

# BATTERY MANUFACTURING

## THE FUTURE IS NOW

The adoption of electric vehicles is rising at a high rate. The U.S. is one of the leading countries in global electric vehicle sales, along with countries such as Canada, which has already begun transforming its transportation infrastructure to accommodate for the switch to electric vehicles. EVs are quickly gaining valuable market share from internal combustion vehicles. While many people may be familiar with EV pioneer Tesla, there is an entire ecosystem of battery producers and lithium mining firms that are playing critical roles in this transformation.



## UNIQUE FIRE RISKS

Lithium-ion battery fires are more dangerous than fires from other battery types because they release a flammable vapor that is toxic and which essentially produces its own fuel, creating a thermal runaway. When lithium batteries overheat, they are capable of spontaneous ignition and explosion. Causes range from electrical shorts, overcharging, rapid discharge, physical damage and just poor design and manufacturing. Overheating happens in the individual cells of the battery and can escalate quickly inside the battery through the release of flammable electrolytes or molten burning lithium.

# BATTERY FIRES CANNOT BE TREATED LIKE ANY OTHER FIRE

## 4 STAGES OF LITHIUM-ION BATTERY FIRES

1. Abuse – any form of electrical, thermal or mechanical abuse. Can be internal or external.
2. Off-Gassing – once the battery starts to fail, the internal electrolytes break down and generate gas that is released from the cell.
3. Smoke – this happens in the very early stages of thermal runaway and will escalate quickly to the 4th stage.
4. Fire – thermal runaway is in full effect.

Lithium-ion batteries that have been involved in a fire are also known to reignite long after they have been damaged – sometimes up to a week later. After a fire, there is often stranded energy which requires the batteries to be removed from the area.

**EVERY LINK IN THE BATTERY SUPPLY CHAIN – FROM EXTRACTION AND PRODUCTION TO RECYCLING – MUST BE EQUIPPED WITH THE RIGHT FIRE PROTECTION SYSTEMS AND EQUIPMENT.**



### Definitions

Thermal Runaway - a process that is accelerated by increased temperature, in turn releasing energy that further increases temperature. Thermal runaway occurs in situations where an increase in temperature changes the conditions in a way that causes a self-perpetuating increase in temperature, often leading to a destructive result (fire or explosion).

Stranded Energy - any scenario where electrical energy remains in a battery without an effective means to remove it. This typically happens when the battery is damaged—by force, a coolant leakage, heat, or water intrusion—and normal function ceases.

# LET'S TALK FIRE PROTECTION

The best decision you can make to protect your people, facility and overall business is to install a professionally-designed and engineered automatic fire suppression system.

Each building and area needs to be carefully reviewed to determine the right fire protection solution that will combine code compliance and workplace safety. Having the wrong suppressant can have catastrophic consequences and can lead to a self-fueling fire situation.



Our group of fire protection companies includes Northern Sprinkler Design, Apex Fabrication & Supply, as well as in-house delivery contractors. We are in constant, and seamless communication with all stakeholders throughout the project life cycle to ensure the final system not only meets the applicable code requirements, but also the buildings unique design and fire protection needs.

Norther Sprinkler Design is our design and engineering firm, who are committed to put our clients first by focusing on designing fire protection systems that lead to successful installations. Our team of designers and engineers have vast experience in the field through completing assignments for large automotive and industrial buildings of similar scope and intricacy. They have intimate and first-hand experience with the unique challenges these complex facilities present.

A key to a successful installation is a dependable supply partner. Apex Fabrication & Supply is our trusted partner to deliver custom fabricated systems, and materials that meet the exact design specifications for the job.

With experienced and knowledgeable staff, fabricated pipe and materials are bundled, packaged and delivered directly to site on-time and labeled clearly to help streamline installation.

Extra precautions are taken such as non-destructive dye testing on each and every weld to ensure your fabricated pipes are leak free. We also systematically check threads with controlled ring gauges to ensure that they exceed the highest standards.

No corners are cut, and nothing is left to chance.

## PARTNERSHIP IS THE KEY

A real benefit in our partnership model with our clients, is to work together as the building is being planned, so we can provide valuable insight and cost savings prior to the estimating process. The end result is a complete fire protection design package that is fully coordinated, engineered, and ready for permit tendering and installation.

Our subject matter experts have years of experience installing and maintaining the highest standards of excellence, especially for challenging installation and complex operations environments. Our designers, engineers and estimators have successfully bid on, and completed large battery storage and manufacturing projects.

Because of our partnerships with designer, supply, fabrication, and delivery contractors, we are able to provide these customers with a higher level of control in project delivery from inception through to execution. Through our supply chain, design team, project managers, installers and cutting-edge software, we provide the right solution - on-time, resulting in a successful execution.

## CLASSIC FIRE + LIFE SAFETY – BETTER SAFETY THROUGH PARTNERSHIP



### CASE STUDY – SK BATTERY AMERICA

In March 2019, SK Innovation broke ground on the first electric vehicle battery manufacturing plant in the U.S. With the increasing demand for EV batteries, SK Innovation started building a second facility at Commerce, Georgia with additional investment of 940 million USD.

The risk of fire is an ever-present danger for any facility containing Lithium-ion batteries. Lithium-ion battery fires are even more dangerous than fires from older battery types because they release a flammable vapor that is toxic and which essentially produces its own fuel, creating a thermal runaway.

Our Team was trusted to supply and install a mixture of wet and pre-action sprinkler systems, a Vesda air-sampling system, a NOVEC 1230 clean agent suppression system, an in-rack wet sprinkler system, two fire pumps, and two water storage tanks.

In total, we installed 184,450 feet of pipe with a total of 55,288 sprinkler heads for their 1.4 million square foot plants.