



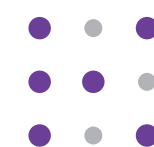
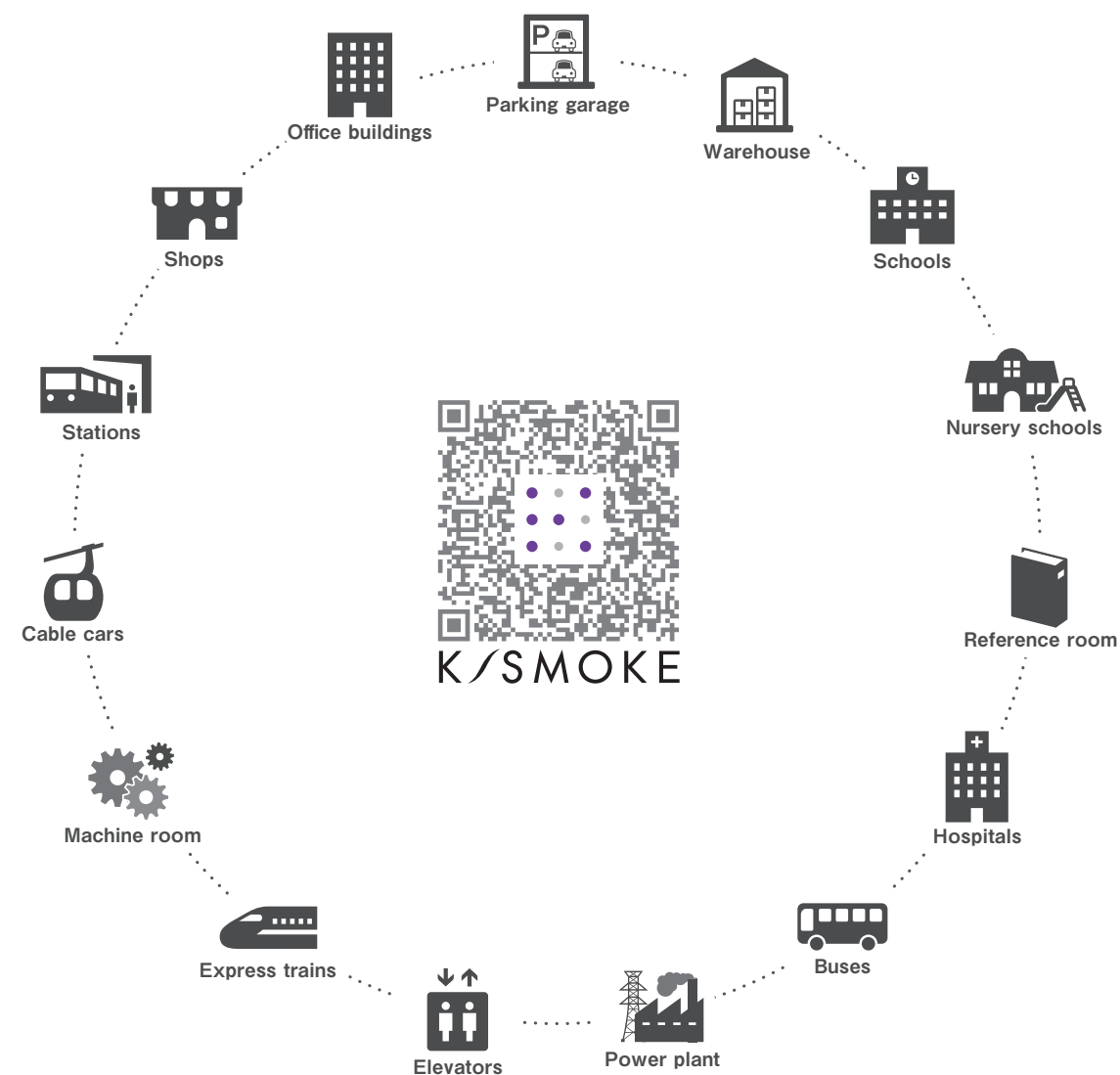
火の安心を、つくろう。
Wishing for Your Safety

Certified by the Minister of Internal Affairs and Communications

Certified by the Minister of Land, Infrastructure, Transport and Tourism

Certified as an LiB Partner by the Ministry of the Environment

Selected for the Fire and Disaster Management
Science and Technology Research Promotion Program



K/SMOKE

GAS
PANEL
DEVICE
LIQUID

Patent No. 6480023 (filed in June 2016)

YAMATO PROTEC CORPORATION

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Website : <https://www.yamatoprotec.co.jp>

※Product photographs in this catalog are samples.

※Please note that the specifications and standards of the products listed in the catalog are subject to change for improvement without prior notice being given.

Contact us here ►



05-082-2609.

YAMATO PROTEC CORPORATION



FEATURES

Safe for human health

For the first time in the world, we have developed a firefighting agent whose principal ingredient is potassium, which is harmless to the human body. Fire extinguishers are tested in accordance with the Organisation for Economic Co-operation and Development (OECD) poison test guideline, confirming their health safety.



Environmentally friendly

Both global warming potential and ozone depletion potential are zero for fire extinguishers. Compared to the existing ones, it is less dirty and environmentally friendly. The downsizing of equipment also reduces carbon dioxide emissions in the manufacturing and construction processes.



Significant reduction of construction period for construction and maintenance

Equipment is simplified, and the burden of construction and maintenance is greatly reduced. Fire extinguishers are domestically produced, so we can hope for a stable supply. In addition, since it does not fall under the Gunpowder Control Law, there are no restrictions on manufacturing, sales, transportation, and use. (Law No. 149 of 1950)



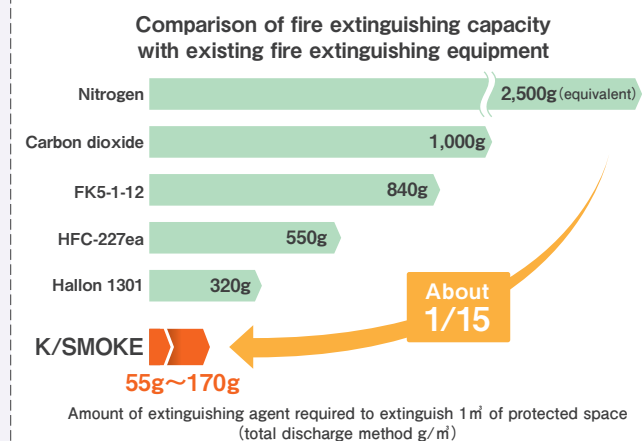
Potassium extinguishes fire by breaking combustion cycle

A combustion cycle is a condition in which hydrogen, oxygen, and moisture that are stable in air are usually destabilized and the reaction is rapidly repeated. K/SMOKE cuts off the combustion cycle and quickly extinguishes the fire when the gasified potassium reacts with oxygen and hydrogen.



Light-weight compact design and excellent fire fighting capability

Excellent fire fighting ability with a small amount of fire extinguishers. We realize equal fire fighting capacity with about 1/15 of the amount of chemicals in the Nitrogen fire fighting equipment.



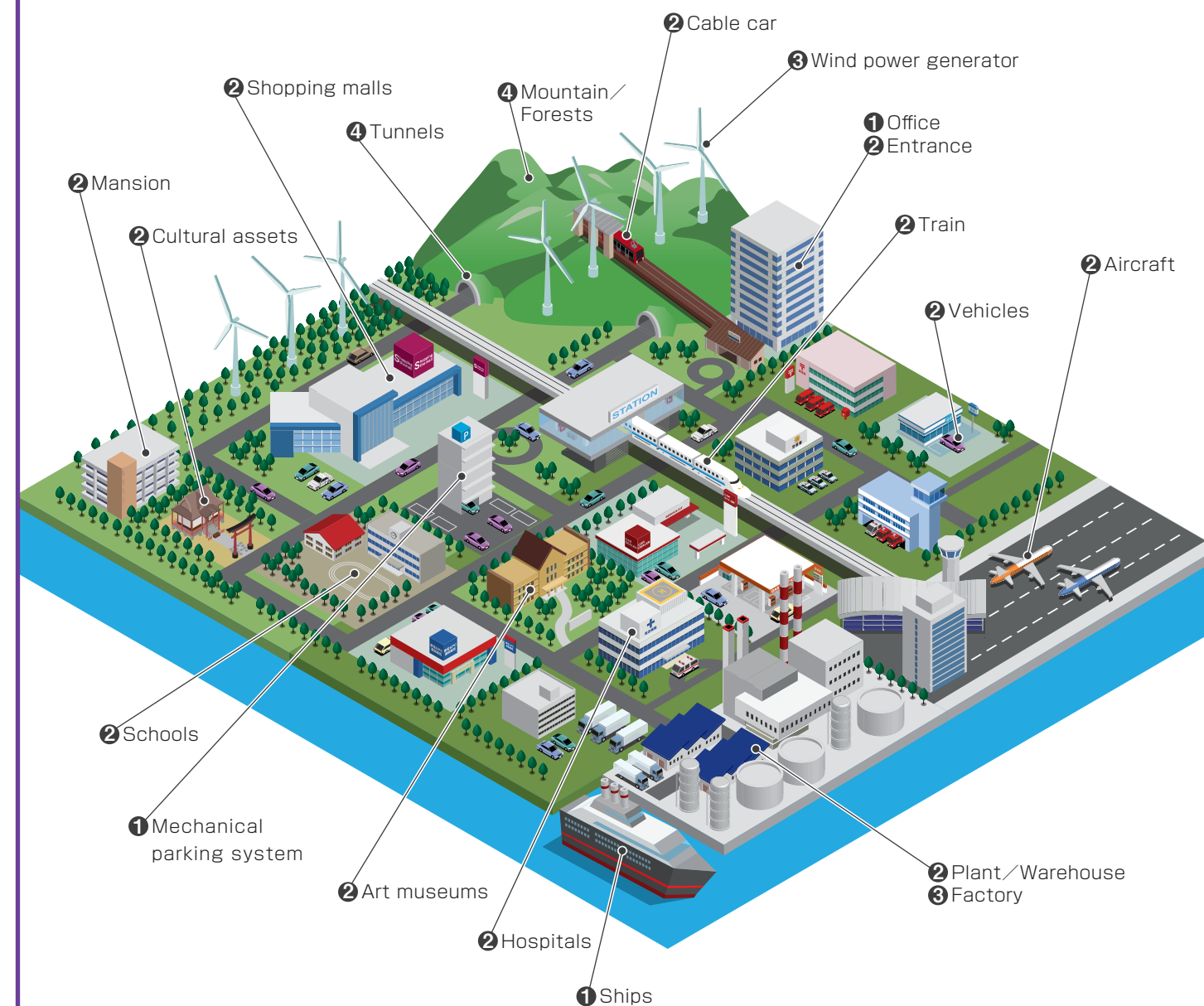
LINEUP (K/SMOKE Town)



On official YouTube
Video available!

① K/SMOKE GAS	P.3
Gas fire extinguishing equipment	
Mechanical parking system/ Office/Ships	

② K/SMOKE PANEL	P.7
Fire extinguishing sheet	
Vehicles/Cultural assets/	
Art museums/Hospitals/Schools/Mansion/	
Factory/Warehouse/Entrance/Aircraft/	
Train/Cable car/Shopping malls	



③ K/SMOKE DEVICE	P.9
Fire extinguishing system	
Wind power generator / Plant	

④ K/SMOKE LIQUID	P.10
Liquid extinguishing agents	
Mountain/Forests/Tunnels	



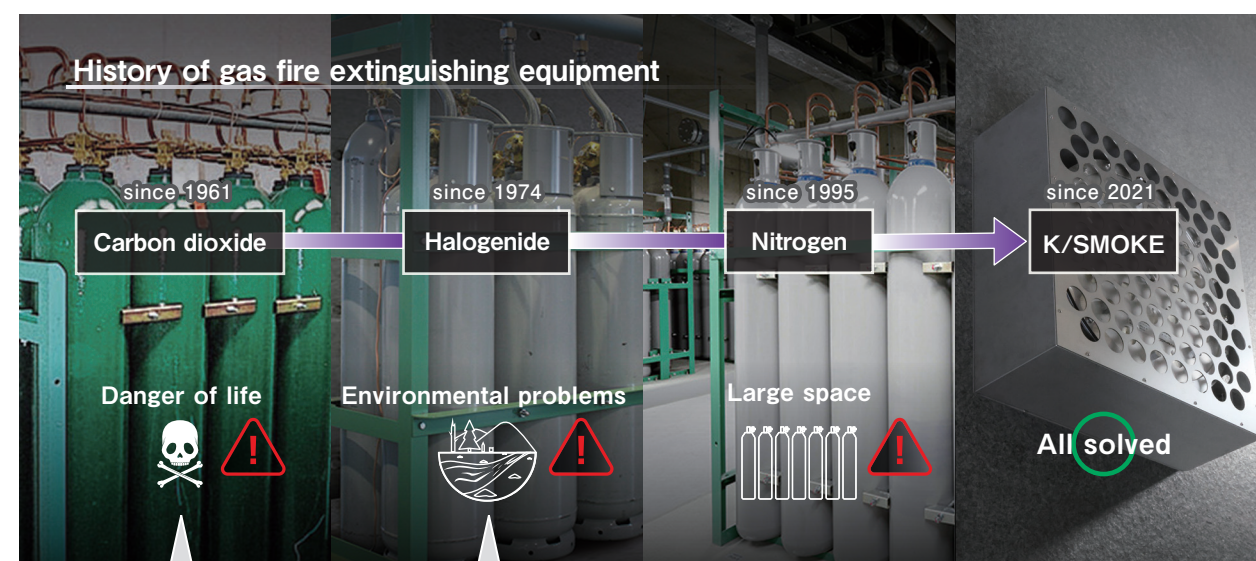
Savior to eliminate fatal accidents caused by accidental release of gas-based fire extinguishing equipment!

Harmless to human body, environment-friendly and space-saving

This is the birth of K/SMOKE GAS, a new-generation gas-based fire extinguishing system. (Patent pending)

14 Years since the idea was conceived. Finally
Approved for Fire Protection Applications!

Certified by the Minister of Internal Affairs and Communications
under Article 17-3 of the Fire Service Act (Route C).
As a result, the system can now be installed in mechanical
parking structures.



Poisonous gas generated in humans and the environment

Fire extinguishing agents used in gas-based fire extinguishing systems are feared to be installed due to accidents involving death or injury caused by erroneous release, as well as the impact on people and the environment, such as global warming and ozone layer depletion.



Improved weakness in gas fire fighting equipment

	Fire extinguisher storage container	Gas cylinder room	Piping	Radiation in places where people are present	Scale of facilities	Noise control	Temperature drop during release	Internal pressure rise measures	Equipment replacement	Pharmaceutical Procurement
K/SMOKE GAS	Not necessary	Not necessary	Not necessary	O ※ As the safety of drugs	Small	Not necessary ※ 110db or less	None	Not necessary	Easy	O ※ Domestic production
Gas fire extinguishing equipment	Necessary	Necessary	Necessary	X ※ Halon 1301 excluded	Large	Necessary	Yes	Necessary	Difficulty	X ※ Overseas imports

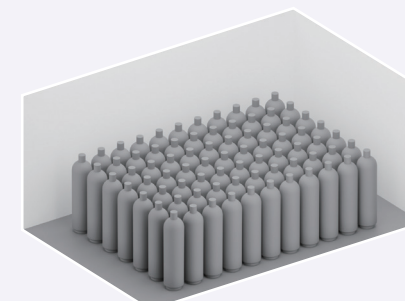
No gas cylinders or space required

Conventional nitrogen fire extinguishing equipment require a large number of pipes and valves, but K/SMOKE GAS does not require any of these.

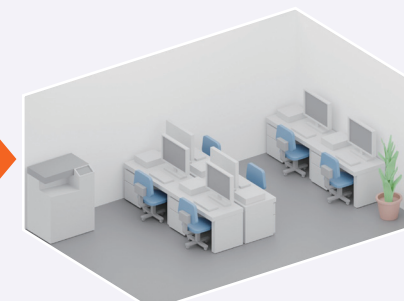
	K/SMOKE GAS	Halon 1301	HFC-227ea	Carbon dioxide	Nitrogen
Space	0m ²	9m ²	12.25m ²	14.25m ²	23.75m ²
Gas cylinder	0 bottles	18 bottles	30 bottles	41 bottles	77 bottles

(For a floor area of 1,000m² and a volume of 3,000m³)

[Nitrogen] Gas cylinder **77 bottles**



[K/SMOKE GAS] Gas cylinder **0 bottles**



Make effective
use of space!

The gas cylinder room is no longer required, allowing that space to be utilized effectively.

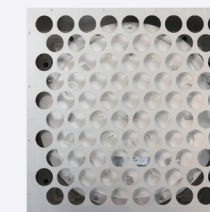
※The location of the gas cylinder room is for illustrative purposes only.

Easy installation without piping

Piping work is unnecessary and installation is simple.

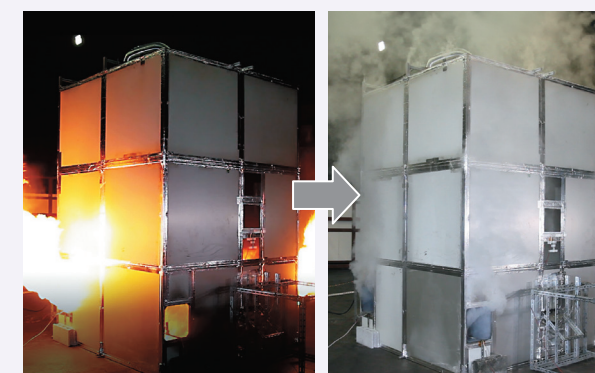
No need for gas cylinders and only fire extinguishing nozzles can be used for design.

Size	H600mm×W600mm×D200mm
Weight	50kg
Fire extinguishing ability	Approx. 27m ² /1unit



Experimental demonstration of superior fire fighting capability

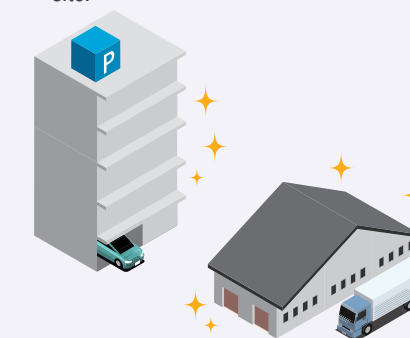
2 kg fire extinguishers are used to extinguish fires. About 3,200mL of the total 4,000mL remained in gasoline dispersed in the floors. It was extremely effective with a small amount of fire extinguishers.



12m² (2m×2m×3m)

There is little fouling, and restoration after fire extinguishing is simple.

As fire extinguishers are released as gas, there is very little residue compared to powder and foam extinguishers, and there is little risk of contaminating the fire extinguishing site.



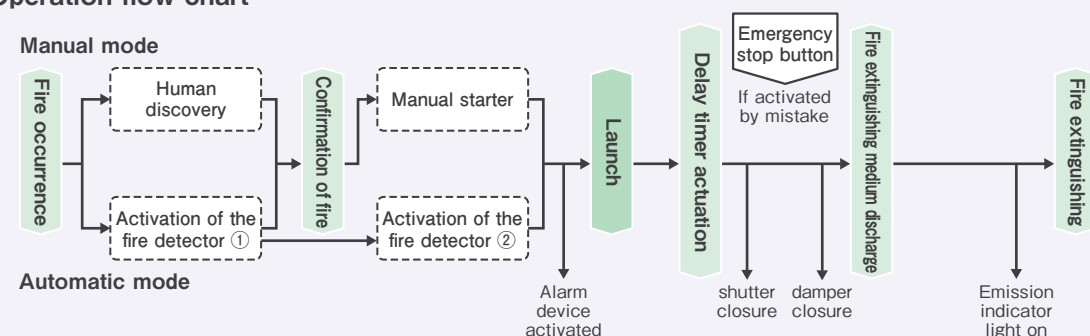


Areas to be installed

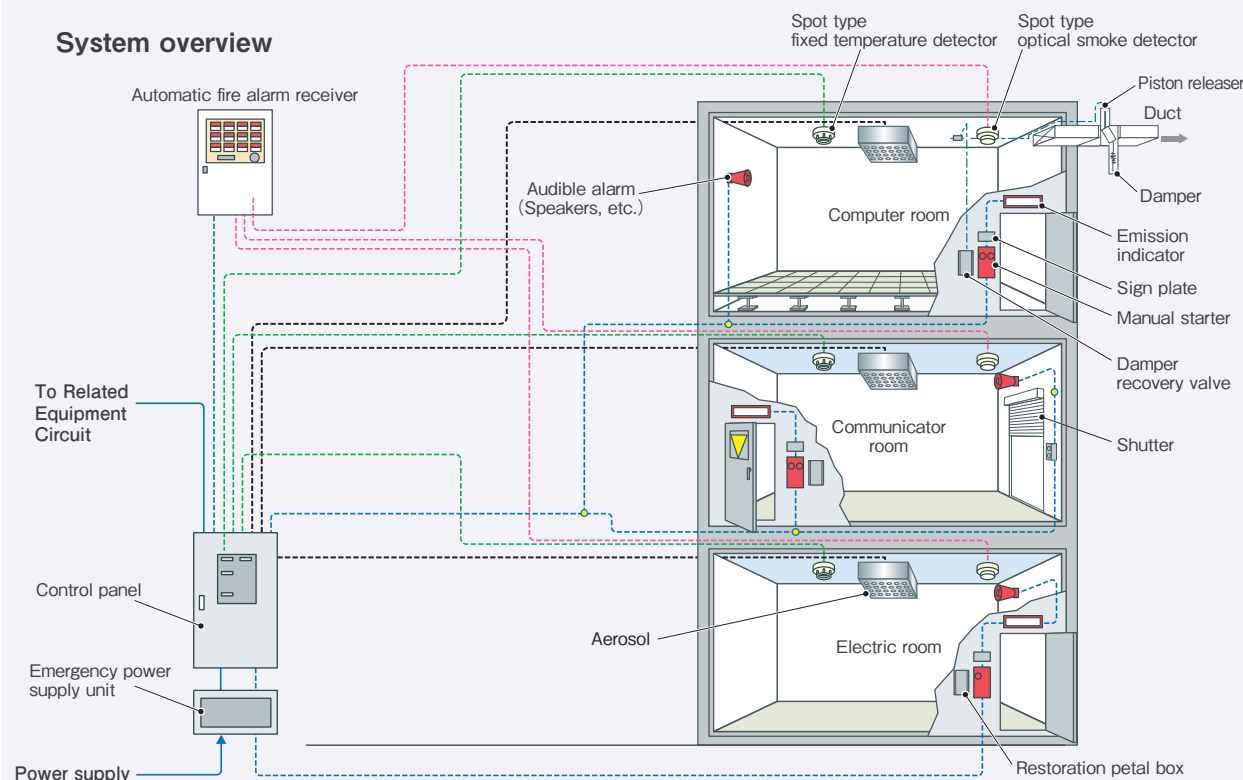
Category of use	Use regarded as the same parcel
Communications Room, etc.	Communication Room, Radio Equipment Room, Telephone Exchange Room, Magnetic Disk Room, Computer Room, Telex Room, Telephone Station Switching Room, Communication Equipment Adjustment Room, Data Printing Room
Control room, etc.	Electric control room, operation room, control room, control room, disaster prevention center, main control room, power instrument room
Electric room, etc.	Electric room, transformer room, switchboard room, UPS room, substation room, CVCF room
Generator room, etc.	GENE. RM
Cable room, etc.	EPS, joint ditch, basement pit, MDF room
Film storage, etc.	Film storage, VTR rooms, tape rooms, projection rooms, and MT rooms
Parking, etc.	Parking lot, roadway slope, car repair shop, storage
Machine rooms, etc.	Machine room, elevator machine room, air conditioning equipment room, pump room, heat source machine room, boiler room, cold/hot water generator
Library, etc.	Library, resource room, library, and medical record room
Art storage, etc.	Important Cultural Property Storage and Storage of Artistic Materials

Route C Approval Covers Mechanical parking systems! Additional Applications Are Coming Soon!

Operation flow chart



System overview



※Automatic/manual switching type using fire detectors is used as standard.

Comparison table of main gas system fire extinguishing systems

Category of extinguishing agent	K/SMOKE GAS	Inert gas		Halides	
Name of the fire extinguishing system	K/SMOKE GAS System	YN System 30MPa	Carbon dioxide fire extinguishing equipment	FM200 fire extinguisher	Halon 1301 fire extinguishing equipment
Fire extinguishing agent	K/SMOKE	N ₂	CO ₂	HFC-227ea	Hallon 1301
Fire extinguishing agent trade name	K/SMOKE	Nitrogen	Carbon dioxide	FM200	Hallon 1301
Physical properties					
Extinguishing principle	Combustion chain reaction suppression	Oxygen dilution	Oxygen dilution and cooling	Combustion chain reaction suppression	Combustion chain reaction suppression
Release method	Entire region	Entire region	Whole area, local, and mobile	Entire region	Entire region and local
Storage condition	Solid	Gas	Liquid	Liquid	Liquid
Storage pressure	None	30MPa (35°C)	5.7MPa (20°C)	4.1MPa (20°C)	4.1MPa (20°C)
Range of the filling ratio	—	—	1.5~1.9	0.9~1.6	0.9~1.6
Maximum working pressure	※	10.8MPa	10.8MPa	4.8MPa	4.1MPa
Antiphlogistic concentration	※	33.6 vol%	34 vol%	5.8~8 vol%	3.4~7 vol%
Required extinguishing agent quantity	0.17kg/m ³	0.52m ³ /m ³	0.75~1.2kg/m ³	0.59kg/m ³	0.32kg/m ³
Minimum design concentration	※	40.3 vol%	34 vol%	7 vol%	5 vol%
Maximum permissible extinguishing agent concentration	※	52.3 vol%	76 vol%	10.1 vol%	10 vol%
Release time	※	60 sec	60 sec	10 sec	30 sec
Effects on human health, etc.					
Safety of fire extinguishers themselves to humans	Safety	Safety	Danger	Safety	Safety
Field of view at release	Somewhat bad	Good	Bad	Somewhat bad	Somewhat bad
Cracked gas during fire extinguishing	None	None	None	HF	HF·HBr
Ozone depletion factor	0	0	0	0	10.0
Global warming factor	0	0	1	3,220	7,140
Incidental equipment, etc.					
Shutdown of compartment closure (damper) ventilation	Necessary	Necessary	Necessary	Necessary	Necessary
Installation of pressure relief port (relief damper)	Not necessary (Required in some cases)	Necessary	Not necessary (Required in some cases)	Necessary	Not necessary (Required in some cases)
Gas exhaust	Necessary	Necessary (Exhaust)	Necessary (Exhaust)	Necessary (Exhaust)	Necessary (Exhaust)
Application for facilities under the High Pressure Gas Safety Law, etc.					
Cylinder room area For a protective volume of 2,000m ³	Not necessary	16m ³ 52 bottles (20 units)	8m ³ 28 bottles (55kg)	9m ³ 10 bottles (Piston flow)	5m ³ 10 bottles (70kg)
Type 1 storage 3,000m ³ (30t) or more of gas [Installation Inspection]	Not necessary	24.99 m ³ /bottle (35°C) More than 121 bottles	45kg/bottle More than 667 bottles	60kg/bottle More than 500 bottles	60kg/bottle More than 500 bottles
Type 2 storage 300m ³ (3t) or more of gas [Notification of installation]	Not necessary	24.99 m ³ /bottle (35°C) 13~120 bottles	45kg/bottle 67~666 bottles	60kg/bottle 50~499 bottles	60kg/bottle 50~499 bottles

※For the installation of K/SMOKE GAS, application by Route C (Article 17, Paragraph 3 of the Fire Fighting Law) is required.
※When installing it, we will design it according to the protective object.



K/SMOKE PANEL

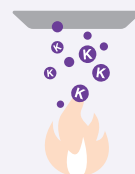
Certified as an LiB Partner by the Ministry of the Environment
Selected for the Fire and Disaster Management
Science and Technology Research Promotion Program

The number of fires involving products using lithium-ion batteries is increasing. The K/SMOKE PANEL leverages its strengths against oil and electrical fires,
This product offers fire prevention measures for lithium-ion batteries.
Also effective against gasoline fires.



Automatically activated
above 300°C

Above 300°C, automatically gasified potassium is released.
The combustion cycle is cut off and the fire is extinguished quickly.

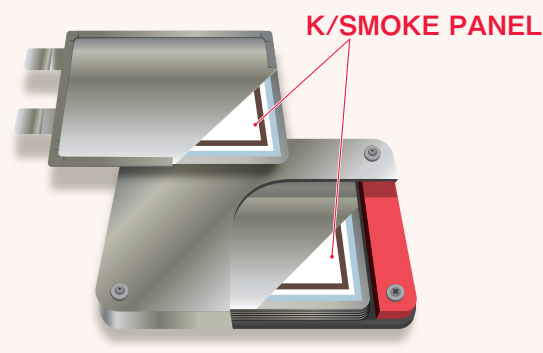


LITHIUM-ION BATTERY

Fire extinguishing on a battery cell basis

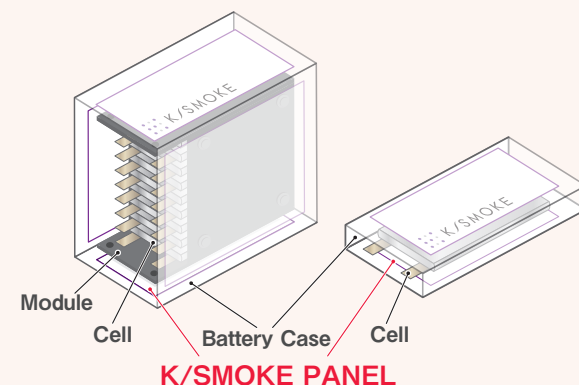
By suppressing the fire of Li-ion batteries inside the cell, the impact on the surroundings is minimized.

By putting seat-shaped K/SMOKE PANEL together, it exerts a powerful fire extinguishing effect.
Flexible design is also possible according to the shape of the lithium ion battery.



Li-ion Battery

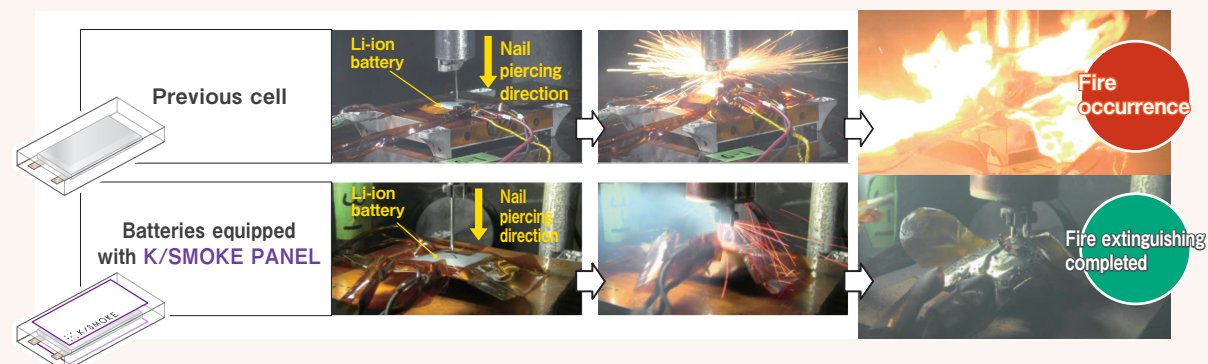
※Image



Construction of Li-ion Batteries Equipped with K/SMOKE PANEL

Li-ion battery nail piercing test

A K/SMOKE PANEL was mounted on a Li-ion battery, and nail penetration tests were carried out.
Both of them ignited due to an internal short circuit, but the batteries equipped with K/SMOKE PANEL were extinguished by releasing the extinguishing agent instantaneously.



On official YouTube
Video available!

Track Record of use

Local Governments

It has been adopted by several local governments as a measure to prevent fires during battery disposal and collection.



K/SMOKE PANEL

Cultural Heritage Sites

Adopted at Daigo-ji Temple, a UNESCO World Heritage Site in Kyoto.



PANEL

Lightweight and thin sheet-like.
It can be adapted to various building materials and installation locations.

Lineup

A5 Size : 7g	Thickness : 0.2 mm
A4 Size : 15g	
Role : 210 mm × 48 m	



※ A4 size



※ Role

SLURRY

Fluid slurry, in which particles of extinguishing agent are suspended in a liquid, can be applied to various locations because of its high viscosity liquid.



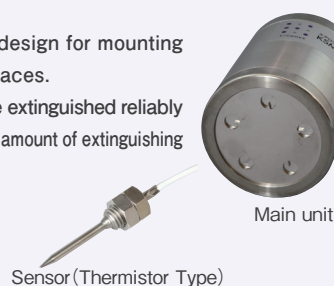


K/SMOKE DEVICE

Widely Adopted in Machine Tools and Wind Farms

POWER SUPPLY TYPE

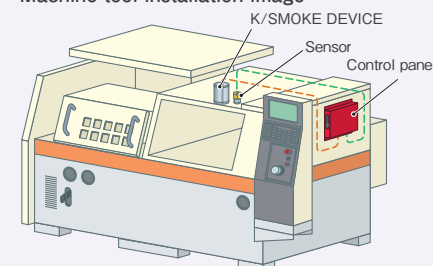
Compact design for mounting in tight spaces.
Fire can be extinguished reliably with a small amount of extinguishing agent.



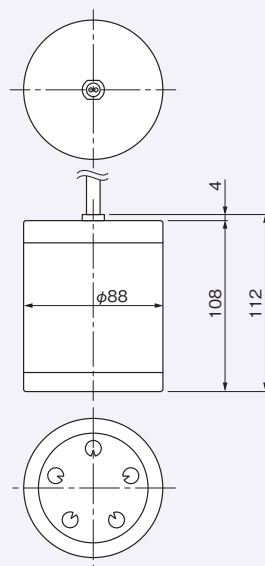
Sensor (Bimetal Type)



Machine tool installation image



Equipment drawings (Main unit)



(Units: mm)

Specifications

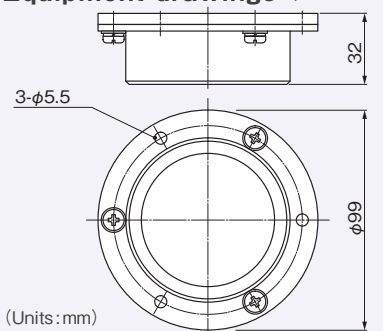
	KSM-100DA	
Total mass	Approx. 1.9 kg	
Extinguishing agent quantity	100 g (solid)	
Protective space	Max:1.80m ³ (closed system/oil fire)	
Mounting height	Max 2m	
Allowable opening	0.125m ² or less (per 1m ² of protective space)	
Release time	Within 10 sec	
Body Size	φ88 mm × 112 mm	
	GCA-KS	GCA-KS3.1DRC
Control Panel Type	GCA-KS	GCA-KS3.1DRC
Maximum number of units that can be connected	2 units	4 units
Control panel size	H.250×W.200×D.42 mm	H.325×W.250×D.90 mm
Automatic start-up	Bimetallic sensing (standard sensing temperature:70°C)	Thermistor sensing (standard sensing temperature:70°C)
Manual startup	Start-up by manual start-up button	
Operating temperature and humidity range	Indoor installation, Temp 0°C to 40°C, Humidity: 85% or less	Indoor installation, Temp 0°C to 40°C, Humidity: 5% to 85%
CE Compliant	○	
Option	DC24V output and power status signal output can be added.	

NO POWER SUPPLY TYPE

Easy installation without power supply and automatic start with heat of fire.
Fire can be extinguished reliably with a small amount of extinguishing agent.



Equipment drawings (Main unit)



(Units: mm)

Specifications

	KSM-100NB
Total mass	Approx. 270 g
Extinguishing agent quantity	100 g (solid)
Protective space	Max.1.0m ³ (closed system/oil fires)
Mounting height	Max 1m
Allowable opening	Within the combined 0.1m ² for the entire protective space
Release time	Within 10 sec
Body Size	φ99 mm × 32 mm (max.)
Startup conditions	The detection unit should continue to reach 250°C or higher for 30 sec or more.
Operating temperature range	Indoor installation -40°C to 60°C



K/SMOKE LIQUID

Certified by the Minister of Land, Infrastructure, Transport and Tourism



On official YouTube Video available!

Large-scale forest fires around the world.

This is an unprecedented breakthrough liquid firefighting agent that was created to protect precious lives and property and to realize coexistence with the natural environment. (Patent pending)

To counter forest fires that are becoming increasingly large-scale

The Australian forest fires that occurred between 2019 and 2020 are said to have spread over 12 million ha, killing 33 lives, and sacrificing more than 1 billion wildlife.

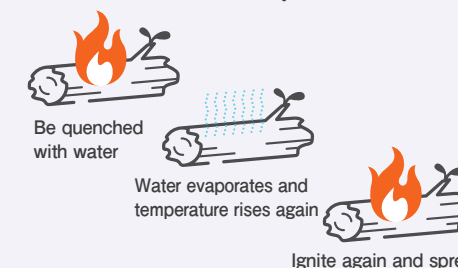


Burnt area	Fatalities	Wild animals burned to death
About 12 million ha	33 people	Over 1 billion

2019-2020 Australia / Jiji.com 2020.Feb.13

Difficulty of extinguishing forest fires, which is how to cope with the recurrence of fires

A tree that has once been extinguished by a forest fire ignites again after a while, and the fire spreads out again. Therefore, the response to "recurrent fires" is the key.



K/SMOKE

Excellent fire fighting capacity

+

WATER

Inexpensive and capable of spraying large quantities

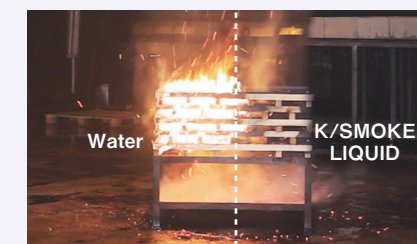
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K/SMOKE LIQUID

Epoch-making liquid extinguishing agent combining the advantages of both

Persistent fire prevention effect proved by experiment

Experiments were made by igniting wood sprayed only with water and wood sprayed with K/SMOKE LIQUID at the same time. While the water continued to burn, K/SMOKE LIQUID extinguished the fire naturally in about two minutes, and it proved to prevent the fire from recurring continuously even after it was sprayed.



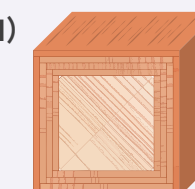
Continuously preventing recurring fire of adhesive phosphorus

Three main components are water, potassium and phosphorus. Phosphorus is an ingredient that also exists in nature and has the effect of controlling ignition. Phosphorus adhered during extinguishing continuously prevents re-ignition.



SHOUKA-MOKU™ (Fire-Resistant Wood Material)

SHOUKA-MOKU™, a fire-resistant wood material jointly developed using this product, has obtained certification from the Minister of Land, Infrastructure, Transport and Tourism.



Click here for details.

