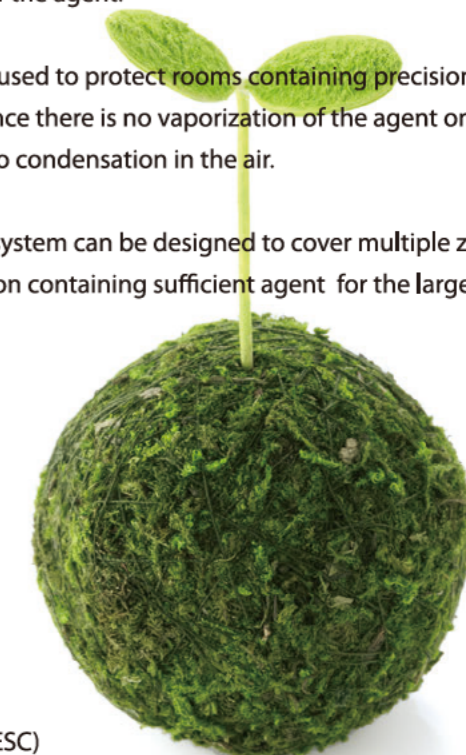
Centralized cylinder station

The NN100 high pressure system can be designed to cover multiple zones with a single cylinder station containing sufficient agent for the largest zone.

Package type available

INTERNATIONAL RECOGNITION

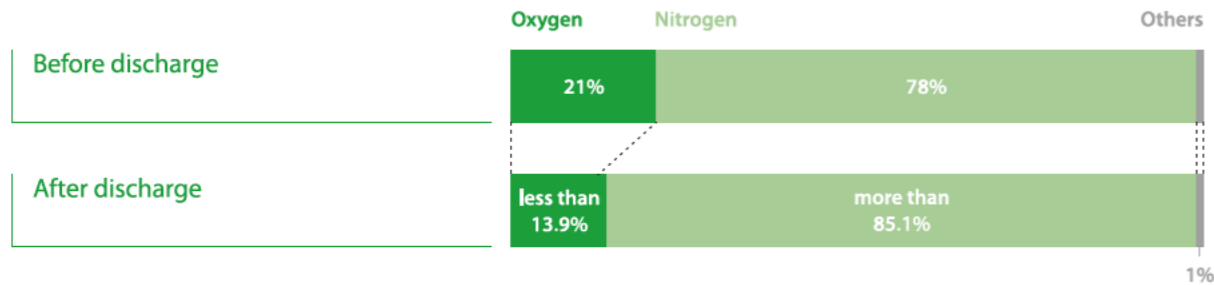
Underwriters Laboratories Inc. (UL)
National Fire Protection Association (NFPA)
US Environment Protection Agency (US EPA)
Fire Protection Equipment and Safety Center of Japan (FESC)
ISO has adopted Nitrogen gas (IG-100) in ISO 14520



How is the fire extinguished?

By volume, air contains approximately 21% oxygen, 78% nitrogen, and 1% other gases. Continuous combustion requires more than 15% of oxygen concentration by volume. The NN100 system, by discharging nitrogen gas into the application, reduces the oxygen concentration to less than 13.9% so that combustion is suppressed.

Gas proportion in the air



Is there any physiological effect on humans?

The Chemicals Evaluation and Research Institute (CERI, Japan) tested for the safety of humans under such conditions and reported that there is no physiological effect on humans when the nitrogen gas is discharged.

The National Fire Protection Association (NFPA, USA) states that unnecessary exposure of humans to low oxygen atmospheres shall be avoided. The NFPA stipulates the human exposure to low oxygen atmospheres in the table below.

Human exposure in low oxygen atmospheres, NFPA 2001, 2012 edition

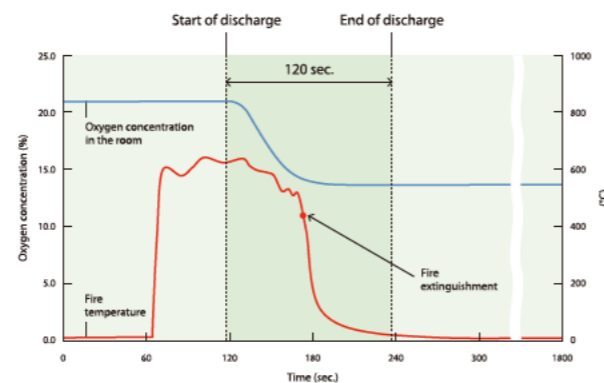
Oxygen concentration designed by inert gas agent systems	12%	10 to 12%	8 to 10%	8% or below 8%
Occupancy of area normally	Allowed	Allowed	Not Allowed	Not Allowed
Limited human exposure time	5 minutes	3 minutes	30 seconds	Shall not be exposed

The NN100 oxygen concentration will be between 10 to 13.9%.

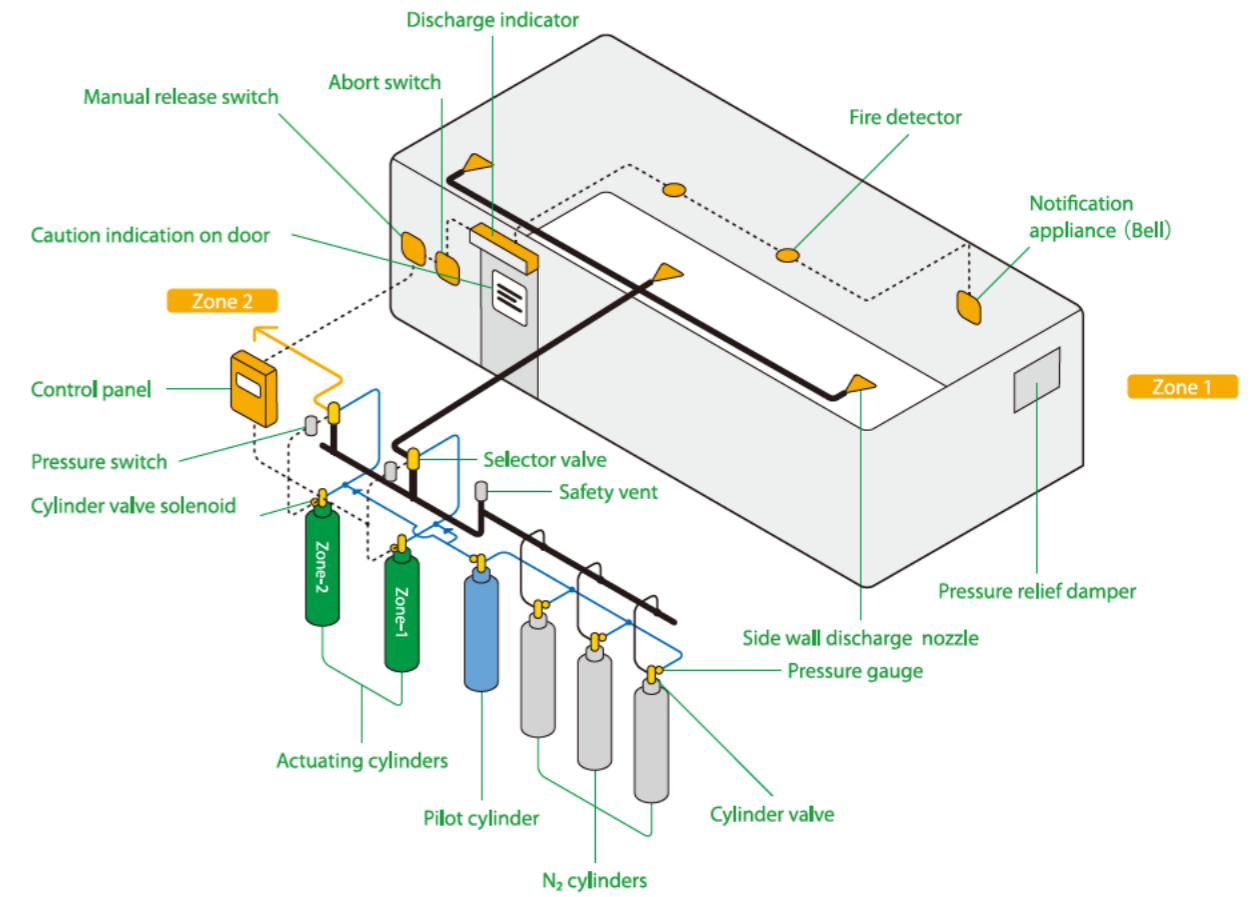
Longer fire suppression time

The specific weight of nitrogen gas is as heavy as that of air, which creates an even distribution for longer retention of gases in a room.

This assists in preventing the fire from re-igniting.

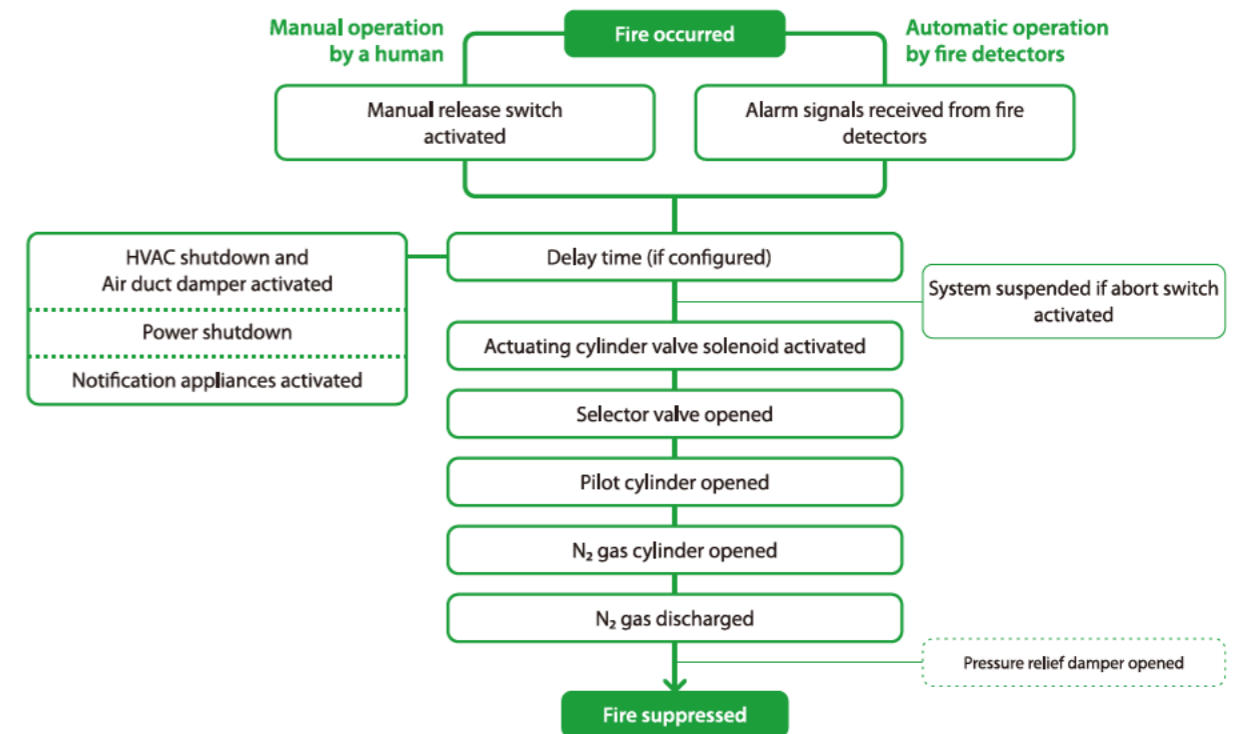


System Configuration



The unique side wall type discharge nozzle provides flexibility in piping compared to the pendant type discharge nozzle.

Typical Operation Flow Chart



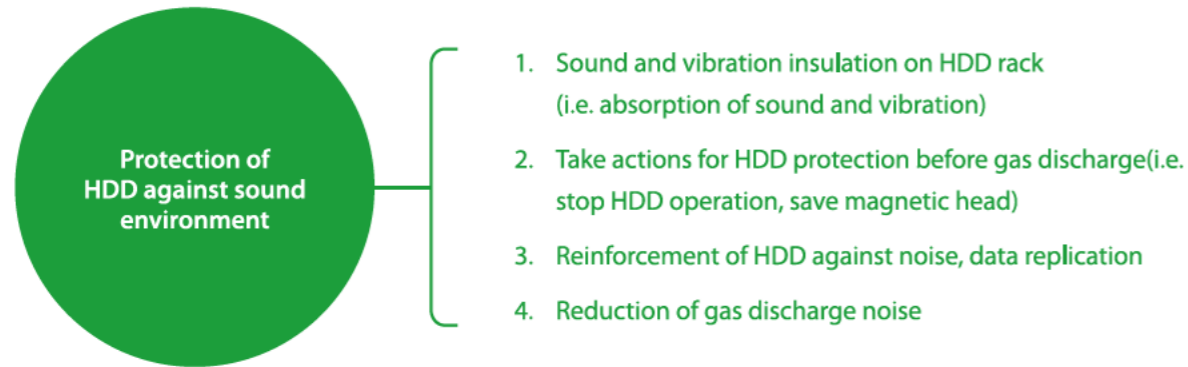
Acoustic effect on precision instruments

At the convention held by the Architectural Institute of Japan on September 11th 2010, an article entitled "Study on the affection of sound environment to precision instruments" was presented.

The article states that noise impact on computer hard disc drive (HDD) was verified by simulator and the possibility of potential damage to HDD by sounds higher than 110dB was found. The article mentions that the discharge sound of an inert gas fire suppression system may affect HDD. Although the acoustic effect on HDD has no relation to the fire suppression effect, when gaseous fire suppression systems are designed, the noise effect and its countermeasure should be considered with end-users, architects, and contractors for every case.

Countermeasures for noise effect

In order to protect HDD against potential noise damage, comprehensive countermeasures are required. Generally, the following countermeasures might be recommended.



Lower noise discharge nozzles

For the above countermeasure 4, we developed lower noise discharge nozzles which achieve a gas discharge noise level lower than 100dB*. Both pendant type and side wall type are available.

*Measured at 1 meter distance from a nozzle, 45 degrees angle from radial axis, 20Hz to 20kHz.

Features of lower sound discharge nozzles

- Reduce effect of gas discharge noise on precision instruments
- No change in fire suppression performance
- Easy replacement of existing discharge nozzles with the lower noise discharge nozzles

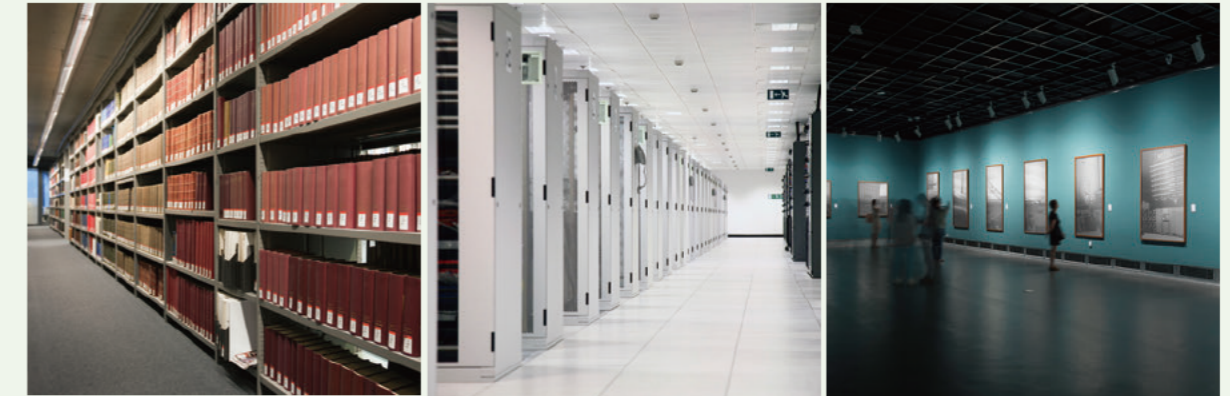
Replacement of discharge nozzles of existing installations

Lower noise discharge nozzles are compatible with NN100 standard discharge nozzles, so that they can be replaced.

- Coverage area and diffusibility of lower noise discharge nozzles are equal to those of standard nozzles.
- Specialized pipe arrangement is not required as the nozzles are compatible. (Depending on the site installation conditions, pipe support might be necessary.)

Applications

The NN 100 system features make it suitable for applications where valuable property is stored, such as Museums, Archives, System Operation & Control Rooms, Computer Server Rooms, and Electrical Rooms.



Specifications

Agent	99.99% nitrogen	
Agent supply	Industrial use	
Design concentration	33.6% for Class A	40.3% for Class B & C
Agent quantity required	0.41 m ³ /m ³ for Class A	0.52 m ³ /m ³ for Class B & C
Cylinder gas filling pressure	30Mpa at 35°C	
Agent volume per cylinder	20.3m ³ at 20°C	
Form of agent in storage	Vapor	
Secondary pressure	10.8Mpa at 40°C	
Piping class	Sch. 80	
Discharge time	120 seconds for Class A and C	60 seconds for Class B
Ozone depletion potential	0	
Global warming potential	0	
Toxicity	No	
Visual difficulties caused by agent discharge	No	

Engineered Type



Package Type





Clean Agent Fire Suppression System

NOTE:

This system is intended to suppress a fire in its early stage. Please note that it may not suppress the fire if kind, quantity and/or arrangement of combustibles in the area protected by this system is changed after installing the system.

This system comprises cylinders filled with highly pressurized gas. Handle the cylinders with care according to the cautions indicated on them.

The discharge of a gas extinguishing agent results in the emission of a high level of noise. This noise may affect modern precision instruments such as hard disc drives ("HDD"). This effect occurs when discharging any agents described in NFPA such as inert gases, HFCs, HCFCs, FICs, FKs, and Halon.

In a communication equipment room, computer room or server room with hard disc drives installed, we recommend you to use the lower noise gas discharge nozzle described in this document, which emits a lower level noise when discharging the gas. Please note that NOHMI does not guarantee the performance of HDD. Other countermeasures may be effective to protect HDD, such as sound insulation and vibration isolation for HDD housing rack (i.e. use of acoustic absorption materials and vibration-proof materials, etc.), measures to protect HDD before discharging a gas agent (i.e. stop running HDD, evacuation of magnetic heads, etc.), or improvement in sound-proofing of HDD itself and/or data protection (backup of data, etc.). Please note that, even if a customer replaces the existing normal discharge nozzles with the lower noise discharge nozzles and adopts all or part of the above countermeasures, NOHMI does not guarantee the performance of HDD.

NFPA 75 "Protection of Information Technology Equipment" states that power supply to all electronic devices should be cut off at the same time when the gas fire suppression system starts discharging the gas agent.

The excessive pressure in a protected room caused by the discharge of the agent must be released to prevent the room from incurring damage. Therefore, a pressure relief device must be installed in the room.

Products of combustion may be released by fire. Therefore, an exhaust fan must be installed in the protected room and it must be activated after extinguishing the fire to remove the products of combustion.

The information contained herein does not purport to cover all the details or variations in the equipment described, nor provide for every possible contingency that may be met in connection with its installation, operation or maintenance.

Specifications are subject to change without notice. Contact Nohmi before relying on the information.

Actual performance is based on proper application of the product by a qualified professional.

Should further information be required or should particular concerns arise that are not covered sufficiently for the purchaser's purposes, the matter should be referred to Nohmi or your nearest distributor.

*"NN100" is the trademark registered by NOHMI BOSAI LTD.

*The contents of this brochure are valid as of November 2014.

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