

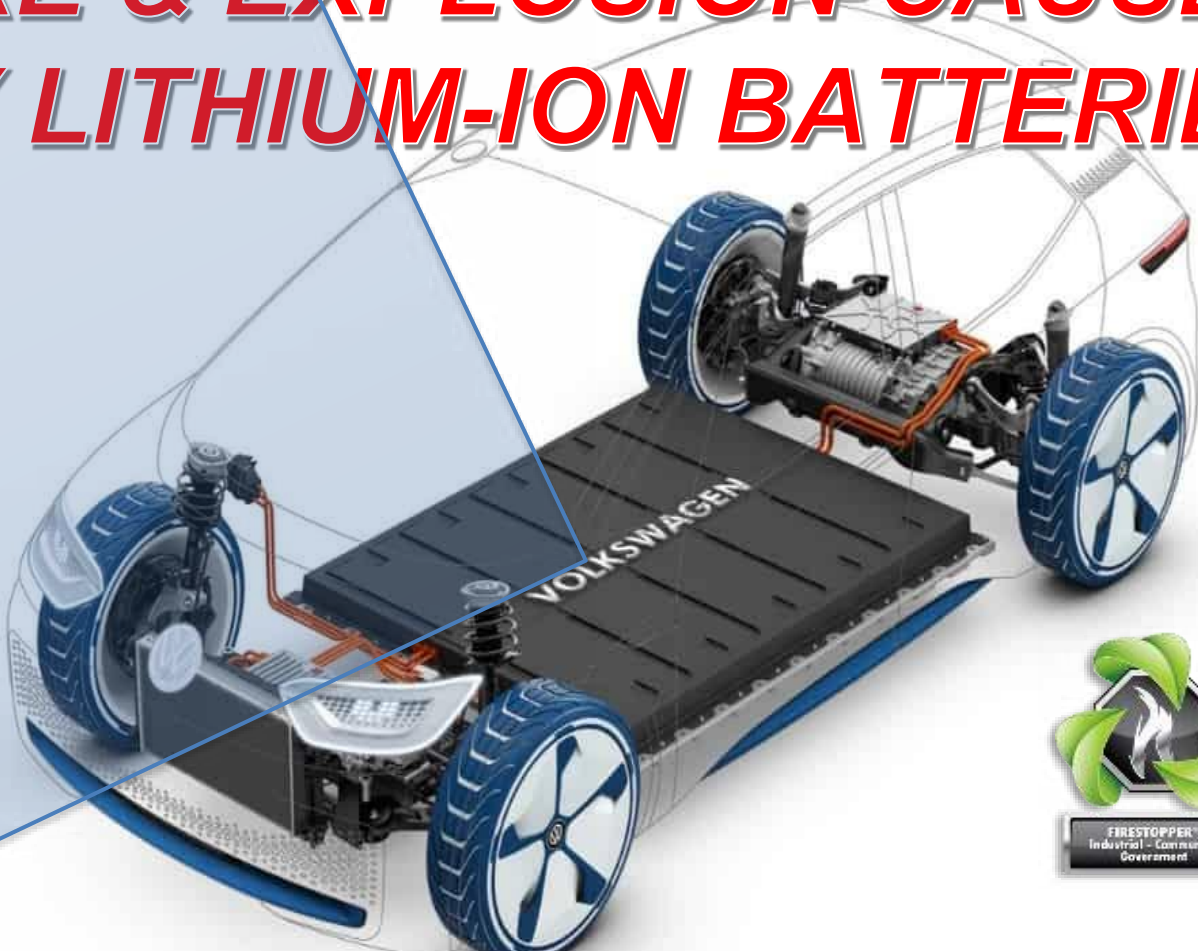
**Marketing Department:**  
**A Technical White Paper**



**INTRODUCING  
THE TOTAL SOLUTION TO  
"THERMAL RUNAWAY  
FIRE INCIDENTS"**



**FIRE & EXPLOSION CAUSED  
BY LITHIUM-ION BATTERIES**



# INTRODUCTION

**FireStopper® International Limited** (FireStopper®), a transnational Registered Company, is the developer of the world's most advanced and uniquely powerful firefighting and anti-explosion **"Proprietary Technology,"** within the meaning of the Uniform Trade Secret Act ("UTSA") Cal. Civ. Code Sec. 3426, Common law, Business and Profession §17200 and all other applicable U.S. and International statutes, which also produce environmental remediation and other supporting applications.

FireStopper® initially devoted the first 25-years of its existence to R&D and market research. Subsequently, FireStopper® is the recipient of the stand-alone Global testing and certifications results unsurpassed by the industry. Such achievement is afforded by way of unprecedented results in fire ratings, usage, and environmental certifications. Without exception, all certifications have been granted through the most respected testing and certification facilities domestically and internationally.

Moreover, this unique Technology has rendered the only available **"all fire class"** effective and **"anti-explosive"** products, which are **Non-Toxic, Non-Irritant, Environmentally Safe and Non-Hazardous**. These achievements were accomplished by way of the most demanding environmental and life and materials exposure testing and certification making the FireStopper® "Brand" the best overall provider of Products over the other existing and available products manufacturers in the explosion/fire and safety channel of business.

FireStopper® continues to maintain its commitment to deliver far and away technological leads over the industry standard. When the need for change is compelled, FireStopper® responds by demonstrating its ability to deliver to the demands for change. This is demonstrated by bringing forth superior advancements whenever revision is needed to insure and support maximum safety to the first responders, the recipients of the fire service, the "People," the environment, and the Planet.

FireStopper® recognized the necessity of fulfilling the need of the "People," Industry, and Government by engineering and making available a complementary infrastructural hardware array that formidably and comprehensibly solves the long-standing unacceptable result of firefighting: **"massive water damage, complete and total destruction of structures by fire, and the contamination of the environment; all at the cost to the "People" paid through taxation."**

## FOCUS AND INTENT

The World is awash with an intentionally misguided focus to implement technology to somehow turn the Planet "GREEN" at any cost. Contrary to the best interest of the inhabitants of the Planet, a knee-jerk reaction by Government and the People by moving into change and forgoing safety at the behest of special interests.

The intent of this "White Paper" is to deliver to everyone the knowledge that a solution to a cumulative and devastating threat is available now and ready to be deployed. The relentless work invested by FireStopper®, through its own research and development, is making available the



*opportunity to integrate and deliver true reliable fire safety. Government, Industry, and the Public have available with FireStopper® dependable fire and explosion suppression never before capable.*

## **BACKGROUND**

*The fire protection industry, in conjunction with Government, has created a monopoly preventing innovation, and the entry and implementation of technical advancements into the market unless said advancements are availed by and through the “Big” industry influential leaders.*

*There are many examples where the ultimate recipients of serious consequences are the People. Brought forth through ill-conceived policies, implementation, and use of incompetent products during emergent fire conditions surely causing death and destruction by ignoring innovation; with the devastation of assets becomes the final result.*

*These are the clear and inconceivable ramifications when the “People” rest in total reliance on Government for their security. A grave mistake when in fact these Government Officials and their go-to conduits lend exclusive support to “Big” Industry’s products, which are proven incompetent by their year over year overall performance.*

*To further illustrate the need for innovation, the World has converted to the use of Lithium-ion batteries, based on the improved performance over traditional batteries, for most of the portable energy use needs. This has accelerated the need for a real solution to these emergent catastrophic effects of fire directly derived from this commodity’s use thus, the manifestation of the “Thermal Runaway Lithium-ion Battery Effect.”*

*Below are 4-illustrations depicting actual ramifications of thermal runaway fires involving lithium-ion batteries:*

### **ILLUSTRATION: 1**

*The consequence of providing advancements without considering safety solutions:*



## **ILLUSTRATION: 2**

*A vulnerability and hazard most of us ignore until it is too late...*



## **ILLUSTRATION: 3**



*Typical result of lithium-ion battery mishap causing total destruction of the cell phone...*

*With its unmatched line of all fire-class handheld portables and in home or office automated fire suppression and extinguishing systems, FireStopper® now offer the Public, and Private sector worldwide, the ultimate in solutions for personal protection against the instant lithium-ion battery problem.*

*Below, we shall introduce more information covering the total delivery of fire and explosive safety without ramifications to the user, materials, and the environment. All achievable with the least*

amount of effort and cost, while greatly reducing collateral damage or risk to health and the environment.

**ILLUSTRATION: 4**



*The Loudoun County fire marshal determined that a faulty lithium-ion battery in a remote-control toy car started a fire in Aldie, Virginia. This now common occurrence displaced a family of four and caused almost a million dollars in damages. This is a prime example of the expected results from most Municipal fire response throughout the World. The largely uninformed and unwilling to change Municipal fire services will mostly encounter lithium-ion batteries in all common occurring fires and due to their antiquated response, this will be the result.*

*The FireStopper® Technology and Product's efficacies have been available online for decades. The third-party Certification and Approvals have also been available since 2012. With today's mass proliferation of lithium-ion energy use, Government, Industry, and the Public must not ignore the advancement and availability of said solution if they want to be safe from the ravages of fire.*

## **DISCUSSION**

*Based upon the conditions stated above, the Public can no longer rely on the Municipal fire services to save their home, auto, or any fire involving lithium-ion batteries. Most people are not aware that throughout the Country, fire Departments have been told to use **water** exclusively to control the course of the fire event on structures, hybrid-electric or fully electric vehicles and all other commonly occurring fire events.*



*The fact that water is ineffective on most flammables is intentionally overlooked. The faulty excuse given is that “water is free;” not so...water supplies throughout most of the World are short and because of the high levels of contaminants poured in daily, the water reclamation plants for most part, have become extremely expensive to run. This is mainly due to the complexity of chemical contaminants being flushed into the system.*

*In today’s environment, the two major causes of fire in a home are in the kitchen while using cooking oils, deemed class K, from Lithium-ion batteries, or electrical malfunctions; water is useless on both classes of fire. In addition, let us not lose sight of the fact that water on hydrocarbon fires (fuels and solvents) is wholly ineffective and dangerous to apply.*

*FireStopper® has amassed an arsenal of weapons in the form of firefighting medias and advanced systems easily deployable against the threat of fire and explosion. No other technology or product line has ever before manifested such reliability or efficacy. With over 90-products in its arsenal, this emerging company continues to enhance and develop products, and knowhow for the safety and betterment of society and the Planet.*

**“New and advanced technologies can be applied globally to change the course of fire protection.”** *Devices built into a system that can act as an extreme early warning mechanism, by detecting and confirming that a fire potential has erupted, can for the first time alert the authorities and the People, if necessary, of a potential major fire event while instantly deploying an automatic failsafe system to defeat the incipient fire event before it becomes an out-of-control devastating experience. With conveniences and ease of use never before availed, FireStopper® uniquely provides reliability and ease of mind that any fire event can safely be ameliorated.*

*In addition to the handheld portable fire extinguisher line, which is the only tested, certified, and approved all fire class effective (ABCDK), this company has developed a novel **FireStopper® ICE System™** that is adaptable for deployment in every environment and application against fire.*

*It will deploy exclusively the only all-flammables effective premix media that is non-toxic, non-irritant, non-aggressive, and environmentally safe extinguishing to end the fire swiftly, economically, and reliably. Moreover, this system can be installed on all foreseeable applications since it can be designed to fit the purpose in every potential application or perceived flammable or explosive environment.*

*This breakthrough in technology obviates the expensive, restrictive, dangerous to life, and the environment, which are the products commonly available and unreliable by their own history of use. These so-called “cleanroom fire protection systems” generally deployed today, continue to rely on fluorination, the subject of over 5000 lawsuits. Besides foam concentrates, the steaming gasses that have no effect on temperature and require massive volumes to replace the oxygen in the zone it protects, are deadly to any human caught in the activated space.*

*A major difference between the currently employed gas system is that these devices are reactive and the **FireStopper® ICE System™** is proactive, thus eliminating the necessity for large volumes of product this relatively small quantity of the FFC (Fire Fighting Catalyst) needed to end the fire potential.*

*Albeit, when dealing with the electronics, mainly computer banks and server farms, fire potential is served by gaseous, oxygen depleting products requiring evacuation of humans and the sealing of said perimeter/room environment for long periods of time until such event is safe from fire and the*

*additive is fully evacuated into the atmosphere; for obvious reasons as stated above, water is not employed and the damage to our environment is cumulative.*

*In contrast, the **FireStopper® Predator FFC™** premix formula is an aqueous foaming catalyst exclusively available through FireStopper® Trademarked Products. This unique ultrafast and reliable extinguishment product is designed to provide fire security in all fire-classes where for the first-time extinguishment of all types of flammable materials is now available.*

*Nonetheless, while securing unequaled environmental efficacy, the **FireStopper® Technology** exclusively produces all its liquid Products delivering unquestionably no-toxicity, no-irritation of skin or eyes, no-aggressiveness to materials while also delivering no re-ignition of the flammable materials it has extinguished.*

*With its never-before capable spectrum of safety, FireStopper® has ceased the opportunity to provide the “World” with never-before capable applications for fire and explosion protection. FireStopper® solely relies on its vast research and development investment both in time and experience, and the level of its achieved and acquired certifications in order to make it representations.*

*Moreover, unlike most of the available producers of fire extinguishing products, while marketing its products, FireStopper® does not edit its video presentations via its website. Without exception, always relying totally on the full representation of the recorded event, “from womb to tomb” whenever possible. Below please see a chart outlining the versatility of the FireStopper® Systems:*

### **Chart: 1**

## **FireStopper® ICE Systems™ APPLICATIONS**

- *ALL Lithium-Ion Battery related operations*
- *Automotive and related sport needs*
- *All aircraft hangar structures*
- *All warehouse structures*
- *All metal foundry operations*
- *All manufacturing operations & facilities*
- *Full spectrum petrochemical operations & facilities*
- *All shipping & transportation related fire and explosion safety needs*
- *Aerospace*
- *Military: All fire & explosion suppression needs*
- *All Municipal fire operations*
- *Wildlands fire (as stated earlier)*
- *Residential including High-rise structures*
- *All mining operations*
- *Cleanroom electronic operations (as stated earlier)*
- *All energy producing operations including nuclear plants*
- *Recycling and Refuse management operations...and more*

*“One technology, one flexible system, and the total protection of asset and personnel...”*

## **THE SYSTEM™**

*FireStopper® has developed a failsafe “High-tech” system comprising of a reliable and dependable, state-of-the-art, early detection and activation system. This system providing fire and anti-*

explosion security is thoroughly flexible and on demand designed to fit the purpose; with durability not offered of made available economically.

For the first time anywhere, FireStopper® is providing the end-user with the ability to have a totally autonomous operating system that prevents the destructive event of fire and explosion at the earliest detectable time, delivering all the necessary steps to prevent fire and subsequent destruction of the involved facility or equipment.

The system, through its early cognitive detection process, provides identification and confirmation at the speed of light instantly activating delivery of the advanced all fire class flammables effective liquid premix media (the **Predator™ FFC**). A system ready to extinguish and eliminate quickly and effectively the potentially devastating events that normally occur under the protection of current technology and all other available supporting products.

We take seriously the statistics that are made available through Government Agencies tasked with studying the fire trends and incidents such as U.S. Fire Administration and organizations such as the NFPA, who also engage in maintaining data of fire and explosions, their causes and thus their participation in designing the testing standards and practical applications.

Notwithstanding the above, FireStopper® takes pride in the level of superior performance while submitting for testing and certifications under the required testing standards both in Europe and the U.S. to achieve global standing as a technology and products manufacturer. Below please find a series of illustrations outlining the components of our systems:

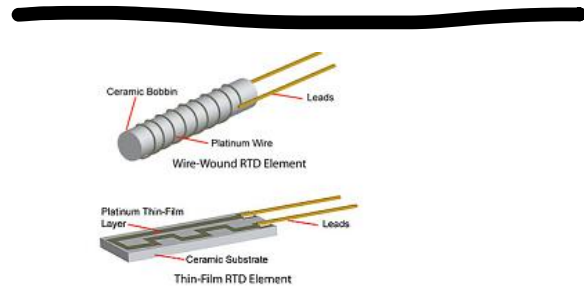
**ILLUSTRATION: 5**

**How the ICE™ System generally works:**

Step 1: Identifier:

Step 2: Confirmation (Triple IR)

OPTICAL CABLE



Step 3: Activation

Step 4: Extinguishment





The ICE™ System performs in two phases to deliver maximum safety against the perceived hazard while eliminating the consequences so common to automated sprinkler and other extinguishing devices. All sprinkler systems deploying their service unanimously resulting in massive collateral damage to the structure or its content that seems to be always the result presented under the current available systems.

ICE™ is designed to detect the potential for fire/explosion and detect when the threat is over automatically shutting-down the flow of liquid. This unique operational function is applicable to all necessary designed to fit uses of the **FireStopper® ICE System™**.

## **THE VEHICLE FIRE SOLUTION**

Being the only technology in the World to fully third-party certify under EN & USA Standards by demonstrating its capability using raw lithium fire testing instead of on limited small quantities of the flammable metal as contained in the lithium-ion batteries, we submitted for testing at one of the world's most recognized testing and certifying under EN3-7 @ MPA Dresden, in Germany.

The **FireStopper® Predator FFC** demonstrated the unique ability to extinguish the most volatile metals such as sodium metal and pure lithium metal in order to demonstrate the stand-alone efficacy. Also, FireStopper® unequivocally demonstrated its stand-alone superiority of all others claiming class D efficacy, by additionally demonstrating incredible performance over Zircaloy (zirconium alloy) the currently unextinguishable cladding material for nuclear fuel rods (please see the actual tests and certification video @: [www.firestopperus.com](http://www.firestopperus.com) )

### **ILLUSTRATION: 6**

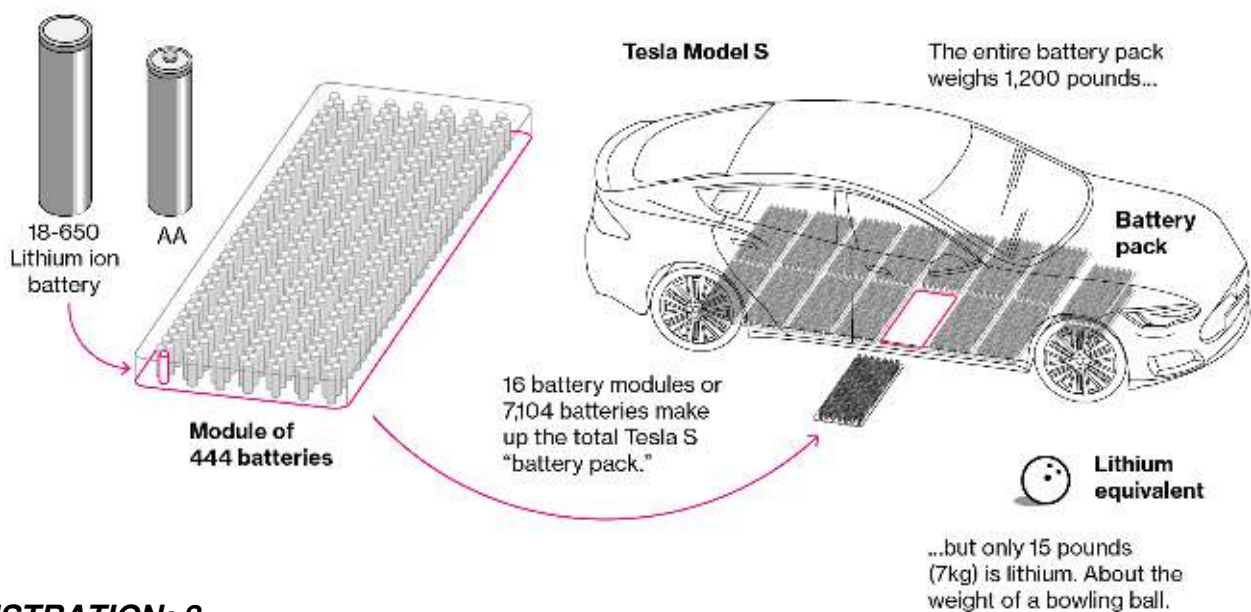
This is a typical illustration of the positioning of the battery-pack in an electric vehicle or a hybrid vehicle version:



In the above illustration we can also see that the individual batteries are placed in a compartmentalized design. This will easily accommodate the FireStopper® proposed solution for all electrical vehicles to eliminate the threat of “Thermal Runaway” occurrence.

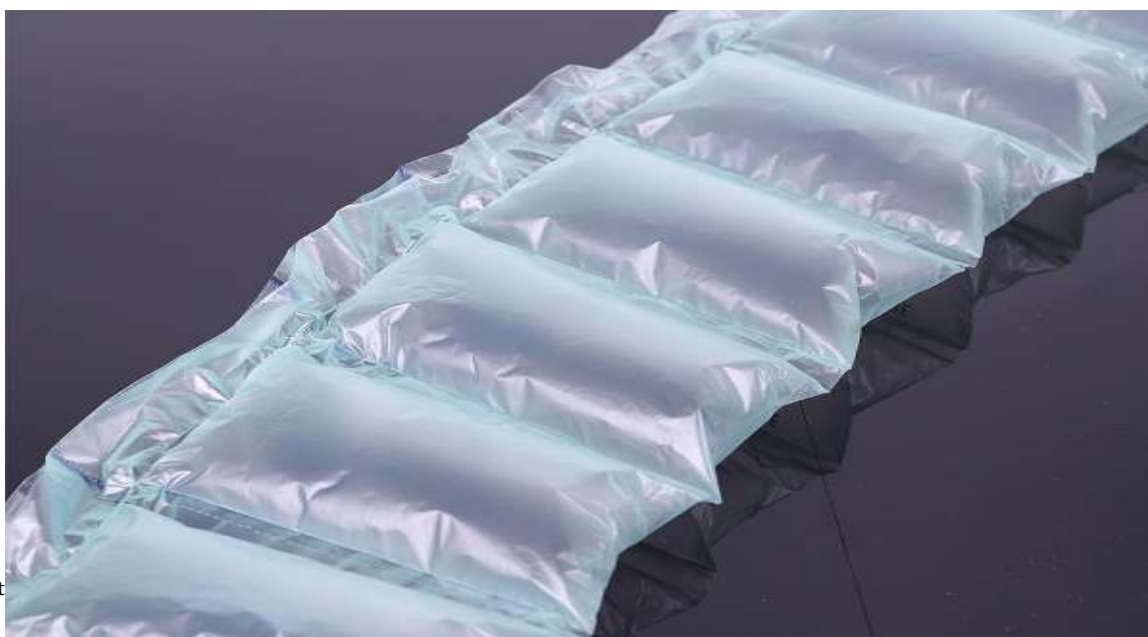
Based on the certified efficacy and durability of the intended FireStopper® premix product for this application, and flexibility of use, we recommend that each battery compartment, making-up the array of energy cells in the subject vehicle, be encased in a bladder system containing the **FireStopper® Predator FFC** premix. Please see ILLUSTRATIONS below:

**ILLUSTRATION: 7**



**ILLUSTRATION: 8**

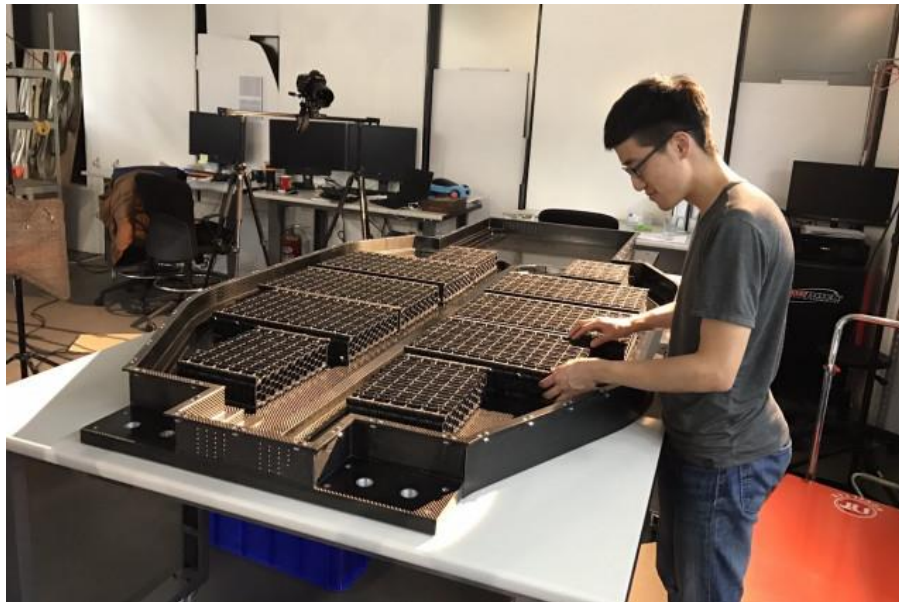
An example of a deployable bladder system:



The application of the **FireStopper® Predator FFC** to lithium-ion batteries or battery packs does not require a mechanical spraying function to deliver full extinguishment as all other fire suppression products require. In vehicle systems environments, as well as other similar transportation uses, it is more efficient to flood the affected compartment in order to stop the heat producing reaction that leads to catastrophic explosive fire results.

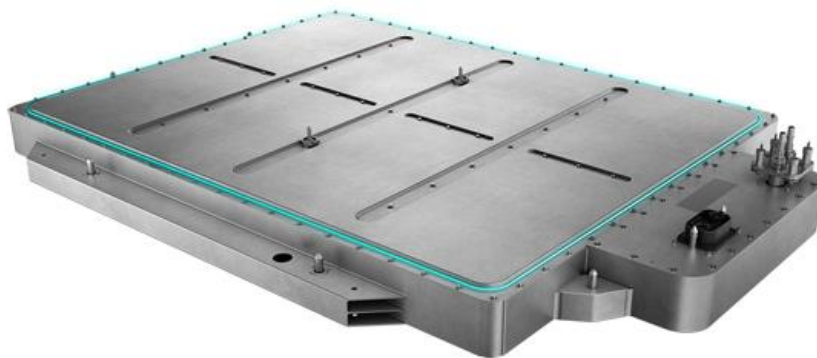
**ILLUSTRATION: 9**

A general example of a Lithium-ion Battery construction:



**ILLUSTRATION:10**

The fully constructed sealed battery pack for auto vehicles:



Once sealed in place, the intended function of the FireStopper® System is to deliver the liquid at the earliest opportunity stopping the inherent and inevitable destructive explosive fire process. With the **FireStopper® Predator FFC** it is achievable by affording a passive system that is



*comprised of bladders filled with the FireStopper® premix liquid providing a failsafe devise to ensure maximum safety.*

*The system can and will be designed allowing the bladder to burst at a designated pre-ignition temperature thereby flooding the affected compartment and fully covering the battery cells. The aim is to neutralize the precursor condition and thus the fire potential. This novel system will eliminate the runaway temperature syndrome of the malfunctioning battery pack leading to the runaway explosive fire syndrome that threatens everyone.*

***“A single or individualizes bladder system holding the measured quantity of the active product needed to totally cover the batteries in the malfunctioning zone (s), compartmentalized and sealed-in within the superstructure of the total energy compartment, delivering the solution to this problem.”***

*As illustrated above, employing a system in every transportation application can contain and deliver the premix in the affected compartment of the battery pack quickly and effectively. This proposed system can be tied into the vehicle’s computer or any other devices notifying the driver and anyone or other entity additionally required to lend assistance, if necessary, of the ensuing problem.*

*Moreover, within the scope of protection built into every extinguishing system, FireStopper® offer a full line of handheld portables extinguisher, in never before available manageable sizes, no other manufacturer provides. This unique opportunity to choose the right product to suit the need of the end-user allows for a never-before available incipient fire intervention magnifying safety and security.*

*Besides the “all fire-class” efficacy advantages offered over every available extinguisher product-lines, such as the “Green,” non-irritant, non-aggressiveness, and non-toxicity of this product, the **Predator FFC**, can be applied exclusively through any delivery system availed through FireStopper® or developed specially to fit the purpose with no restriction in use or application.*

## **CONCLUSION**

*Since fire protection in general is stagnated and unchanged for the past two centuries, attention should be paid to real and positive science-based advances and not special interest’s financial gains. Given the fact that Government and Industry persist in being exposed to catastrophic fires and explosions while continuing to enact the same failed solutions, attention must be paid to ameliorating this issue and taking “special interests” out of the mix. The repercussions born-out of the incompetence of those decision makers are clearly a burden on to the public’s shoulders through taxes, and cost of goods and services.*

*The solution to combatting fires economically, reliably, and responsibly is here and now, only available through FireStopper®! In the 27-years of FireStopper® operations many have claimed efficacy usually with staged results and lacking third-party certifications.*

*With the release of the next generation of FireStopper® Liquid Products replacing all previously available liquid products in the market, this advanced product-line now offers even more efficacy,*

*safety, and economy through actual quantified use and reliability over all others. Please see initial gains below:*

### **Industry**

- *Massive loss prevention reducing the cost of insurance*
- *Massive reduction of loss of business opportunity*
- *Superior safety to personnel*
- *Reduced costs of operations*
- *No environmental damage exposure*

### **Private Sector**

- *Lower Insurance premiums*
- *Massive reduction of personal property loss*
- *Unparallel life protection & lowest risk of injury*
- *Minimal, if any, collateral damage to property and the environment*
- *And much more...*