

NKTECH

Disaster Prevention / Service Gas System,
Halon 1301, Safety Equipment



Green Promise for the People





NK is the history itself.

We have made the history sticking to its way nobody wants.
NK men are proud of the history we have made to meet what is needed by the time period as the time period is created.
NK men do not scare at the new future to create when all other people say it is not, when they say they should just pass by and when they say this is enough.
Sticking to the best being proud of ourselves as top, we will create the better picture along with the present and future progress not satisfied from the past history to make the higher dream come true based on the challenge and success history.

NKTECH
1995

THE SAFETY
2002

ENK
2005



NKFS

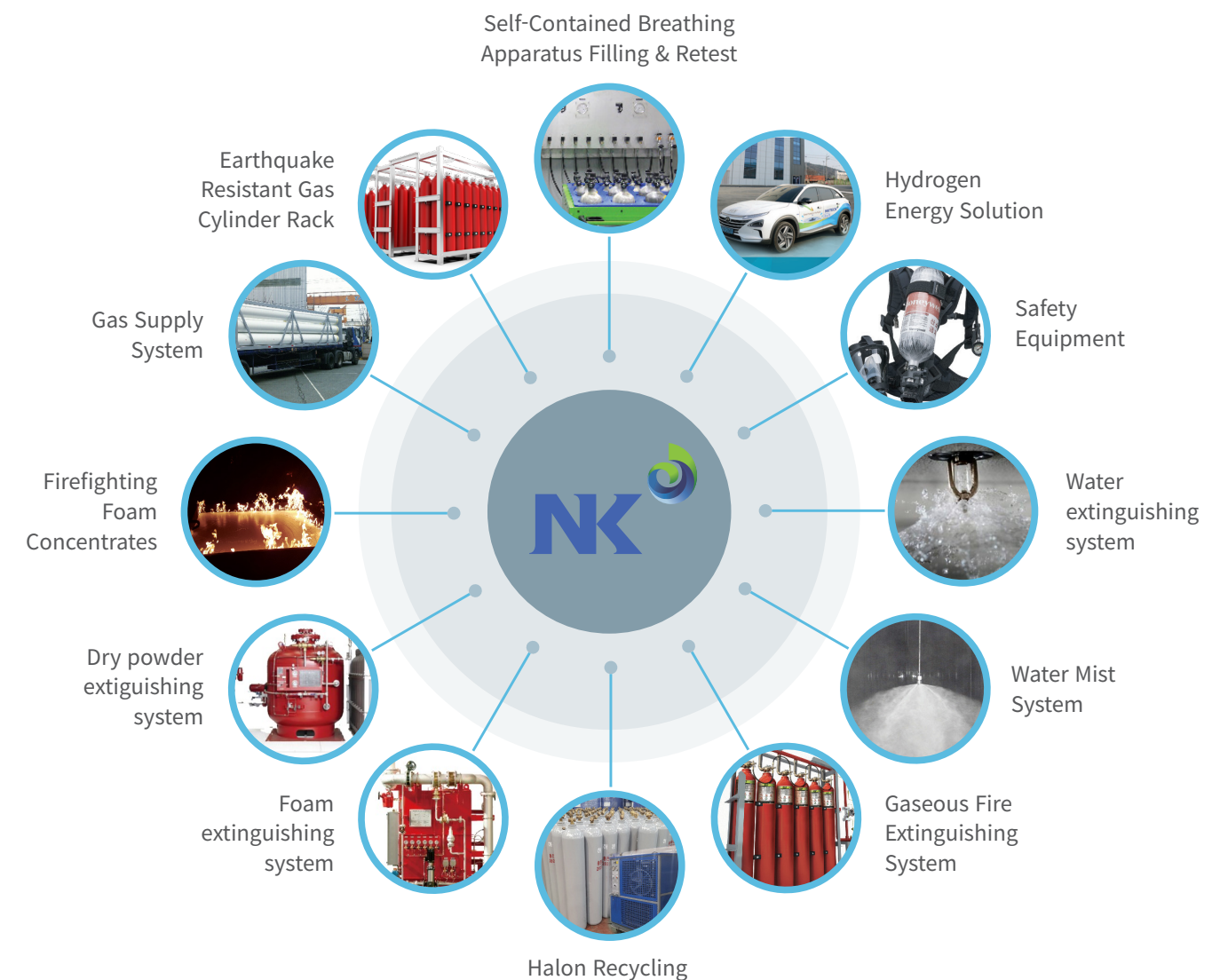
Steps towards the Future

We have made the history sticking to its way nobody wants.
NK men are proud of the history we have made to meet what is needed
by the time period as the time period is created.

- | | | |
|---------|--|---|
| 1995 | 1995.10 | Established Seho Industries Co., Ltd. |
| | 2001.01 | Renamed as NK TECH Co., Ltd. |
| | 2004.01 | Established Noksan Branch (1464-1 Songjeong-dong, Gangseo-gu) |
| | 2004.09 | Recognized as a KOLAS (Korea Laboratory Accreditation Scheme) |
| | 2004.09 | Established company-affiliated technology research center |
| | 2005.02 | Registered as a specialized fire-fighting facilities contractor |
| | 2005.08 | Constructed Mobile CNG charging facility |
| | 2006.07 | Registered as a first-class gas facility construction company |
| | 2006.09 | Certified as a promising small business in Gyeonggi-do and obtained ISO 9001, 14001 certifications |
| | 2007.04 | Received INNOBIZ certification as a technology-innovative small business |
| 2010 | 2008.07 | Received MAINBIZ certification as a management-innovative small business |
| | 2010.03 | Established Jisa Branch (1172 Jisa-dong, Gangseo-gu) |
| | 2012.02 | Completed construction of the fire suppression test site / new accreditation scale (Asan Techno Valley) |
| | 2012.11 | Obtained KFI performance certification for NKFS-HPCOz and LPCOz |
| | 2014.04 | Approved for reinspection of DOT 3AA, 3AAX, and 3T |
| | 2014.07 | Obtained KFI performance certification for NKFS-100 |
| | 2015.10 | Obtained KFI performance certification for NKFS-125 |
| | | Certified Alcohol-Resistant AFFF 3% (KR / MED) 050% |
| | 2018.04 | Certified eco-friendly mark for foam extinguishing agents |
| | 2018.04 | Approved by the U.S. Department of Transportation for special gas ultrasonic testing |
| 2020 | 2019.05 | Completed construction of Seobu-San NK hydrogen charging station |
| | 2019.08 | Obtained KFI performance certification for NKFS-227 |
| | 2021.03 | Obtained UL performance certification for NKFS-227 |
| | 2021.10 | Completed construction of Daejeon hydrogen charging station (Sindae-dong) |
| | 2021.12 | Completed construction of Cheonan hydrogen charging station (Cheonan City Hall) |
| | 2022.01 | Completed construction of Daegu hydrogen charging station (Gwaneum-dong) |
| | 2022.09 | Completed construction of Pyeongtaek hydrogen charging station (Wolgok-dong) |
| | 2023.12 | Completed construction of Gimhae hydrogen charging station (Pungyu-dong) |
| | 2024.04 | Completed construction of Boeun hydrogen charging station (Boeun-eup) |
| | 2024.09 | Obtained KFI performance certification for NKFS-5112 |
| 2024.12 | Completed construction of Seongnam hydrogen charging station (Seongnam Water Purification Plant) | |
| 2024.12 | Hyundai next-generation mobile hydrogen charging station (700BAR) 3 units | |
| 2025.03 | Completed construction of Yeonggwang hydrogen charging station (Yeomsan-myeon) | |
| 2025.05 | Completed construction of Ginje hydrogen charging station (Hadong) | |

NK Group with its quality that satisfies our clients

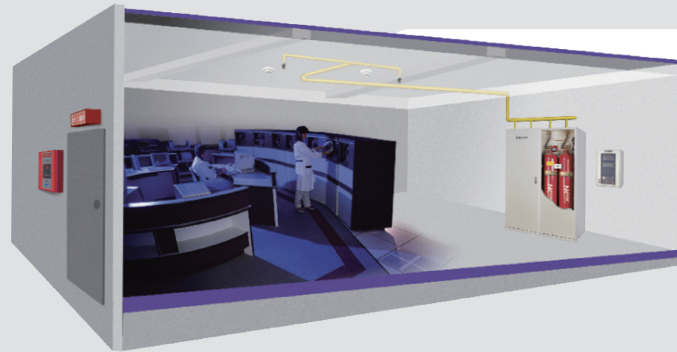
NK Group, as a leading company in various specialized fields,
is building the best technology and systems
and achieving the strongest business partnerships.



Gaseous Fire Extinguishing System

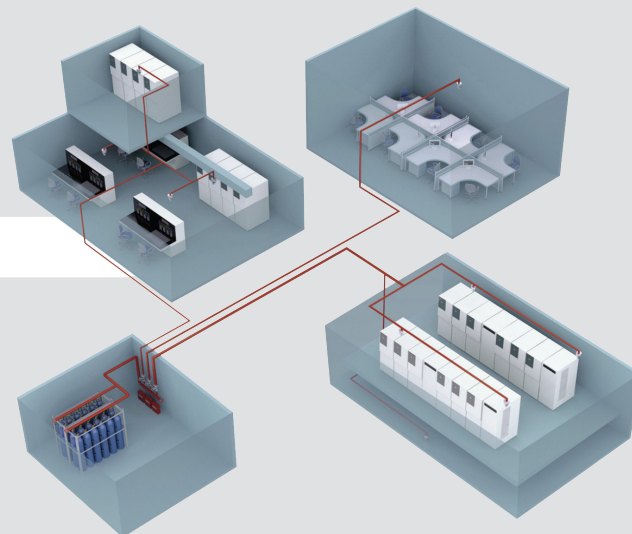
The only company in Korea providing a one-stop service from container manufacturing to fire extinguishing agent filling and reinspection

Gas fire extinguishing systems are designed using a certified design program, which meets the fire safety Technical standards (NFTC 107A) for halogen compound and inert gas fire suppression systems. This program has received performance certification from the Korea Fire Institute according to the technical standards for design program performance certification and product inspection of gas fire suppression systems.



Modular System

A method of storing fire extinguishing agents inside the protected area without installing a separate storage room and installing piping and discharge heads



Central Storage System

A method of storing the required amount of agent for the largest protected area among multiple enclosed protected areas in a separate storage room to protect one or more protected areas simultaneously

Application place of Gas Fire Extinguishing System



Communication Devices & Electrical Rooms

Communication and radio equipment rooms, data rooms, computer rooms, telephone exchanges, server rooms, electrical rooms, transformer rooms, switchgear rooms, CVCF rooms, generator rooms, non-operational generator rooms, EPS rooms, underground cable pits, cable rooms, etc



Control Rooms

Big data centers, disaster prevention centers, central control rooms, control rooms, power control rooms, monitoring rooms, operation rooms, power instrument rooms, etc



Parking Lots & Equipment Rooms

Big data centers, disaster prevention centers, central control rooms, control rooms, power control rooms, monitoring rooms, operation rooms, power instrument rooms, etc

Affects on the environment

Extinguisher System name	Hydrofluorocarbon system			Inerting system	
	HFC-227ea	HFC-125	FK-5-1-12	IG-100	HPCO ₂
Affects on the environment					
Ozone Depletion Potential(ODP)	0	0	0	0	0
Global Warming Potential(GWP) The amount of CO ₂ that creates over 100 years as a given amount of greenhouse gas	2,900	2,800	1	0	1
Atmospheric Lifetime(ALT) HFC-227ea, HFC-125, NKFS-5112	35 years	41 years	0.014 years	78% of atmospheric components	0

Affects on the human body

Maximum permissible concentration	Hydrofluorocarbon system			Inerting system	
	HFC-227ea	HFC-125	FK-5-1-12	IG-100	HPCO ₂
	10.5%	11.5%	10.0%	43.0%	No construction allowed in the residential area

Domestic-overseas market share

Market share	HFC-227ea		HFC-125		FK5-1-12		IG-100		CO ₂	
	Domestic	Overseas	Domestic	Overseas	Domestic	Overseas	Domestic	Overseas	Domestic	Overseas
	26%	40%	38%	10%	18%	20%	15%	36%	3%	4%

HFC-227ea _ An HFC-based system known for its excellent fire suppression performance and high reliability among HFC agents

IG-100 _ An inert gas system that is the most environmentally friendly within the inert gas category, containing 78% of the Earth's atmosphere, ensuring a stable supply of the agent

FK-5-1-12 _ The most eco-friendly among HFC agents, with excellent electrical insulation properties, making it outstanding for electrical fires



Film Storage

Film and tape storage rooms, VTR rooms, projection rooms, color correction rooms, MT rooms, etc



Archives & Exhibition Rooms

Archives, KARTE (medical record cards), libraries, reference rooms, document storage, exhibition rooms, art exhibition rooms, important cultural heritage storage, exhibition cases, etc



Oil Handling

Paint booths, oil storage, etc

NKFS-227[®] UL Fire Extinguishing System

This is a halogen compound fire extinguishing system that, upon initial fire detection, releases fire extinguishing agents within the protected area. It suppresses the fire by cooling combustible materials and interrupting chain reactions through chemical reactions, thereby effectively controlling the fire.

HFC227
NKFS

Approval
: Installation19-2 / KFI



Cost-saving Effects

- Lower extinguishing agent concentration and a wider range of agent discharge for reduced agent costs as storage container quantities decrease
- Utilization of specialized large-capacity 140 L storage containers without the need for separate pressurized vessels, resulting in cost savings on construction due to reduced storage space requirements
- Higher nozzle coverage area, reducing the number of nozzles needed and thus saving on accessory costs

Part No.	Description	Filling Quantity
S3-CYL-68L-1-UL	68L Cylinder Set	28kg ~ 71.4kg
S3-CYL-82.5L-1-UL	82.5L Cylinder Set	33kg ~ 86.6kg
S3-CYL-140L-1-UL	140L Cylinder Set	56kg ~ 147kg

Key Features

- Offers excellent fire suppression performance and the highest reliability among HFC systems
- Allows for variable charging methods with storage containers of 68 L, 82.5 L, and 140 L
- Operates with charging pressures of 4.2 MPa & 7.0 MPa, enabling long-distance piping designs
- Built with products that have undergone maximum height piping tests and component durability tests for reliability
- Includes pressure gauges for real-time monitoring of anomalies
- Designed using the highest distribution rate and recognition from Jensen Hughes, a global leader in fire protection engineering

Calculation Software

Jensen Hughes USA(USA)

Applicable Code

NFTC 107A & NFPA 2001 & UL 2166

Applicable Pipe

ASTM, JIS, KS SCH40 & Gloove Joint

Design Pressure

6.56 MPa

Design Temperature

0 ~ 50 °C

Discharge Time

6 ~ 10 Seconds

Design Concentration / Flooding Factor

Level A - 7.03% / 0.485kg/m³ UL : Level A - 6.70% / 0.525kg/m³
 Level B - 9.14% / 0.735kg/m³ UL : Level B - 8.71% / 0.697kg/m³
 Level C - 7.92% / 0.628kg/m³ UL : Level C - 7.02% / 0.552kg/m³

NKFS-5112[®]

This is a halogen compound fire extinguishing system with excellent electrical insulation properties and residue-free discharge after gas release, making it safe for human exposure.

FK-5-1-12
NKFS

Approval
: Installation24-3 / KFI



Cost-saving Effects

- Lower extinguishing agent concentration and a wider discharge range reduce the quantity of stored agents, resulting in cost savings
- Utilization of specialized large-capacity 140L storage containers eliminates the need for separate pressurized vessels, leading to reduced construction costs due to smaller storage space requirements
- High nozzle coverage area reduces the number of nozzles needed, thereby lowering accessory costs

Part No.	Description	Filling Quantity
S4-CYL-82.5L	82.5L Cylinder Set	33kg ~ 86.6kg
S3-CYL-140L	140L Cylinder Set	56kg ~ 147kg

Calculation Software

Jensen Hughes USA(USA)

Applicable Code

NFTC 107A and NFPA 2001

Applicable Pipe

KS S40

Filling Pressure

8.0 MPa

Design Temperature

0 ~ 55 °C

Discharge Time

4 ~ 10 Seconds

Design Concentration / Flooding Factor

A : 4.71% / 0.69kg/m³
 B : 6.11% / 0.91kg/m³
 C : 5.30% / 0.78kg/m³

NKFS-125[®]

This is a halogen compound fire extinguishing system that, upon initial fire detection within the protected area, releases fire extinguishing agents. It suppresses the fire by cooling combustible materials and interrupting chain reactions through chemical reactions.

HFC 125
NKFSApproval
: Installation15-5-1 / KFI

Part No.	Description	Filling Quantity
S1-FS-125-68L	68L Cylinder Set	35kg ~ 54kg
S1-FS-125-82.5L	82.5L Cylinder Set	40kg ~ 66kg
S1-FS-125-140L	140L Cylinder Set	44.8kg ~ 112kg

※ HFC-125(Purity : Over 99.0 %), N2 Filling Pressure : 41.37 at 21°C

Calculation Software	Jensen Hughes USA(USA)
Applicable Code	NFTC 107A and NFPA 2001
Applicable Pipe	KS S40 & Gloove Joint
Design Pressure	5.8 MPa
Design Temperature	0 ~ 55 °C
Discharge Time	6 ~ 10 Seconds
Design Concentration / Flooding Factor	A : 8.7% / 0.485kg / m ³ B : 11.31% / 0.649kg / m ³ C : 9.79% / 0.552kg / m ³

NKFS-100[®]

This system reduces oxygen levels within the protected area to below 13% upon fire occurrence, thereby extinguishing the fire through oxygen dilution. This system releases gas without leaving residues and is safe for human exposure.

IG 100
NKFSApproval
: Installation14-8 / KFI

Part No.	Description	Filling Quantity
U-FS-100-84L	84L Cylinder Set	28 MPa, 20.63 m ³
U-FS-100-80L	80L Cylinder Set	28 MPa, 19.65 m ³

※ N2(Purity : Over 99.9 %), N2 Filling Pressure : 28.0 Mpa at 21 °C, Raw Material : Italy

Calculation Software	VDS Germany(Germany)
Applicable Code	NFTC 107A and NFPA 2001
Applicable Pipe	KS S40 & S80
Design Pressure	8.0 MPa
Design Temperature	0 ~ 35 °C
Discharge Time	51.7 ~ 60 Seconds
Design Concentration / Flooding Factor	A : 37.8% / 0.475kg / m ³ B : 45.5% / 0.607kg / m ³ C : 42.53% / 0.554kg / m ³

NKFS-HPCO₂[®]

NKFS-HPCO₂ is a fixed fire extinguishing system that stores inert gas CO₂ in high-pressure gas containers. Upon detection of a fire, it releases the gas into the protected area manually or automatically. This action suppresses the fire by displacing oxygen in the atmosphere, thereby causing suffocation and providing cooling action.

HPCO₂
NKFS

Approval
: Installation12-7 / KFI
20151001-EX15807 / UL



Part No.	Description	Filling Quantity
F68.0KLEM	68L Cylinder Set	45kg
F82.5CO ₂	82.5L Cylinder Set	55kg

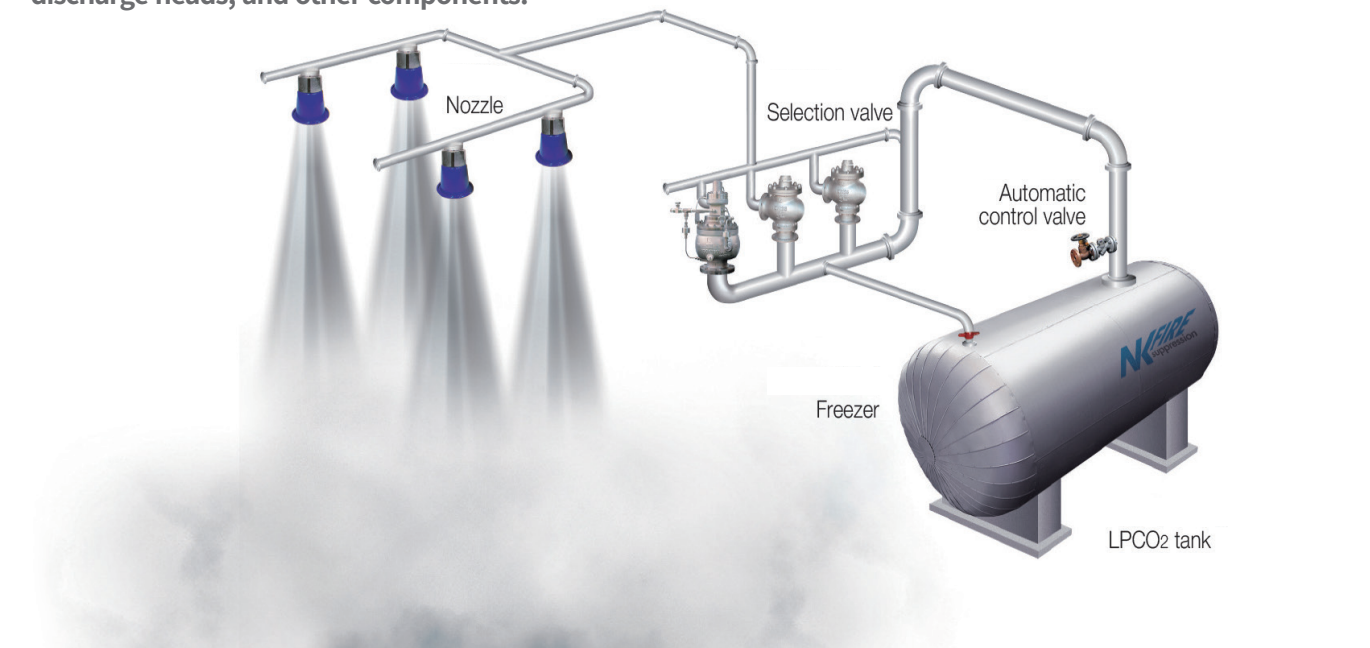
Calculation Software	NKTech, Korea
Applicable Code	NFTC 106 and NFPA 12
Applicable Pipe	KS S80 / ANSI S80
Design Pressure	11 MPa
Design Temperature	0 ~ 40 °C
Discharge Time	60 ~ 260 Seconds
Design Concentration / Flooding Factor	A.C : 50 ~ 75 % / 1.3 ~ 2.7kg / m ³ B : 34 ~ 75 % / 0.75 ~ 3.3kg / m ³

NKFS-LPCO₂[®]

NKFS-LPCO₂[®] is a fire extinguishing system that uses inert gas CO₂ stored at -18°C as liquid carbon dioxide within storage containers. The system releases the CO₂ into the protected area through spray heads, blocking oxygen and extinguishing the fire through suffocation and cooling. NKFS-LPCO₂ systems are typically composed of storage containers, automatic control valves, refrigeration units, selection valves, discharge heads, and other components.

LPCO₂
NKFS

Approval
: Installation13-1-2 / KFI



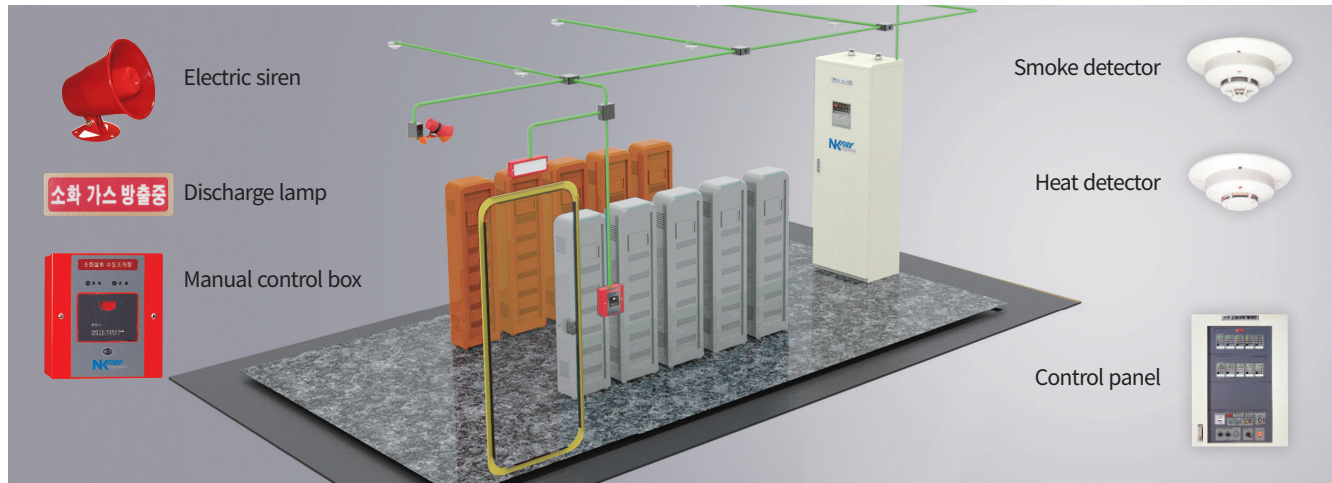
Tank Assembly

Applicable Standard	KGS code AC111, KS B6733
Material	KS D3521, SPPV490(ASTM A516-70), KS D3541, SLA360, etc
Gas Weight	0.5 ~ 50 Ton
Design Pressure	Min. 25.9 MPa
Design Temperature	- 20 °C
Operating Pressure	2.1 MPa @ -18 °C
Test Pressure	3.5 MPa(DP x 1.5 Times)

Calculation Software	GSI USA
Applicable Code	NFTC 106 and NFPA 12
Applicable Pipe	KS S40 & S80 / ANSI S40 & S80
Design Pressure	2.59 MPa
Design Temperature	-18 ~ 40 °C
Discharge Time	40 ~ 285 Seconds
Design Concentration / Flooding Factor	A.C : 50 ~ 75 % / 1.3 ~ 2.7kg / m ³ B : 34 ~ 75 % / 0.75 ~ 3.3kg / m ³

Cabinet Type Auto-Extinguisher

This fire extinguishing device is designed for initial fire suppression purposes in unmanned equipment rooms or during nighttime, capable of safely extinguishing fires using agents like HFC-227ea, HFC-125, CO₂, etc., in both automatic and manual modes.



Part No.	Description	Filling Quantity	Max. protect volume m ³
S4-CAB-68L-1	NKFS-5112 PACKAGE 1	50Kg x 1 bt	57.8
S4-CAB-68L-2	NKFS-5112 PACKAGE 2	50Kg x 2 bt	115.6
S1-CAB-68L-1	NKFS-125 PACKAGE 1	50kg x 1 bt	77
S1-CAB-68L-2	NKFS-125 PACKAGE 2	50kg x 2 bt	154
S1-CAB-68L-3	NKFS-125 PACKAGE 3	50kg x 3 bt	231
S3-CAB-68L-1	NKFS-227 PACKAGE 1	50kg x 1 bt	72.9
S3-CAB-68L-2	NKFS-227 PACKAGE 2	50kg x 2 bt	145.8
S3-CAB-68L-3	NKFS-227 PACKAGE 3	75kg x 1 bt	109.4
S3-CAB-68L-4	NKFS-227 PACKAGE 4	75kg x 2 bt	215.8
H-CAB-68L-1	NKFS-HPCO ₂ PACKAGE 1	45kg x 1 bt	45
H-CAB-68L-2	NKFS-HPCO ₂ PACKAGE 2	45kg x 2 bt	90

**NKFS-5112 / 125 / 227
1BT PACKAGE**
S1-CAB-68L-1 (W)450, (H)1900, (D)430



**NKFS-5112 / 125 / 227
2BT PACKAGE**
S1-CAB-68L-2 (W)620, (H)1900, (D)430

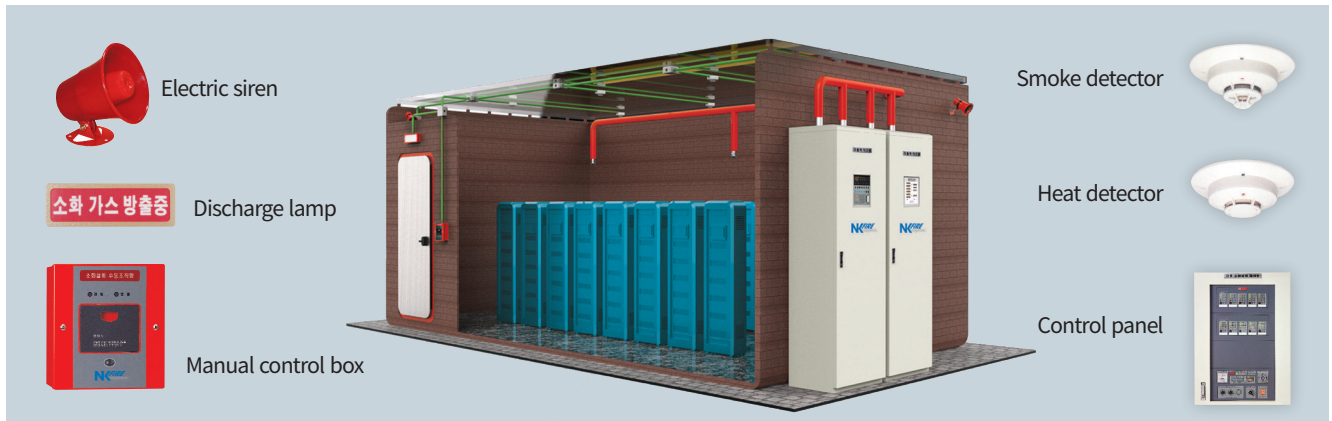


**NKFS-125
3BT PACKAGE**
S1-CAB-68L-3 (W)930, (H)1900, (D)430



Modular System Auto-Extinguisher

This system requires installation within the protected area without the need for separate storage rooms, allowing for early suppression of fires. It is compatible with systems such as NKFS-100, NKFS-125, and NKFS-227.



Part No.	Description
S1 / S3 / S4-MOD-68L-1	NKFS-125 / 227 / 5112 MODULAR
S1 / S3-MOD-68L-2	NKFS-125 / 227 MODULAR
S1 / S3-MOD-68L-3	NKFS-125 / 227 MODULAR
S1 / S3-MOD-82.5L-1	NKFS-125 / 227 MODULAR
S1 / S3-MOD-82.5L-2	NKFS-125 / 227 MODULAR
S1 / S3-MOD-140L-1	NKFS-125 / 227 MODULAR
S1 / S3-MOD-140L-2	NKFS-125 / 227 MODULAR
U-MOD-80L-1	NKFS-100 MODULAR
U-MOD-80L-2	NKFS-100 MODULAR
U-MOD-80L-3	NKFS-100 MODULAR



NKFS-CO₂ Hose Reel Fire Extinguisher

This system ensures effective fire suppression in scenarios where human presence may be limited, providing a reliable safety measure for unmanned areas or nighttime operations.

Part No.	Description	Filling Quantity
H-REEL-68L-1	NKFS-CO ₂ REEL-1	45kg x 1 bt
H-REEL-68L-2	NKFS-CO ₂ REEL-2	45kg x 2 bt

CO₂ 45kg X 2 B / T
 Working Pressure 13.8 MPa
 Discharge distance 5 ~ 6 m
 Color IVORY Powder Coating

NKFS-CO₂ HOSE REEL 1BT
Part no. H-REEL-68L-1



NKFS-CO₂ HOSE REEL 2BT
Part no. H-REEL-68L-2



Automatic Fire Suppression System

NK TECH's automatic fire suppression system is designed for small-scale protection areas such as EPS and TPS to suppress fires promptly.



※ Please note that product application standards may change without prior notice to enhance product quality and performance.
(Container colors may change due to the situation of the manufacturer.)

Automatic Fire Suppression System (NKFS-Small-Series)

Model name	NKFS-Small-951	NKFS-Small-952	NKFS-Small-953	NKFS-Small-954	NKFS-Small-955
Category	Single		Separable		
Agent amount	9.5kg x 1bottle	9.5kg x 2bottle	9.5kg x 3bottle	9.5kg x 4bottle	9.5kg x 5bottle
Fire protection volume	Level A,C	19.73 m ³	39.46 m ³	59.19 m ³	78.92 m ³
	Level B	14.08 m ³	28.16 m ³	42.24 m ³	56.32 m ³
Max. fire protection area (max. protection distance)	1 row	17.73 m ² (4.91m x 3.61m)	17.73 m ² x 2 (4.91m x 3.61m x 2)	17.73 m ² x 3 (4.91m x 3.61m x 3)	17.73 m ² x 4 (4.91m x 3.61m x 4)
	2 rows	-	17.73 m ² (4.91m x 3.61m)	17.73 m ² x 2 (4.91m x 3.61m x 2)	17.73 m ² x 2 (4.91m x 3.61m x 2)
Max. installation height	1 row	4.5 m			
	2 rows	4.5 m	9.0 m		
Total weight	15.9kg	16.1kg x 2bottle	16.1kg x 3bottle	16.1kg x 4bottle	16.1kg x 5bottle
Charging pressure	25bar@20°C(Compressed nitrogen)				
Container spec.	Height : 729mm(Valve incl.), Diameter : 165mm, Material : Aluminum(no welding)				
PRD, P/S sync	Linkable (additional device)				

6kg / 12kg Automatic Fire Suppression System(NKFS-Small-06 / 12 Series)

Model name	NKFS-Small-06 Series		NKFS-Small-12 Series			
	NKFS-Small-061	NKFS-Small-062	NKFS-Small-1201	NKFS-Small-1202	NKFS-Small-1203	NKFS-Small-1204
Category	Single	Separable	Single	Separable		
Agent amount	6kg x 1bottle	6kg x 2bottle	12kg x 1bottle	12kg x 2bottle	12kg x 3bottle	12kg x 4bottle
Fire protection volume	Level A,C	12.93 m ³	25.86 m ³	51.72 m ³	77.58 m ³	100 m ³
	Level B	9.23 m ³	18.46 m ³	36.98 m ³	55.47 m ³	73.96 m ³
Max. fire protection area (max. protection distance)	1 row	12.38 m ² (3.61m x 3.43m)	12.38 m ² x 2 (3.61m x 3.43m x 2)	24.76 m ² (6.86m x 3.61m)	24.76 m ² x 2 (6.86m x 3.61m x 2)	24.76 m ² x 3 (6.86m x 3.61m x 3)
	2 rows	-	12.38 m ² (3.61m x 3.43m)	24.76 m ² (6.86m x 3.61m)	24.76 m ² (6.86m x 3.61m)	24.76 m ² (6.86m x 3.61m x 2)
Max. installation height	1 row	4.5 m		4.5 m		
	2 rows	-	9.0 m	4.5 m	9.0 m	
Total weight	16.6kg	16.8kg x 2bottle	22.6kg	22.8kg x 2bottle	22.8kg x 3bottle	22.8kg x 4bottle
Charging pressure	25bar@20°C(Compressed nitrogen)					
Container spec.	Height : 556mm(Valve incl.), Diameter : 230mm, Material : Metal (welding)					
PRD, P/S sync	Linkable (additional device)					

16.1kg Automatic Fire Suppression System(NKFS-Small-16 Series)

Model name	NKFS-Small-1611	NKFS-Small-1612	NKFS-Small1613
Category	Single	Separable	
Agent amount	16.1kg x 1bottle	16.1kg x 2bottle	16.1kg x 3bottle
Fire protection volume	Level A,C	33.45 m ³	100.00 m ³
	Level B	23.87 m ³	71.61 m ³
Max. fire protection area (max. protection distance)	1 row	31.98 m ² (8.86m x 3.61m)	31.98 m ² x 2 (8.86m x 3.61m x 2)
	2 rows	-	31.98 m ² (8.86m x 3.61m)
Max. installation height	1 row	4.5 m	
	2 rows	4.5 m	9.0 m
Total weight	30.1kg	30.1kg x 2bottle	30.1kg x 3bottle
Charging pressure	25bar@20°C(Compressed nitrogen)		
Container spec.	Height : 735mm(Valve incl.), Diameter : 230mm, Material : Metal (welding)		
PRD, P/S sync	Linkable (additional device)		



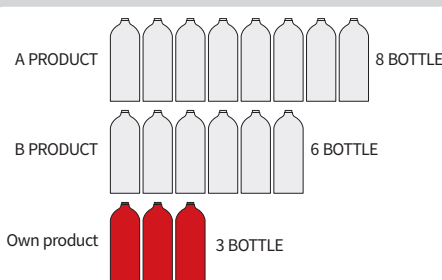
High Sensitive

- The detection unit employs an early-response sprinkler head sensitive to temperatures starting at 68°C



High Safety

- Premium products (NKFS-Small series) use high-grade aluminum containers, achieving a minimum 30% reduction in weight compared to other products. This enhances safety during installation and maintenance, reducing risks of leakage.
- To prevent safety incidents from accidental discharge of fire extinguishing agents due to damage during transport and installation, it uniquely incorporates a safety pin among gas-type automatic fire suppression devices (patent registered)



Competitive Cost

- Excellent fire suppression performance results in reduced agent consumption
- By using large-capacity products, agent consumption in protected areas can be reduced by 25% to 50%. (e.g., using 16.1kg x 3 Set products for a 100m³ protected area)

Earthquake Resistant Gas Cylinder Rack & Manifold



Structural Design Laws and Application Standards

- Seismic Design Standards for Fire Protection Facilities (Fire Agency)
- Commentary on Seismic Design Standards for Fire Protection Facilities (Fire Agency, 2022)
- Building Structural Standards by the Ministry of Land, Infrastructure, and Transport (KDS 411700)
- Enforcement Regulations of the Building Act / Regulations on Building Structural Standards

Earthquake Resistant Gas Cylinder Rack Application Scope

- Carbon Dioxide Fire Extinguishing Systems
- Halogenated Compound and Inert Gas Fire Extinguishing Systems
- Plant Service Gas Systems
- Marine Vessels

Distinctive Advantages

1. Weld-free Assembly

- **Easy Installation** : Quick and simple installation with bolt assembly, without the need for welding.
- **Versatile Installation** : Earthquake Resistant Gas Cylinder Racks can be easily assembled in desired locations such as basements.

2. Semi-permanent Corrosion Prevention

- **Wide Applicability** : Suitable for use both on land and at sea, fitting various markets and sites.

3. Suitable for Both Onshore and Offshore Use

- **Wide Applicability** : Suitable for use both on land and at sea, fitting various markets and sites.

4. Versatility in Lifting Methods

- **Flexible Lifting Options** : Provides test certificates for pressure resistance, airtightness, dimensional accuracy, and painting to ensure reliability.

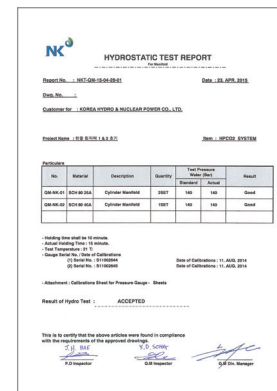
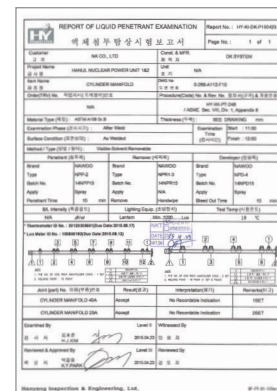
5. Provision of Test Certificates

- **Technical Verification** : Provides test certificates for pressure resistance, airtightness, dimensional accuracy, and painting to ensure reliability.

Certificate



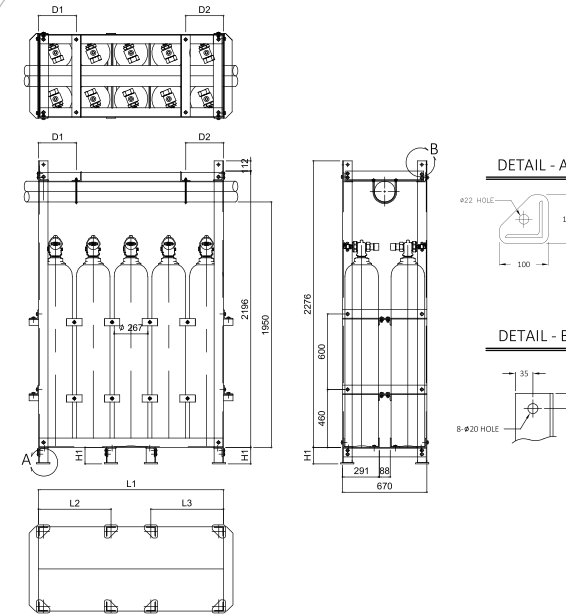
Report



Earthquake Resistant Cylinder Rack

- Direct Manufacturing at Factory (Onshore & Offshore)
- Seismic Design Compatibility: RACK manufacturing based on structural calculations, suitable for seismic design.

Reference Drawing for NKTECH HFC-125 / 227ea 68L 2-Row Seismic Rack



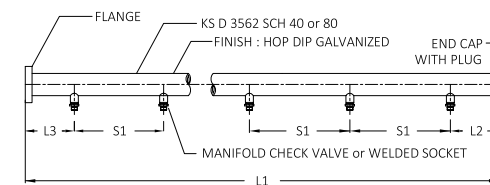
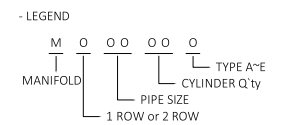
Part No.	Cylinder	Manifold	L1	L2	L3	D1	D2	H1
S1-68-NKR206	6	150A	870	-	-	285	285	130
S1-68-NKR208	8	150A	1170	-	-	285	285	130
S1-68-NKR210	10	150A	1470	581	-	285	285	130
S1-68-NKR212	12	150A	1770	881	-	285	285	130
S1-68-NKR214	14	150A	2070	881	-	285	285	130
S1-68-NKR216	16	150A	2370	1181	-	585	585	130
S1-68-NKR218	18	150A	2670	881	881	585	585	130
S1-68-NKR220	20	150A	2970	881	881	585	585	130

No.	Description	Bottle	Remark
1	Seismic Rack, Single Row	1~10 BT	68L 82.5L 140L
2	Seismic Rack, Double Row	6~20 BT	
3	γ-ANGLE	75 x 6T	Other Materials
4	c-CHANNEL	100 x 50 x 5T	
5	ANCHOR BOLT	M20	

※ For Other Drawings and Seismic Rack Sizes, Please Inquire Separately.

Manifold

- In-house manufacturing at the factory (onshore & offshore) with HYDRO TEST facilities available
- Proven track record of delivering to numerous plant sites, ensuring excellent quality
- Flange connection method adopted, allowing for on-site installation without welding



TYPE B: HFC-125/227ea 68L, 82.5L											
Part No.	Socket	L1(*)	L2	L3	S1	Part No.	Socket	L1(*)	L2	L3	S1
M1XX03B	3	1000	200	200	300	M2XX06B	6	1150	200	200	150
M1XX04B	4	1300	200	200	300	M2XX08B	8	1450	200	200	150
M1XX05B	5	1600	200	200	300	M2XX10B	10	1750	200	200	150
M1XX06B	6	1900	200	200	300	M2XX12B	12	2050	200	200	150
M1XX07B	7	2200	200	200	300	M2XX16B	14	2350	200	200	150
M1XX08B	8	2500	200	200	300	M2XX16B	16	2650	200	200	150
M1XX09B	9	2800	200	200	300	M2XX18B	18	2950	200	200	150
M1XX10B	10	31200	200	200	300	M2XX20B	20	3250	200	200	150

Installation Photos



Manifold



Earthquake Resistant Gas Cylinder Rack

Water-Based Fire Protection System

WATER MIST SYSTEM

Principle of the fire extinguishing

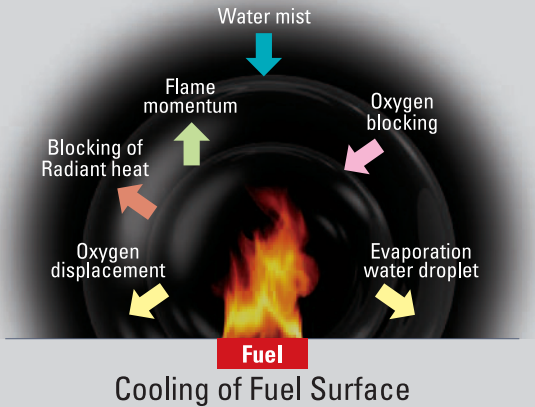
Air cooling effect
Cooling air
& high temperature surface

Inerting effect
Reduces/blocks oxygen

Additional effects
Purifies smoke/gas, shielding effect,
blocks radiant heat

Characteristics

- Maximum protection height is 8m, with a spacing between poles of 4m, ensuring excellent feasibility and cost-effectiveness during installation
- Economical due to the absence of micro noise
- Facilitated installation and assembly with the lock fitting method using sockets
- STS 316 of the body material, ensuring excellent corrosion resistance
- No clogging phenomenon in the orifices
- Less than 1,000µm of Dv0.99
Suppresses fire by moving around the obstructions
Increase in surface area - outstanding evaporation characteristics
Evaporates in flame - Lowers the oxygen concentration - Suffocation action
Lower the temperature of source of flame - Cooling fire extinction
- Can be applied to the oil and electrical fire
- Lowers the secondary damages of fire extinction
- Does not induce environmental problems

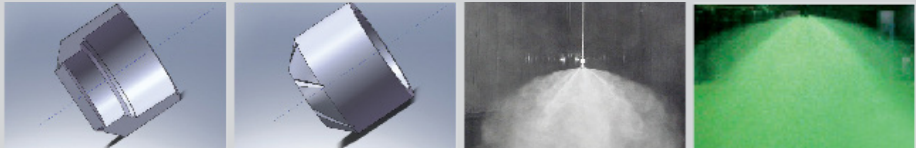


Patent No.

- | | |
|--|--------------------------|
| • Complex fire extinguishing system | 2007.01.20-20060026805 |
| • Sprial mist spray type Water Mist Nozzle | 2007.11.20-1007797290000 |
| • Change type by sprial mist spray | 2009.01.17-1003803610000 |

Approval

Local Water Mist System :
IMO MSC. Circ. 913 KR /
Total Water Mist System :
IMO MSC. Circ. 1165 & 1269 KR



Regulation

- Underwriters Laboratories Inc.(UL 2167)
- Factory Mutual Insurance(FM Class 5560)
- International Maritime Organization(IMO MSC.Circ. 913 & 1165 & 1269)
- Verband der Schadensversicherer(VdS)
- Manufacturers

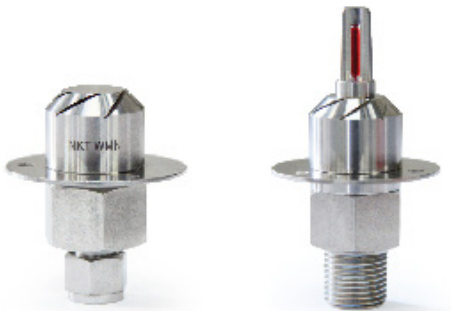
Standardization Work

- NFPA 750
- International Maritime Organization(IMO)
- CEN TC 191, WG5, Task Group Water Mist Systems

Product Parts

Product Name	Water Mist Nozzle
Model	NKFS - Water Head
Connection	15A PT, 1 / 2 lok fitting
Flow Rate	3 ~ 20 Lpm(Various Product)
Approval	Water Head17-1
Design Pressure	8 ~ 10 MPa
Droplet Size	172 ± 25 µm
Material	STS316L
Type	Open, Close

※NOZZLE PATENT & DESIGN PATENT



Product Name	Water Mist Gun
Model	NKFS-Water Gun
Connection	1 / 2" Quick Coupling
Flow Rate	Direct : 15.2~17 Lpm Water Mist : 18~20.1 Lpm Mixed : 29.2~33 Lpm
Approval	Mist Gun 17 - 2
Design Pressure	8 ~ 10 MPa
Droplet Size	160 ± 25 µm
Material	STS316L
Type	General, Lance

※GUN NOZZLE DESIGN PATENT



NKFS Water Mist Extinguishing System

Fixed pump system



Water mist FE hose reel box



Product Name	Fixed Pump System
Power Soucer	3 ph 380V or 440V
hP	30 hp ~ 60 hp
Flow Rate	128 ~ 400 Lpm
Working Pressure	120 bar
Water Volume	1 ~ 2 ton
Application	Water Mist Gun, Nozzle

SPRINKLER HEAD

FUSIBLE LINK TYPE

- This product is a high-strength integrated unit that excels in impact resistance and sealing, addressing all the shortcomings of traditional sprinkler heads.
- It features a compact protrusion that minimizes the risk of damage and boasts an elegant design suitable for residential use such as hotels, studio flat, and apartments.

Pendent Sidewall

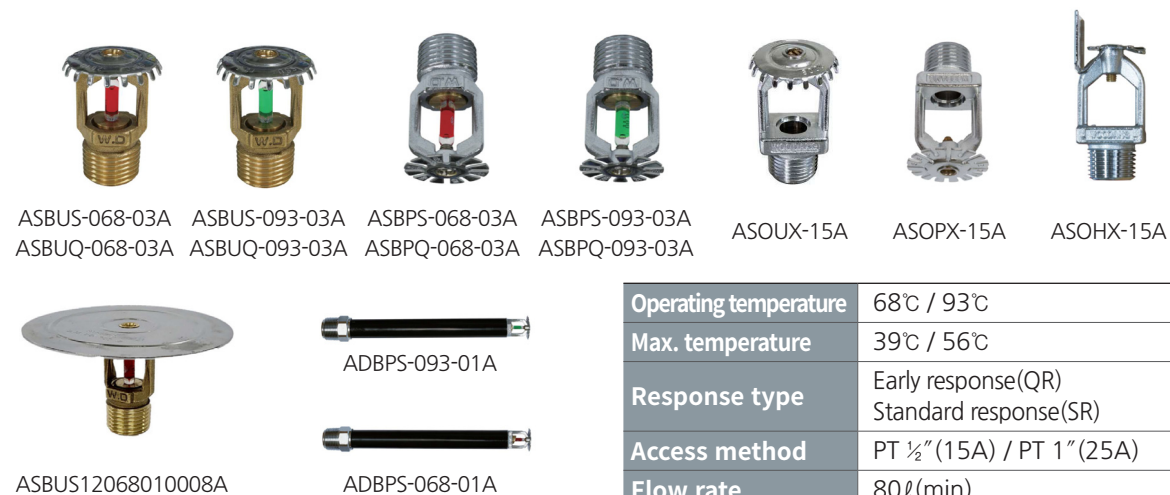


Operating temperature	72℃ / 105℃
Max. temperature	39℃ / 67℃
Response type	Early response(QR) Standard response(SR)
Access method	PT ½" (15A) / PT 1" (25A)
Flow rate	50ℓ(min) / 80ℓ(min)

GLASS BULB TYPE

- It operates by breaking a sealed glass bulb filled with liquids such as alcohol or glycerin instead of using a fuse, thereby suppressing fires
- Lightweight and compact in size

Upright Pendent Sidewall



Operating temperature	68℃ / 93℃
Max. temperature	39℃ / 56℃
Response type	Early response(QR) Standard response(SR)
Access method	PT ½" (15A) / PT 1" (25A)
Flow rate	80ℓ(min)

K115 K160



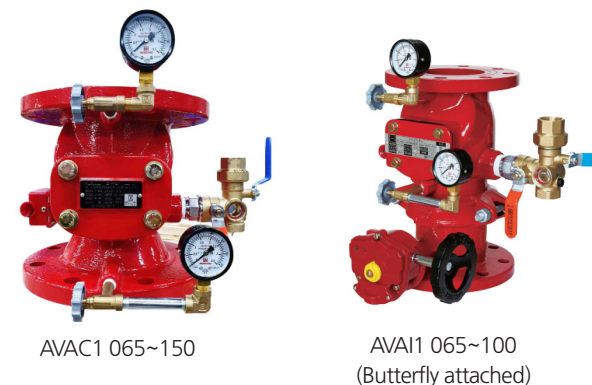
name	20A(PT / NPT)
Operating temperature	68℃ / 93℃
Max. temperature	39℃ / 56℃
Flow rate	115 LPM / 160 LPM



Alarm Valve

The alarm valve is a wet-type automatic fire extinguishing valve that supplies water to the sprinkler heads at the end of the secondary piping. It does not require separate automatic fire detection equipment. When one or more sprinkler heads operate, the clapper opens, triggering a fire alarm, and releasing firefighting water to the fire location.

Flange Type



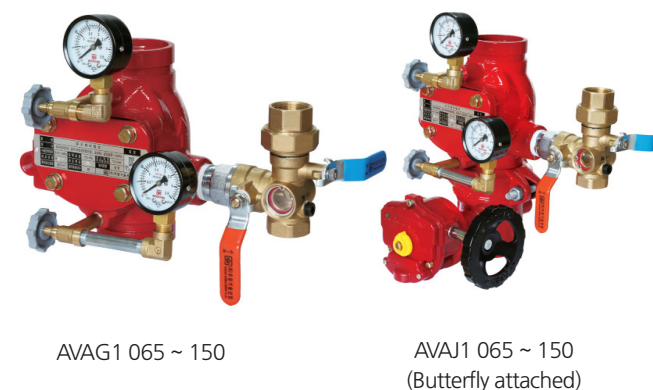
Model no.	AVAC1 065~150	AVAI1 065~100
Dimension	1MPa - 65A ~ 150A	1MPa - 65A ~ 100A
Pressure scope	0.15 ~ 1.4MPa	
Operating method	Clapper swing	
Access standard	KS B 1511 1MPa FF Flange	
Applicable liquid	Water	

Anti-groove Type



Model no.	AVAE1 065 ~ 100
Dimension	1MPa - 65A ~ 100A
Pressure scope	0.15 ~ 1.4MPa
Operating method	Clapper swing
Access standard	KS B 1511 1MPa FF Flange + KS B 1507 Groove joint
Applicable liquid	Water

Groove Type



Model no.	AVAG1 065 ~ 150	AVAJ1 065 ~ 150
Dimension	1.0 / 1.6MPa(65A ~ 150A)	
Pressure scope	0.15 ~ 1.4MPa / 2.1MPa	
Operating method	Clapper swing	
Access standard	KS B 1507 Groove joint	
Applicable liquid	Water	

HALON 1301 Private Operator of Halon Bank

Due to regulations under the Montreal Protocol for ozone layer protection, which were legislated domestically (Knowledge Economy Ministry Notice No. 2010-18, 2010.01.20), production has been prohibited. However, it is still used for essential purposes. In order to establish the requirements for private sector operations, we have obtained KFI type approval (No. 19-6) for a Halon compound B-grade fire extinguishing agent with a concentration of 4.2% (for facilities) and Halon manufacturing permits. The compound, known domestically as Halon 1301 and maintaining a colorless and odorless gas state at room temperature, is bromotrifluoromethane. Although current production is banned, we possess facilities capable of recovering and recycling used Halon gas (purity of 99.6% or higher). Additionally, we comply with quality standards set by the American Material Testing Association's testing criteria and methods (ASTM-5632-17 Type2), enabling us to recycle Halon gas below 99.6% purity using separate regeneration devices, thereby maintaining the highest domestic quality standards.

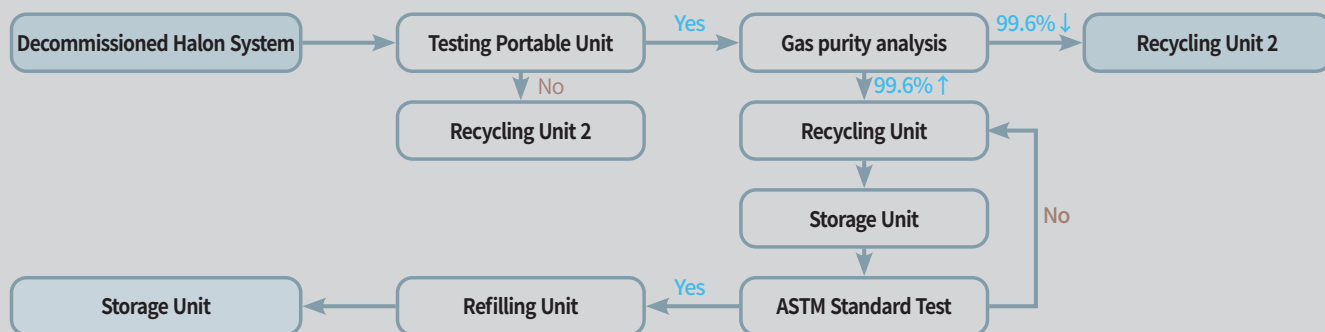
Buy and Sell

We purchase and sell containers in all forms, including cylinders attached to the system, portable fire extinguishers, and tanks.



Recycling

We possess a device capable of recycling HALON 1301 to the highest quality standards, meeting the unique ASTM-5632-17 Type2 criteria set by the American Materials Testing Association for quality standards and methods.



Application Aeroengine, generator, military/space industry



Firefighting Foam Concentrates

- Producing a variety of these agents for supply to domestic petrochemical complexes, large vessels, aircraft hangars, and fuel storage facilities by leveraging our manufacturing expertise in marine fire suppression agents
- A track record of supplying for over 5 years to domestic shipyards including Samsung Heavy Industries, Hyundai Heavy Industries, Daewoo Shipbuilding & Marine Engineering, Hanjin Heavy Industries, and Sungdong Shipbuilding
- Obtained MED (Marine Equipment Directive) B + D certification under stringent IMO (International Maritime Organization) Rules, which require stricter standards than those for land-based applications & rigorous post-annual inspection quality management
- Registered with KR (Korean Register of Shipping) & recognized as a specialized inspection agency for marine fire suppression agents & conducting quality inspections for fire suppression agents used on ships worldwide



NKFS-Foam supplies eco-friendly high-performance products.

- Prohibited substances : APEOs, alkylphenol ethoxylates / APDs, alkylphenolderivates / ethylene glycol / PFOS, perfluorooctane sulfonate PFHxS, perfluorohexanesulfonate / PFOA, perfluorooctanoate / 8:2 FTOH, 8:2 fluorotelomer alcohol
- Below the standard of harmful element content : Pb, As, Cd, Hg, Cr, Cu, Ni, Zn • Biodegradable & no acute toxicity
- Aqueous Film Forming Foam (AFFF 3% ICAO C) complies with the standards set by the International Civil Aviation Organization (ICAO) Level C rating. It excels in firefighting and rapid extinguishing performance

Category	Aqueous film forming foam for land use				
	 			 	
Model name	ECO AFFF 33	AFFF 3%	AFFF 3% IACO C	ECO AFFF LT 33	AFFF LT 3%
Name	Eco-friendly aqueous film forming foam for freeze protection	Aqueous film forming foam for freeze protection	High performance aqueous film forming foam	Eco-friendly aqueous film forming foam for extra freeze protection	Aqueous film forming foam for extra freeze protection
Concentration	3%				
Approval no.	Apx. 22-61	Apx. 22-57	Apx. 22-63	Apx. 22-62	Apx. 22-53
Viscometer(cSt)	6.0	6.0	6.8	7.4	6.0
Storage temp.(℃)	-10 ~ 50			-20 ~ -50	
Flow point(℃)	-12.5			-22.5	
Common spec.	Package unit(L) : 200 / 1,000 Storage period : 15years Ph(20℃) : 7.0 ~ 9.5 Weight : 1.01 ~ 1.20 Appearance : Light yellow				



Eco-Friendly Foam Fire Extinguishing Agent

Eco-friendly alcohol-based and water-based film-forming foam fire extinguishing agents are biodegradable products that reduce regional environmental pollution and harmful substances without compromising fire extinguishing performance.

Environmental Label Certification : A nationally certified product that reduces energy and resource consumption throughout all stages of production and minimizes the generation of pollutants among products of the same purpose.



High Expansion Foam Fire Extinguishing Agent

High expansion foam fire extinguishing agents, based on synthetic surfactants, enable rapid fire suppression with an expansion ratio exceeding 500 times. They are effective for surface fires (ship engine rooms, boiler rooms, aircraft hangars, tunnel fires, large warehouses). Unlike gas-based fire suppression systems, they have minimal impact on the sealing of protected spaces and low risk of asphyxiation, providing excellent protection for life and property.



Alcohol Foam Fire Extinguishing Agent

Alcohol foam fire extinguishing agents are highly effective against hydrocarbon, alcohol, and water-soluble flammable fires. By forming a polymer gel on the liquid surface that is poorly soluble in aqueous polar solvents, they block vapor and quickly coat the combustion surface for effective smothering. They exhibit excellent fire extinguishing performance not only for class A and B fires but also for alcohols, ethers, and various chemicals.



Aqueous Film Forming Foam Fire Extinguishing Agent

Aqueous film forming foam fire extinguishing agents enhance firefighting capabilities by strengthening film-forming functions. Based on fluorosurfactants, they quickly coat fuel surfaces to block oxygen and suppress vapor, forming an aqueous film for effective smothering. They demonstrate excellent fire extinguishing performance for most class A and B fires.

Category	Aqueous film forming foam for land use			For marine use	
	Alcohol foam			Alcohol foam	High expansion foam
Model name	ECO AR AFFF 3%	AR AFFF LT 3%	AR AFFF 3%	NKT-AR33	NKD-101M
Name	Eco-friendly alcohol foam	Alcohol foam for extra freeze protection	Alcohol foam for freeze protection	Alcohol foam	High expansion foam
Concentration	3%			3%	1%
Approval no.	Apx. 22-57	Pending	Apx. 22-52	MED-MB-1051-16 / 19.10305296	MEDB00006NS
Viscometer(cSt)	630	600	200	395	15
Storage temp.(°C)	-10 ~ 30	-20 ~ 50	-20 ~ 30	-5 ~ 50	0 ~ 50
Flow point(°C)	-12.5	-22.5	-22.5	-10	-5
Common spec.	Package unit(L) : 200 / 1,000 Storage period : 15years Ph(20°C) : 7.0 ~ 9.5 Weight : 1.01 ~ 1.20 Appearance : Light yellow			Package unit(L) : 200 / 1,000 Storage period : 15years Ph(20°C) : 7.0 ~ 8.0 Weight : 1.02 Appearance : Light yellow	

※Please note that product application standards may change without prior notice to enhance product quality and performance.

Self-Contained Breathing Apparatus

Composed of air cylinders, regulators, masks, etc., it is protective equipment worn in oxygen-deficient environments, places with dust, and where hazardous gases are emitted, ensuring safe operations.

HANCOM Life Care Breathing Apparatus

It complies with the regulations under the High-Pressure Gas Safety Management Act and is a nationally certified firefighting product subject to U.S. D.O.T. inspection.



Category		SCA300	SCA680	SCA790
total (weight of extra mask & air exclud.)		Under 7kg	Under 9kg	Under 11kg
Usage time (40L/min when breathing)		Apx. 30 min	Apx. 45 min	Apx. 60 min
Charging gas		Air		
Related test		Inspected Products by Korea Fire Institute		
Container	Material	Carbon Cylinder (Fulity Wrapped Composite Cylinders)		
	Inner volume	Apx. 4.7 L	Apx. 6.8 L	Apx. 9.0 L
	Max. charging air capacity	Apx. 1,457 L	Apx. 2,040 L	Apx. 2,790 L
	Weight(air & valve exclud.)	Apx. 3.2kg	Apx. 3.6kg	Apx. 5kg
	Max. charging pressure	Apx. 310 bar	Apx. 300 bar	Apx. 310 bar
	Pressure proof test pressure(TP)	Apx. 517 bar	Apx. 500 bar	Apx. 517 bar
Related test		Testing products of Korea Gas Safety Corporation & US DOT		

HONEYWELL Breathing Apparatus

The flashing device (VAD) on the HONEYWELL TITAN C450PLUS air respirator serves as a residual pressure warning device and is explosion-proof certified (EX ib IIB T4).

What is explosion-proof certification? It is a certification system that verifies the safety of products used in explosive environments. In Europe and the United States, explosion-proof certification for electronic equipment used in air respirators is a mandatory requirement (EN137, NFPA1981).



Category		C300	C450	C600
total (weight of extra mask & air exclud.)		Under 7kg	Under 9kg	Under 11kg
Usage time (40L/min when breathing)		Apx. 30 min	Apx. 45 min	Apx. 60 min
Temperature		-20 °C ~ 60 °C		
Exhaust impedance		Below 71.4 mmH2O		
Sight angle		Above 230°		
Container	Material	Carbon container(Type 3)		
	Inner volume	Apx. 4.7 L	Apx. 6.8 L	Apx. 9.2 L
	Max. charging air capacity	Apx. 1,457 L	Apx. 2,040 L	Apx. 2,852 L
	Function pressure	Apx. 310 bar	Apx. 300 bar	Apx. 310 bar
	Test pressure(TP)	Apx. 517 bar	Apx. 500 bar	Apx. 517 bar
	Safety Certifications	Approved by Korea Fire Institute (KFI) / Certified by Korea Gas Safety Corporation		

NKFire CO₂ Fire Extinguisher (Aluminum/Steel)



Why NK Fire Aluminum Fire Extinguisher?

Non-corrosive

Lightweight

Clean

Strong

Economical

Type & Model Name	CO2 2.3kg (Aluminum)	CO2 4.5kg (Aluminum)
Approval no.	Hydrogen 05 - 6 - 2	Hydrogen 05 - 18 - 1
Agent weight	2.3kg	4.5kg
Agent	CO ₂	CO ₂
Total weight	6.6kg	12.2kg
Discharge distance	2 ~ 3 m	2 ~ 3 m
Fire class	B1, C	B3, C
Test pressure	24.5 MPa	24.5 MPa
Range of temp.	- 20 ~ 40 °C	- 20 ~ 40 °C
Safety Valve Pressure Relief Device (PRD)	17.6 ~ 24.5 MPa	17.6 ~ 24.5 MPa
Discharge time	20 Seconds	24 Seconds

Safety Charging Case

Performance Conditions of Safety Charging Case

During the charging of an air respirator cylinder, the safety charging case remains upright and does not topple over even in the event of a cylinder rupture. It ensures safety by preventing any damage to its exterior and the ejection of metal fragments. Additionally, neighboring cylinders being charged do not rupture.

Features

- The safety charging case is robustly designed and reinforced.
- The charging pressure can be easily adjusted using an On-Off valve.
- The assembly method of the external cover facilitates maintenance.



www.nktech.co.kr

Service Gas System



The service gas system is applied for corrosion prevention, cooling, and gas exchange in power plant piping and equipment. The N₂ gas supply device is used for internal sealing to prevent corrosion in piping and devices that use steam generators or water.



The service gas system is applied for corrosion prevention, cooling, and gas exchange in power plant piping and equipment. The N₂ gas supply device is used for internal sealing to prevent corrosion in piping and devices that use steam generators or water.

Air Respirator Cylinder Charging and Reinspection



KOLAS
(Korea Laboratory
Accreditation Scheme)

To ensure safety, the charging of air respirator cylinders must be conducted at facilities equipped with safety measures as stipulated by law. Movement of charged cylinders should be carried out using registered or permitted vehicles by individuals who have undergone safety training. Additionally, inspections of air respirator and scuba cylinders are mandated every 3 to 5 years by specialized inspection agencies to prevent hazards associated with high-pressure gases and to ensure public safety.

Safety inspections & charging under the High Pressure Gas Safety Management Act

As a licensed high-pressure gas manufacturer (charger) and certified inspection organization (KOLAS), we manage device maintenance according to the "Standard for Respiratory Protective Equipment Safety Management."

Air quality analysis

Every 6 months or recommended usage time (1,000 hours)



Air Charging Permit

Most incidents involving cylinder accidents occur during charging, hence charging must be conducted at facilities equipped with safety measures as per the **High Pressure Gas Safety Management Act Article 4**.

Purification of charging unit filters

Every 2 weeks or recommended usage time (100 hours)



High Pressure Gas Transporter Registration

After charging, cylinders must be transported by individuals who have received safety training using registered or permitted vehicles, as mandated by the **High Pressure Gas Safety Management Act Article 5-4**.



Cylinder Inspection

To prevent hazards associated with high-pressure gases and ensure public safety, all high-pressure gas cylinders must undergo inspections every 3 to 5 years by specialized inspection agencies, according to the **High Pressure Gas Safety Management Act Article 17**.

Internal Pure Water Treatment & Hygiene Inspection / Charging Process



Internal Pure Water Treatment

To prevent internal corrosion, cylinders are thoroughly rinsed with ultra-pure water ranging from 2MΩ to 10MΩ.

Water → Filtration device → Reverse osmosis filtration device → Mixed bed ion exchange resin column → Ultrafiltration device → Ultra pure water



Hygiene Inspection

Inspect internal conditions of the cylinder such as foreign substances, corrosion, lining, thread corrosion, cracks, etc.



Air charging - Charging rate: 2 ~ 4 MPa/min

- Maintain air cleanliness by analyzing air quality every 6 months
- Charge in a dried state after ultra-pure water rinsing to minimize corrosion
- Manage charging rate to protect the cylinder
- Use internationally validated chargers and regularly maintain charger components and inspections



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