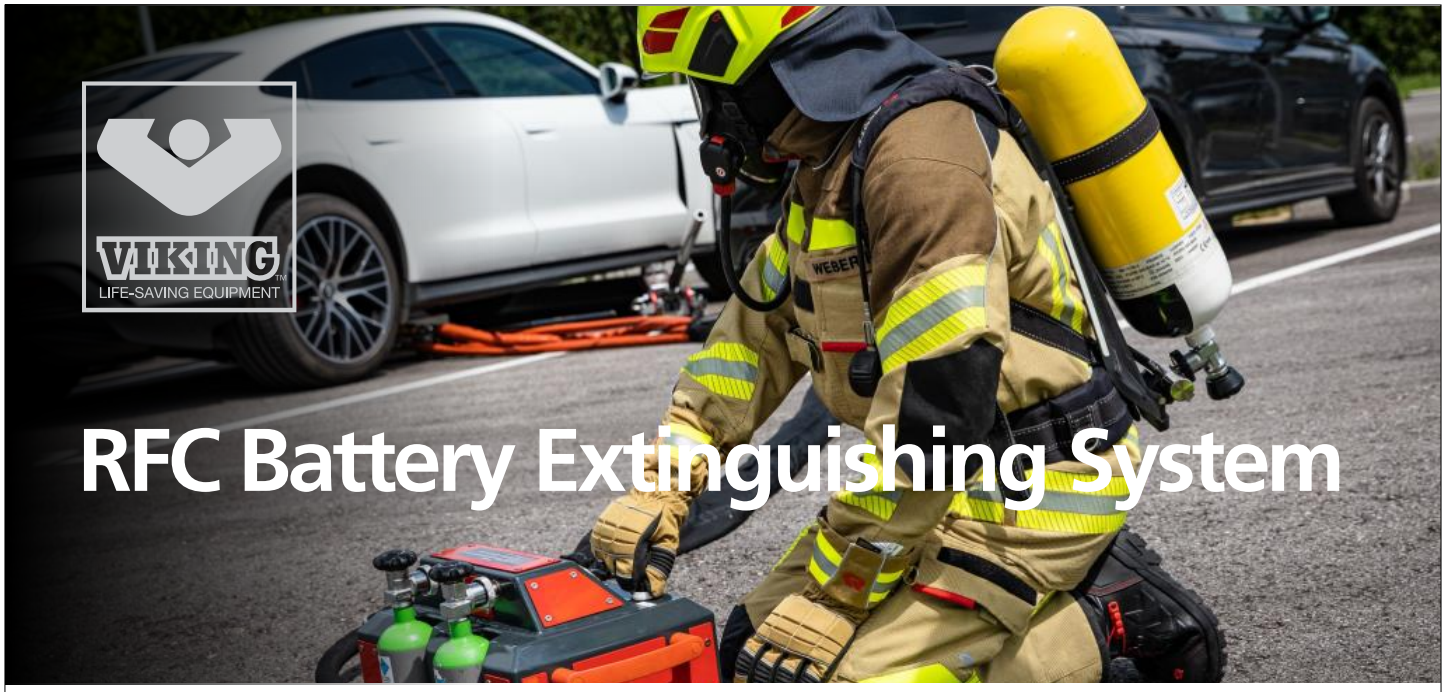


RFC Battery Extinguishing System

Extinguishing system for batteries in EV or PHEV vehicles

The new Rosenbauer extinguishing system for high-voltage batteries in electrically powered cars is a system for safe, efficient and rapid extinguishing in batteries based on lithium-ion technology. This enables direct cooling of battery modules or the battery cells inside the modules and thus fast stopping of the chemical reaction in the cells and the consequent heating. The system consists of three main components: an extinguishing unit and a control panel, interconnected with hoses.

The extinguishing unit is placed under the battery and, if necessary, fastened to the car with a jack or in another suitable position. The preferred position is on the underside of the car. The control panel controls the extinguishing unit's extinguishing spear, which penetrates the battery housing at a safe distance. Immediately after the penetration, the battery housing will be doused with water and the cooling process will begin.

FEATURES

Safe

The responding crew are near the vehicle that needs to be extinguished only for a very short time. Reducing this time near the burning vehicle reduces the risk of contamination with the toxic substances emitted during the fire.

Efficient

The extinguishing system ensures that the water is propelled exactly where it has an effect, cooling the battery cells and the battery housing. This means that the extinguishing system is resource-saving and minimizes the spread of toxic gases from the fire.

Rapid penetration

Thanks to the specially-designed extinguishing spear and penetration method, all known types of battery housing can be pierced with the extinguishing spear.

Self-powered

The required energy for the extinguishing spear is delivered via pressure hoses from pressure cylinders on the control panel.

Tested under realistic conditions

Research and development of the system included extensive testing and trials involving a large range of battery systems and complete vehicles. The system has been tested with all known battery types used by European and American manufacturers of passenger cars, trucks and vans. The tested batteries had capacities of up to 120 kWh.

Tested in practice

Full-time and part-time emergency response services in Europe have tested the system for months and provided valuable feedback on its practical application.

Low-pressure extinguishing system

The extinguishing system only requires an available water supply with a pressure of 4 to 10 bar. This means that the system can be used in connection with all commonly used extinguishing systems.

Water for extinguishing can be supplied via a C-hose or other compatible water supply.

Use of the extinguishing system

1) In case of fire in an electrically powered vehicle, the battery may not necessarily be affected by the fire. Therefore, the primary fire in the car must be extinguished first. If the battery is still not affected by the fire, extinguishing the fire and cooling the battery will suffice.

2) If there are clear signs that the battery is affected by the fire, Rosenbauer's extinguishing system should be used as quickly as possible.
The following may indicate a fire in the battery:

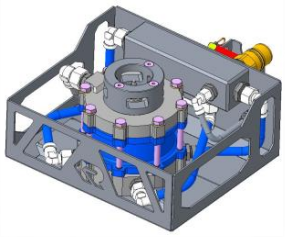
   a) Smoke from the area around the battery. (The exact location may vary depending on the battery's position.)
   b) Flares from the area around the battery.
   c) Characteristic noises from the battery cells that are being heated (crackling, whistling or hissing).
   d) Rising temperature (even if only parts of the battery) in and around the battery housing. It can be very helpful to monitor this with a thermal camera.

3) Place the extinguishing unit directly next to the battery. The preferred location is directly below the battery, so that the extinguishing spear can penetrate the battery quickly and efficiently.
If necessary, the car can be raised using a jack or other suitable tool. If the extinguishing unit is placed in the cab or trunk of the car (e.g. a PHEV vehicle), the extinguishing unit must be fastened. This can be done using a RAM or spreader, for example.

4) The water supply can be prepared while the extinguishing unit is being positioned. The nominal operating pressure is 7 bar. The water supply can come from a fire engine, a portable pump or a fire hydrant with the required pressure.

5) Open the pressure cylinders on the control panel and activate the penetration spear. Immediately after the penetration, the battery housing will be doused with water and the cooling process has begun. The process should be monitored with a thermal camera.

6) The duration of the process may vary according to the size of the battery but will last from 10 to 60 minutes.

Technical data		Extinguishing unit	Control panel
Water consumption	30 l/min at 7 bar.		
Water consumption from 25 l/min at 4 bar up to 50 l/min at 15 bar.			
Hose length	8 meters as standard		
Air supply	2 x 1 liter / 300 bar pressure cylinders		
Extinguishing unit – weight	Approximately 20 kg		
Control panel – weight	Approximately 20 kg		
Hose set – weight	Approximately 20 kg		

Contact

Text and illustrations are not binding. The illustrations may display extra equipment that is not included in the scope of delivery and is available at an additional cost. Rosenbauer reserves the right to revise specifications and dimensions without prior notice

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