

# Guard-K

2023

## Fire response for electric vehicles Lithium-ion Battery Fire

Continuous investment and research..

Leads to localization results

Researchers communicate directly with customers, optimize vehicle fire response due to localization results, and Cho Wook-rae, CEO of Firecover, "I want to be a company looking for customers rather than a company chasing customers."



|                            |                                    |
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**Contact Us**



Efforts to prevent  
further disasters,  
Efforts for a safer  
world.

The logo for Guard-K features the text "Guard-K" in a bold, black, sans-serif font. Above the text is a thick yellow horizontal bar that is slightly curved at both ends, resembling a protective guard or a stylized underline.

**Guard-K**



파이어커버 전기차 EV

# Firecover EV



## BATTERY

Electric vehicle fire/  
Ritum-ion battery Only

## WEIGHT

28kg based on 6x9

## split

Due to the nature of the material, cracks may occur when folded

## SIZE

- 6m X 9m
- 6m X 8m
- Can be manufactured by outer size

## Surface treatment

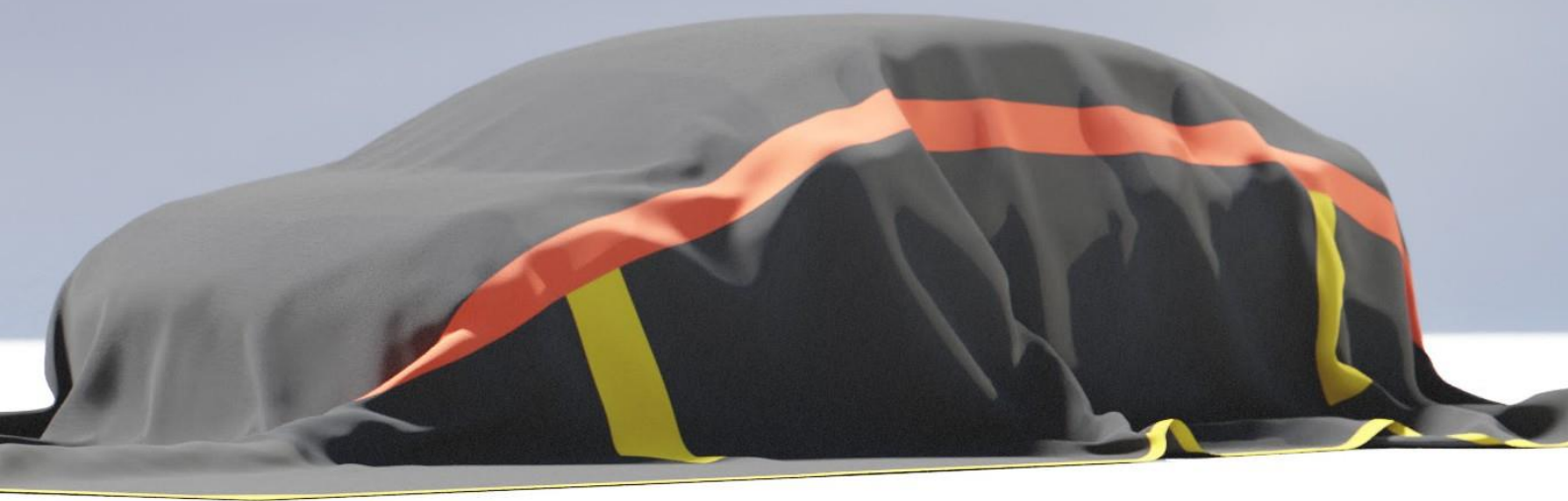
Special Refractory Silicon Coating

## STORAGE

Room temperature storage required

## COMPARISON OF FIRE BLANKETS

| General FIRE BLANKET                                                                                                                                                      | FIRECOVER EV PRO                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| Inorganic fibers (hysilica, glass, quartz fibers)                                                                                                                         | Reinforced Natural Fiber (SC Fiber)              |
| respiratory distress                                                                                                                                                      | harmless to the respiratory tract                |
| Inorganic Coating (Silicon Coating                                                                                                                                        | Organic coating(astro solution)                  |
| When you fold it, it cracks                                                                                                                                               | No splits                                        |
| Toxic gases in coating fluid fire                                                                                                                                         | Surface treatment liquid fire harmless           |
| Room temperature storage required                                                                                                                                         | Can be stored at high and low temperatures       |
| causing respiratory skin allergies                                                                                                                                        | Hamless to the human body                        |
| Easy to tear with sharpness                                                                                                                                               | A strong intensity                               |
| 27-50kg                                                                                                                                                                   | 25kg                                             |
|  Hazardous substances subject to management under the occupational Sfety and Health Act | Cellulose & Natural Materials & Reinforced Fiber |



파이어커버 전기차 EV 프로

# Firecover EV Pro

| PURPOSE             | SIZE          | WEIGHT                                                                         | MATERIAL                 |
|---------------------|---------------|--------------------------------------------------------------------------------|--------------------------|
| SUV(INCLUDING VANS) | 6m x 9m (표준형) | 25kg                                                                           | Natural reinforced fiber |
| CAR, GOLF CART ONLY | 6m x 8m       |                                                                                |                          |
| TRUCK               | 7.5m x 10m    |                                                                                |                          |
| BOX TRUCK           | 9m x 12m      | Surface treatment<br>Water-based refractory coating<br>for harmless human body | THICKNESS<br>0.45t       |
| ELECTRIC CAR PACK   | 5m x 4m       |                                                                                |                          |
| GENERAL TYPE        | 3m x 3m       |                                                                                |                          |
| INITIAL FIRE TYPE   | 1.5m x 1.5m   |                                                                                |                          |

## ■ FIRECOVER EV PRO

It is a product that literally a Fire blanket for electric vehicle fire to extinguish the fire by suffocating the fire. General fires can be completely extinguished without oxygen, but electric vehicle fires disappear, but heat remains for a long time, so other efforts are needed to lower the temperature to completely extinguish them. Firecover evpro can be used to prevent spread in electric vehicle fires.

### PRO's unique distinction

Firecover EV Pro doesn't crack or break even after storing it for a long time. Generally, 6m x 9m products are used, and the size is 54 square meters. In order to put it in a bag about 40cm X 70cm X 50cm, it is folded and stored several times, and since the fire does not know when it will occur, damage to the fabric can degrade the actual fire. This is the biggest problem to consider when purchasing a Fire blanket for electric vehicle fire



파이어커버 전기차 EX

# Firecover EX

| 용 도                 | 사 이 즈              | WEIGHT                                                                         | Characteristics                 |
|---------------------|--------------------|--------------------------------------------------------------------------------|---------------------------------|
| SUV(INCLUDING VANS) | 6m x 9m (STANDARD) | 25kg                                                                           | Professional Super-Strong Fiber |
| CAR, GOLF CART ONLY | 6m x 8m            |                                                                                |                                 |
| TRUCK               | 7.5m x 10m         |                                                                                |                                 |
| BOXTRUCK            | 9m x 12m           | Surface treatment<br>Water-based refractory coating<br>for harmless human body | THICKNESS<br>0.45t              |
| ELECTRIC CAR PACK   | 5m x 4m            |                                                                                |                                 |
| GENERAL TYPE        | 3m x 3m            |                                                                                |                                 |
| INITIAL TYPE        | 1.5m x 1.5m        |                                                                                |                                 |

## ■ FIRECOVER EX

The product was developed for use by firefighters and professional firefighters by upgrading the performance of EV-PRO with the success of the development of high-strength, ultra-high-temperature fabrics with GuardK's technology

# FIRECOVER BOX



사이즈 500mm X 500mm X 1100mm

COLOR



black



red

## Characteristics



a charging device



Height adjustment



partition,



a transparent window

## 안전한 화재 진압을 위한 구성품

| A set                                                                               |                             | B set                                                                               |                        |
|-------------------------------------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------|------------------------|
|  | an infrared thermometer * 1 |  | Wet smoke mask* 2      |
|  | fireproof gloves * 2        |  | fireproof gloves * 2   |
|  | a gas mask* 2               |  | fire response suit * 2 |
|  | a car-glass hammer* 1       |                                                                                     |                        |



# FIRECOVER WATERTRAP



After the electric vehicle fire suppression,  
Firecover water trap to prevent re-occurrence

The firecover water trap is a product jointly developed by the Chungnam Fire Department and Guard K, and was developed to prevent the possibility of recurrence during storage after extinguishing electric vehicle fires. It is a product created after dozens of tests and trial and error, and the entire fabric is basically made of flame retardant materials, and a perfect tank-type product is completed due to the high-frequency bonding form.

. Fire Department is inquiring about the purchase after making its debut at the Daegu Fire Show on August 31, 2022



## ■ SIZE

4500mm X 7500mm  
refractory fabric ( Fire  
Resistance Test by Korea  
Fire Industry Technology  
Institute )

## ■ COLOR

BLUE

## ■ Thickness

0.5T

## ■ Components

Material  
Stainless steel viner  
8 pairs of fixed bars  
a pole  
Bags

## ■ PRODUCT

GUARDK

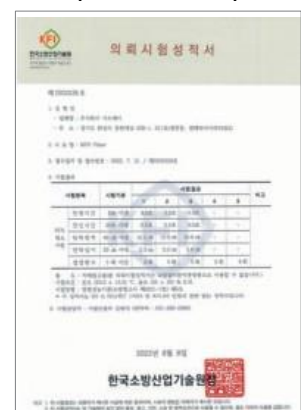
## ■ COUNTRY

KOREA

## ■ custom-made

Size changeable  
Can be changed to  
thickness 1T  
Color blue changeable

## ■ Request test report



# A Breakthrough Tube



|      |                               |            |         |
|------|-------------------------------|------------|---------|
| size | Length 1000mm<br>Diameter 25A | weight     | 16kg    |
|      |                               | connecting | 40A/65A |

## ■ A piercings TUBE

It can be used before or after the firecover is covered, and the Tube does not move due to water pressure even if it is not held by a person when used due to sunflower-type drinking water. The front part has a tongs structure, so even if it is bent after use, it can be used by grinding it like a pencil, so it can be used semi-permanently.

### Use effect

The toxic gas and smoke inside the vehicle adhere and sink by the waterproof pressure flowing into the passenger room through the use of breakthrough pipes, and the cooling water accumulated on the bottom of the vehicle flows into the battery pack to lower the heat of the lithium-ion battery.

Lower water Tube

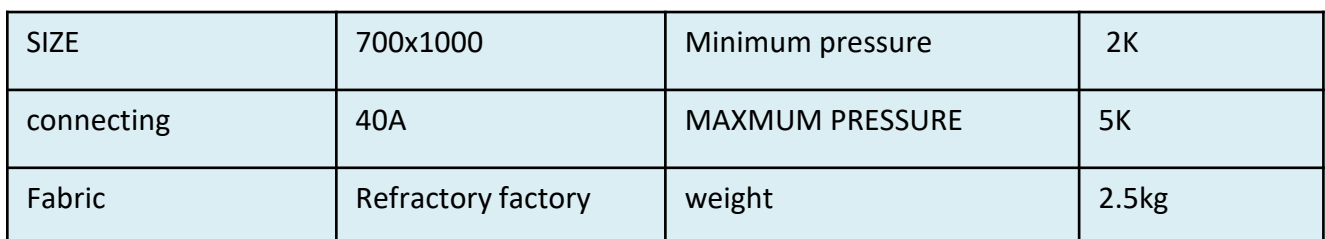


|            |                                           |           |                      |
|------------|-------------------------------------------|-----------|----------------------|
| MATERIAL   | Interior galvanized exterior powder paint | THICKNESS | 40A PIPE             |
| WEIGHT     | 15kg                                      | COLOR     | Body blue, stick red |
| connecting | 40A / 65A                                 | PRODUCT   | Guard-K              |
| SIZE       | 700mm x 500mm                             | COUNTRY   | made in Korea        |

Lower water Tube

Equipment for lowering battery temperature in the event of an electric vehicle fire. Electric trucks have a battery position under the loading box, allowing water to be sprayed directly onto the battery through the lower main water Tube.





It is a spray water jet made using waterproof refractory fabric and is manufactured in a folding structure, making it easy to store and easy to carry. It is a convenient product for the general public to use in electric car fires and can be useful for fires that require a wide range of injection holes.

# Lithium battery simple water tank



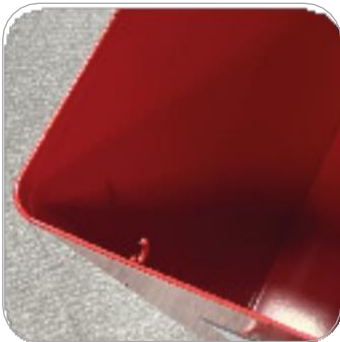
|          |                         |         |                                                                                                                                                                                                |
|----------|-------------------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Size     | 2000mm X 2000mm X 600mm | FORM    | assembly TYPE                                                                                                                                                                                  |
| material | Refractory fabric       | amount  | 2,400L                                                                                                                                                                                         |
| pole     | aluminum                | purpose | After extinguishing the battery fire, put the battery that is expected to catch fire in water<br>A product made for the purpose of complete discharge (prevention of re-ignition) by immersion |



## ■ COLOR CUSTOMIZE

You can choose from a variety of colors when ordering.

# Collection box for Litum-ion batteries only



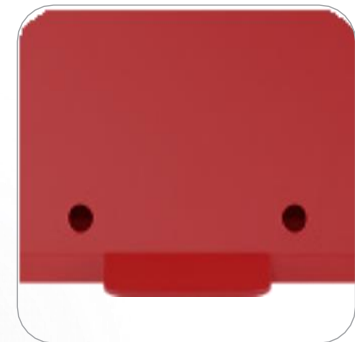
## Inner hanger

.It has a structure in which flames are not safely transmitted to the outside even if a vinyl or collection bag is hung inside by making an inner hanger



## an upper angle

The upper part is designed not to open more than 65 degrees, so the lid does not fully open and closes again in the event of an internal explosion.



## heat circulation structure

In the event of an internal fire, the internal heat is lowered through the lower air circulation.

# Lithium Battery Trash Can



|          |                       |
|----------|-----------------------|
| SIZE     | 340mm X 340mm X 470mm |
| WEIGHT   | 12kg                  |
| Warranty | 12month               |

color



옐로우



레드



화이트

## ■ Lithium Battery Trash Can Features



### Upper angle

The upper part is designed not to open more than 65 degrees, so the lid does not fully open and closes again in the event of an internal explosion.



### a heat outlet

. With 80mm space at the bottom for heat circulation  
It's 25mm perforated



### a plastic rack

Designed for the Korean situation Made easy to use by attaching 5 rings to the inside of the trash can by hanging vinyl or bags



### Handle

a rotary handle  
I've attached a handle to move  
The handle is rotary, so it doesn't usually stand out.

# A Fireproof long-sleeved wristlet



## Purpose

Welding, grind, camping, kitchen

## degree of fire resistance

1000°C - full refractory fiber

## SIZE

Free

## Personal Protective Equipment for Welding

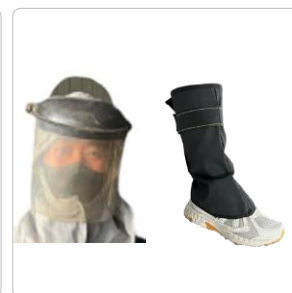
# Weld Protective Equipment Set



apron



Fireproof  
long-sleeved wristlet



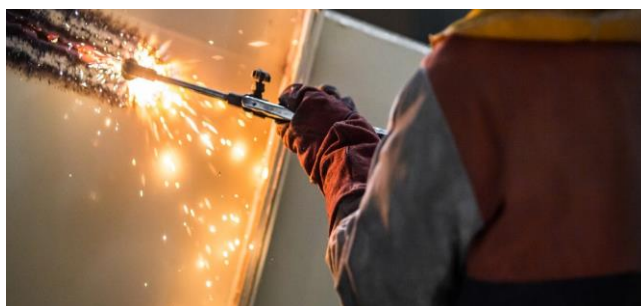
Head &  
sleeve safe

## PURPOSE

Protect your body during welding and grinding operations

## Material

endothelial waterproof  
fabric, surface refractory fabric



## Removable Flame Shield

# Fire extinguishing fluid for lithium batteries only



## ■ Characteristics of lithium-only digestive fluid PRIVATE

- ① Superior performance for modular digestion
- ② At the same time as the injection, it calms the fire and cools the inside of the battery to prevent recurrence.
- ③ Normal operation at -20℃.
- ④ There is no secondary damage caused by digestive fluid debris.
- ⑤ The liquid inside the fire extinguisher is not hardened, so regular inspection is not required.
- ⑥ Due to domestic production, it is possible to order and produce various capacities (100L-1000L or more)
- ⑦ Non-toxic, pollution-free human harm - minimizes toxic gases and smoke during fire suppression.

| product name       | GUARD-K PRIVATE<br>2kg | GUARD-K PRIVATE<br>3kg | GUARD-K PRIVATE<br>4kg | GUARD-K PRIVATE<br>100kg |
|--------------------|------------------------|------------------------|------------------------|--------------------------|
| capacity           | 2 kg                   | 3 kg                   | 4 kg                   | 100 kg                   |
| gross weight       | 3.9 kg                 | 5.4 kg                 | 6.3 kg                 | -                        |
| radiation distance | 3 ~ 4 m                | 3 ~ 4 m                | 3 ~ 4 m                | 25 m                     |
| Radiation time     | 48 초                   | 70 초                   | 95 초                   | 20 분                     |
| Pressure in use    | 9 Bar(N2)              | 9 Bar(N2)              | 9 Bar(N2)              | -                        |
| Temperature of use | -20 ~ +40℃             | -20 ~ +40℃             | -20 ~ +40℃             | -                        |



## Verification through numerous real-life tests

When requesting a fire test, it is conducted after consultation

## A simple fire suit

It is a product composed with Firecover that can protect the body by wearing it in a short time and is manufactured in the form of a surgical suit if it needs to be extinguished in close proximity in the event of a fire.



Long-sleeved apron form



# A product under development

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## ■ a fire shield



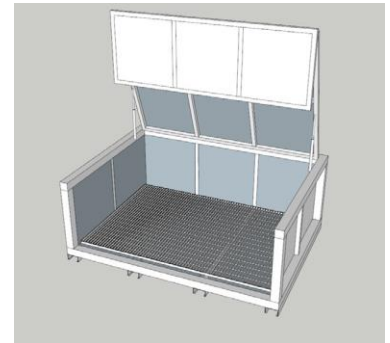
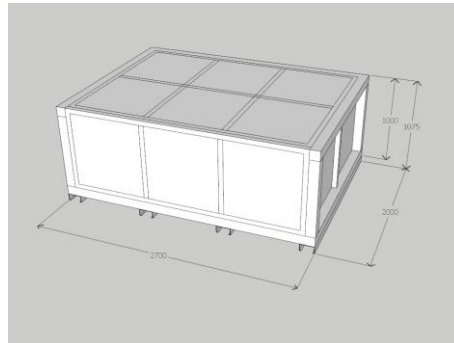
## ■ flameproof work clothes



## ■ flameproof spray



## ■ a battery transportation system



## ■ Development request

✉ [info@guardk.com](mailto:info@guardk.com)



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