



USHA ARMOUR

F-500 LITHIUM-ION FIRE EXTINGUISHER



RESGUARDO[®]

DANGERS OF LITHIUM - ION BATTERIES

Overheating, Overcharging, Penetration, Short circuits are the main causes for battery fires.



Explosiveness

Lithium based batteries are extremely powerful. When they are recharged repeatedly, something called dendrites may form and can trigger a short circuit, causing the battery to burst into flames.



Self sustaining

The positive electrodes also contain oxygen, which is released through electrochemical reactions and provides all the necessary elements for a fire to become self-sustaining.



Thermal runaway

It can be very difficult to stop a chain reaction inside a battery cell when its temperature reaches the point that allows for chemical reactions to take place. This causes increasing amounts of heat and more chemical reactions spreading to other cells.



Toxic fumes

Lithium-ion batteries emit potentially fatal gases like carbon monoxide which can be detrimental both to people by way of skin, eye, and nasal irritation as well as the environment.



FEATURES OF F- 500 - LITHIUM ION FIRE EXTINGUISHER



Cooling Effect

Mixing F-500 agent with water provides higher cooling effect in comparison to other extinguishing media such as pure water and delivers faster heat extraction from the fire. Rapid cooling of the fire below the auto-ignition point ensures permanent burn back resistance.



Encapsulating Agent

The agent is able to contain toxic and combustible gases such as hydrogen fluoride that can spew out of the battery by creating a layer (micelle encapsulation) between the runaway and atmosphere. This renders the liquid non-flammable even during clean up and shields persons from inhalation of these gases.

Watermist

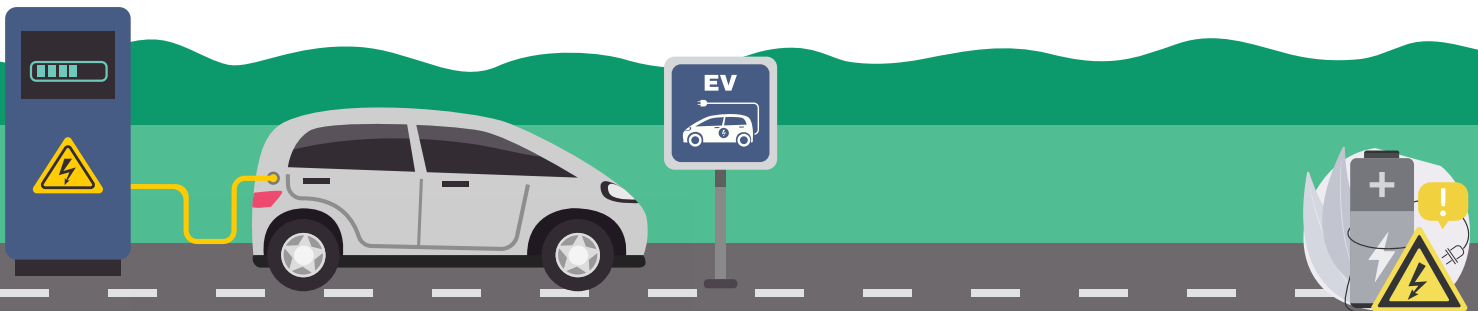
The agent is an additive with water that is expelled out through watermist nozzles. Lower surface tension of the mixture contributes to smaller droplets which leads to higher surface area per volume of medium and better fire suppression. Droplet size is between 30-60 microns.

Penetration

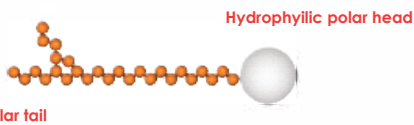
The surface tension of water is reduced considerably when the F-500 agent is added. Decrease in surface tension of the medium is crucial for penetration of the battery and maximum extinguishing effect. Addition of F-500 agent with water decreases its surface tension from 72 dynes/cm to 33 dynes/cm times lower surface tension compared to pure water.

Environment friendly

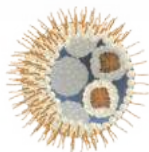
F-500 EA is an ecological agent, containing no fluorine. It is non-corrosive, non-toxic and biodegradable



MECHANISM OF FIRE SUPPRESSION



The F-500 Encapsulating Agent is an amphipathic molecule that has a hydrophilic polar head and a hydrophobic nonpolar tail. When it's mixed with water, the F-500 EA molecules form micelles, as the nonpolar tails try to avoid contact with the water. Each droplet of F-500 EA contains many micelles.



The nonpolar tails have an attraction for hydrocarbons, so they attach themselves to the fuel or flammable material, forming a layer around it that renders it non-flammable. The F-500 EA droplets have a larger surface area than plain water droplets, so they can absorb heat by thermal convection rather than turning into steam when heated.



F-500 EA micelles surround hydrocarbon

This helps reduce the temperature and prevent re-ignition and spreading of fire while interrupting the free radical chain reaction or thermal runaway and reducing toxic gas emissions.



F-500 LITHIUM-ION FIRE EXTINGUISHER

TECHINICAL SPECIFICATIONS

CAPACITY	2L	4L	6L	9L
TOTAL HEIGHT (MM)	380 ± 2	432± 2	475± 2	575± 2
DIAMETER (MM)	107 ± 0.5	140 ± 0.5	160± 0.5	174 ± 0.5
VOLUME (L)	2.3	4.7	7	10.8
EMPTY WEIGHT (KG) APPROX.	1.3	2	2.4	3.3
FULL WEIGHT (KG) APPROX.	3.5	6.2	8.6	12.3
FIRE RATING	1A	2A	3A	4A
OPERATING TEMPERATURE	+5°C TO +60°C	+5°C TO +60°C	+5°C TO +60°C	+5°C TO +60°C
SERVICE PRESSURE	15 BAR	15 BAR	15 BAR	15 BAR
MAX.SERVICE PRESSURE	16 BAR	16 BAR	16 BAR	16 BAR
TEST PRESSURE	35 BAR	35 BAR	35 BAR	35 BAR
EXTINGUISHING MEDIA (CONTENTS)	F500 WITH DEIONIZED WATER	F500 WITH DEIONIZED WATER	F500 WITH DEIONIZED WATER	F500 WITH DEIONIZED WATER
EXPPELLING AGENT (PROPELLANT)	NITROGEN	NITROGEN	NITROGEN	NITROGEN
AVG.EFFECTIVE DISCHARGE TIME	27 SEC.	59 SEC.	92 SEC.	114 SEC.
BULK RANGE (APPROX.)	4 M	5 M	6 M	6 M



2 LITRE

4 LITRE

6 LITRE

9 LITRE



Electrical conductivity tested to 36000volts



MARKETED BY

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