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Kfire

ELECTRIC VEHICLE FIRE SUPPRESSION SOLUTION

always ready for danger and hopes everyone's safety.

Hankook Fire Fighting Equipments Co.,Ltd

Kfire ELECTRIC VEHICLE FIRE SUPPRESSION SOLUTION

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Difficulties of extinguishing **Electric Vehicles** fire

Electric vehicles may have a risk of fire due to external impact or during power charging. It is difficult to suppress the fire completely with a general fire e suppressing method.

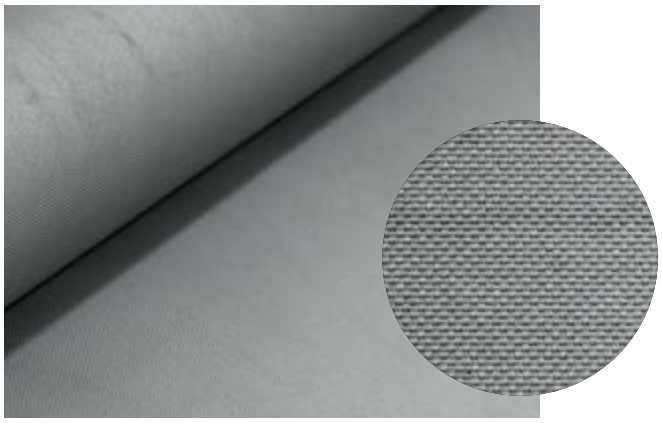
Kfire has a variety of fire suppressing solutions based on fire preventing fire cover KEV-Cover which it can prevent initial spread of fire and reduce casualties and property damage.

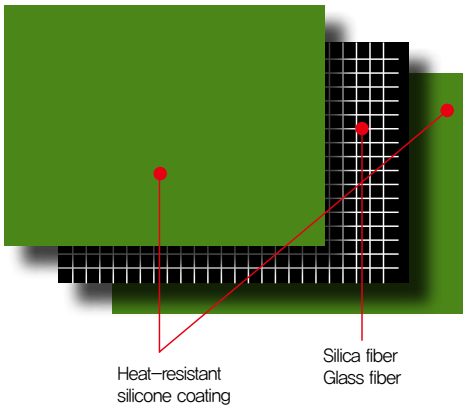
By analyzing the usage environment, we provide consulting on fire prevention and suppression solutions by applying a fire extinguishing water tank (KEV-WT), a fire suppressing robot (KAION) and a fire preventing fire cover (KEV-COVER) under optimal conditions.

Products

	Standard	Premium	Details
Fire Cover	KEV-cover-01 Glass Fiber	KEV-cover-02 Silica Fiber (High heat resistance)	Prevention of initial spread of electric vehicle fire.
Portable Fire Extinguishing Water Tank	KEV-WT-01 Charge with air respirator	KEV-WT-02 Storage volume, weight 30% ↓	Move to accident site for installation. Charging water tank with air respirator. Used with fire cover.
Fixed Fire Extinguishing Water Tank	KEV-WT-101	-	Installed at an electric vehicle charging station and capable of responding. immediately to a fire during charging.
Fire Fighting Robot	KAION	-	Fire detection, fire prevention, and internal water injection in to fixed fire extinguishing water tank.

■ Fire Cover (KEV-Cover)





| Material Used |

Fabric

Soft and flexible to cover fire objects as if they were wrapped around them. Silica fiber and glass fiber can be applied depending on the use environment.

Coating

Storing and using increases the durability of the fabric and may harden the silicone during fire exposure. Maximize choking performance by maintaining non-combustibility.

| How to use |

1. Electric Vehicle Fire

2. Move the KEV-cover storage carrier to the accident site and open it.

3. Select the position and spread the fire cover horizontally(6m).

4. Hold the KEV-cover from both sides of the spread KEV-cover and deploy it in a longitudinal direction (9 m) to cover the accident vehicle.

5. Cover the vehicle completely and step on the floated area to maximize the suffocation effect.

| Storage |

Type A

Fire cover 1EA, Fire Extinguisher

Type B

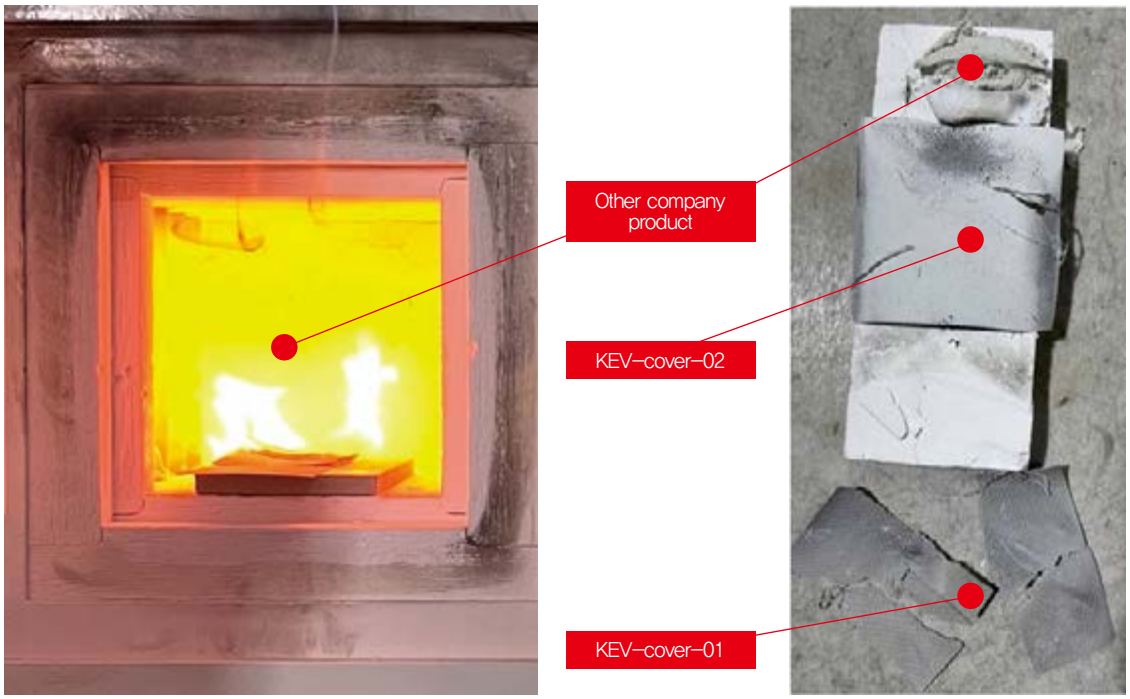
Fire cover only

| KEV-cover SPEC |

	KEV-cover-01	KEV-cover-02
Fabric	Glass Fiber(Glass Wool)	Silica Fiber
Coating	1 silicone coating / Dipping	1 silicone coating / Dipping
Size	6m × 8m	6m × 8m
Product weight	26.5kg	23.5kg
Unit weight	555g/㎡	490g/㎡

*Product specifications(Fabric, Coatings and size) can be adjusted after consultation.

| Heat resistance test |



• Test method
Exposed to 1000℃ heating for 15 minutes and visually determined condition

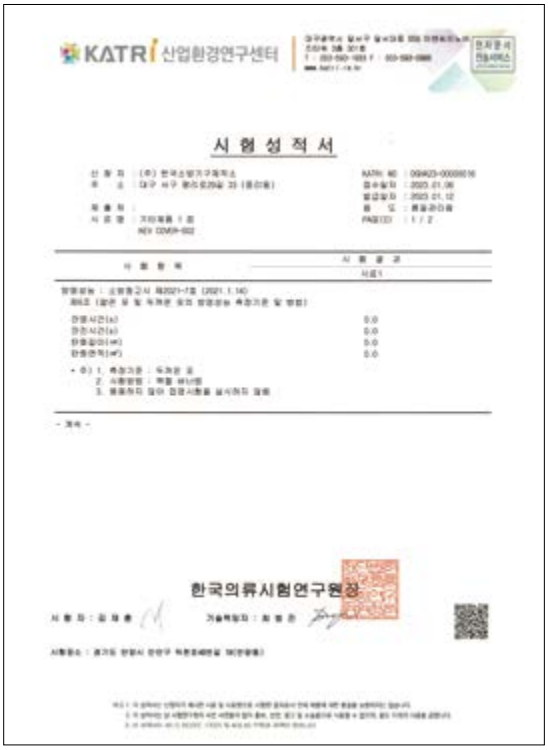
• Comparison
1. Other company product
2. KEV-cover-02
3. KEV-cover-01

Other company product	Combustion
KEV-cover-02	Hardened. Maintains fabric shape even with impact
KEV-cover-01	Hardened, broken with slight impact

| Test & Analysis of Fire Cover |

KEV-cover-01

KEV-cover-02



Test category	Test method	Unit	KEV-cover-01	KEV-cover-02
Piercing Strength	ISO 13996:1999	N	15.0	34.0
Flame Protection Performance	Korean Fire Athourity Notice Article 6 No. 2019-20	-	-	-
After flame time	-	s	0.0	0.0
After glow time	-	s	0.0	0.0
Char length	-	cm	0.0	0.0
Char area	-	m^2	0.0	0.0
Flame contact	-	Times		
Heat Shrinkage	ISO 17493:2016	Warp%	0.0	0.0
		Weft%	0.0	0.0
Ignition	Appearance inspection	-	Not Found	Not Found
Melting and dripping	Appearance inspection	-	Not Found	Not Found
Char	Appearance inspection	-	Not Found	Not Found
Hole	Appearance inspection	-	Not Found	Not Found
Spread	Appearance inspection	-	Not Found	Not Found
Deformance	Appearance inspection	-	Not Found	Not Found
Wear and tear resistance	KS M ISO 5470-1:2002(Taber)	50 times	Coating failed	Surface coating failed

■ Portable Fire Extinguishing Water Tank

This is an assembled cooling tank used with the asphyxiating fire cover KEV-cover.

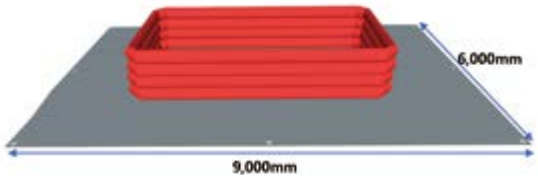
KEV-WT-01

Air Volume	3,000L
Air Charging	Within 3 minutes (use air respiratory containers)
Installation Size	5,000mm(L) x 2,500mm(W) x 1,000mm(H)
Storage Size	1,000mm X 1,000mm X 600mm
Weight	65kg

- Size customizable based on request
- Handle, gas inlet, outlet, Etc.
- Quantity and location of options can be changed after agreement.

KEV-cover size comparison

- If cooling water is injected after installation, the floor must be large enough as it is drawn into the water pressure



- Guidelines for easy center installation
- Installing a ring that can be connected to a rope
- Special inorganic particle coating stabilizes shape at 1,000℃ or higher
- Weight around 25kg
- Recommended use 5 times

KEV-WT-01(Standard)

- **Water Tank** : Polyester + PVC coating fabric applied. Heavier than the premium

KEV-WT-02(Premium)

- **Water Tank** : Storage volume and weight is reduced by applying hypalon fabric.

| Order of installation |

1. Install the floor

2. Installing the wall

3. Water supply

■ Fixed Fire Extinguishing Water Tank (KEV-WT-101)

- Installation in an electric vehicle charging facility
- The fire extinguishing water tank storage box is installed on the floor along the parking line, and the fire extinguishing water tank is automatically formed when the operation button is pressed in case of a fire.
- Aiming and releasing water from the Kaion(Fire fighting robot) to extinguish electric vehicle fires

| Product Configuration |

- Storage box & Control box

▶ Storage box

- Applied material SUS304 and thickness of 3T
- Hyphalon-based Fire Extinguishing Water Tank
- Fire extinguishing water tank built in 4 layer of Ø15cm x 4 up to 60cm high
- After suppression of early stage fire, activate manually to pump the water

▶ Control box

- Storage of high-pressure gas containers for filling fire extinguishing water tanks
- Auto/manual switch attachment with solenoid valve
- Installation of the fire extinguishing water tank exhaust pump

KAION Fire Fighting Robot

| Specification |

Item	Fire Fighting Robot
Components	Controller, nozzle, camera, IR sensor
Fire detection	UV, IR, CAMERA
Water tank capacity	1,600L (10 minutes), 3,200L (20 minutes)
Water discharging time	10 ~ 20 minutes
Pump capacity	3HP, Three phases 220/380
Nozzles I.D.	14.6mm
Pipe size (Suction and discharging)	32A
Appearance figures (horizontal x vertical x height)	Nozzle height : 3m ~ 5m
	1) Water tank for 10 minutes : 920×920×2,000
	2) Water tank for 20 minutes : 1,300×1,300×2,000 (2-stage separation type)

Top view

| Fire recognition |

- Real-time fire monitoring
- UV, IR and Camera (Application of three types of fire detection systems) → Ensuring accuracy
- Fire detection recognition rate of 90%↑

| Fire suppression |

- Tracking and suppression of ignition points
- Feedback on fire extinguishing
- D/B set up and learning AI
- Remote and manual operation

Controller

[*Kfire* is special – **Durability, convenience, quality, design**]

| Application |

Ships · ports

Aircraft

Airport

Tunnel

Hotel lobby

Industrial site

■ KEV-WT + KAION

| Product Components |

- Fire extinguishing water tank storage (Hypalon applied), Control box, Fire fighting robot

| Application principle |

- A fire breakout
- Fire fighting robot detects fire (UV, IR, image recognition)
- Shoot out water for early stage of fire
- The fire extinguishing water tank control box receives a fire signal and opens the valve of the gas container connected to the fire extinguishing water tank to deploy
- When the fire extinguishing water tank is completely charged, it detects the internal pressure and stops supplying the charging gas
- Stabilize the battery by supplying water to the height of the battery of the accident vehicle

1. Fire break out – Fire fighting robot detects fire

2. Shoot out water for early stage of fire

3. The deployment of a fire extinguishing water tank

4. Fire release position fully submerged, battery stabilized

Kfire

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