BATTERY-ELECTRIC VEHICLES
SAFETY BY DESIGN

01 In-house battery production

02 Engineered for UG mining

03 Strategic battery cell supply from a gigafactory

04 The right kind of chemistry

05 Battery as a service

06 New Afton I LH518B

SANDVIK

IN-HOUSE BATTERY PRODUCTION

IN-HOUSE RESEARCH AND DEVELOPMENT

Sandvik is the only OEM with a battery system that is fully designed and assembled in-house. This gives us full control over R&D and enables rapid response to customer requests, aftermarket needs and product upgrades. Battery development and construction takes place at our 100 MWh battery factory in Camarillo, California. At over 90,000 square feet, it also features a training center and is always open to customers for a tour.

Our battery cells go through a long list of quality control checks before leaving our supplier's gigafactory. We've leverage automation in our production to improve quality and throughput as the battery packs are assembled.

QUALITY CULTURE

Our BEVs are backed by over 15 years of battery design expertise. The batteries have been through extensive field testing in underground hard rock mines. Additionally, we have a test track next to the factory with simulated mining conditions.

BATTERY TESTING

- ✔ Crush
- ✔ Shock
- ✔ Vibration
- ✔ Overcharge
- ✔ Thermal test
- ✔ Forced discharge
- ✔ Altitude simulation
- ✔ External short circuit

ENGINEERED FOR UG MINING

The Artisan ® battery pack is engineered in-house for Sandvik trucks and loaders. It features the patented AutoSwap and AutoConnect systems, allowing the operator to swap out a depleted battery for a fully charged one in about five minutes without having to leave the cabin.

The specific goal of our engineers was to minimize the likelihood of an incident by choosing the most efficient battery pack design and the best battery chemistry. The battery design reduces the severity of an incident with the lithium-iron phosphate (LiFePO4 or LFP) battery chemistry and limits propagation, making containment easier.

INNOVATIVE SYSTEM DESIGN

- ✔ Only OEM with in-house battery system
- ✔ Robust mechanical protection and swapability
- ✔ No cobalt or scarce minerals
- ✔ LFP’s low heat release rate improves safety
- ✔ Voltage and temperature monitoring
- ✔ Cooling and isolation system for increased safety
- ✔ Built-in suppression and containment system

STRATEGIC BATTERY CELL SUPPLY

HIGH QUALITY BATTERY CELL SUPPLY

CALB is one of the world's leading electric vehicle battery cell manufacturers. The automated gigafactory has a long cooperative relationship with Sandvik. The company has over 180 patents and Sandvik works closely with them to ensure our cells meet the strictest quality and environmental requirements.

BATTERY SYSTEM TESTED AGAINST

- ✔ Battery system standards*
- ✔ UN 38.3 Transport safety
- ✔ CE HSE compliance
- ✔ IEC 62619 Industrial application testing
- ✔ ROHS Restriction of Hazardous substances
- ✔ UL 2580 Batteries for Use In Electric Vehicles
- ✔ IEC 62485-6 Battery installations used for electric off-road vehicles
- ✔ IEC 63660-3 Safety requirements for secondary batteries (Traction battery)
- ✔ IEC 60204-1 Safety requirements for secondary batteries and battery installations
- ✔ Battery Directive 2006/66/EC
- ✔ Low Voltage Directive 2014/35/EU
- ✔ EMC Directive 2014/30/EU

* Tested by Sandvik or 3rd parties against these standards to meet the requirements of UL but not been independently tested by UL.

Trusted by CALB

RoHS CNAS CE TÜVRheinland SGS ISO 9001 PONY UN38.3 MSDS

THE RIGHT KIND OF CHEMISTRY

LITHIUM-IRON PHOSPHATE (LiFePo4 or LFP) BATTERY CHEMISTRY

Sandvik battery-electric trucks and loaders use a lithium-iron phosphate (LiFePO4 or LFP) battery chemistry. LFP batteries are a type of rechargeable battery that has a longer lifetime than the more commonly used cobalt-based lithium-ion chemistry.

Sandvik chose LFP for its BEVs for safety reasons. The structural stability of LFP means that in case of cell temperature rise, it happens at a lower rate that other chemistries. In case of a battery cell thermal event the energy, heating rate and maximum temperature are considerably lower than for the other lithium-ion chemistries because of the LFP structural stability. The LFP chemistry doesn't release oxygen in a thermal event. Should a fire start, this chemistry greatly reduces the chances of explosive or large fires by keeping it internalized and slow burning.

BATTERY AS A SERVICE

For those who are new to battery-electric mining equipment, we offer Battery as a Service to avoid CAPEX during start up of use. Depending on the selected package, Sandvik retains ownership of the batteries and chargers, assumes responsibility for their maintenance and assures availability of stock. Sandvik battery experts make sure that your batteries are in optimal condition throughout the life of the battery-electric equipment. When the batteries are no longer suitable for mining environments, Sandvik will make sure the batteries are repurposed or recycled responsibly.

You only pay for the amount of battery power you use, giving you predictable monthly costs, without upfront investment. The goal is to make our customers' transition to battery powered equipment smooth and easy.

Always included

BASE RATE

- Capacity guarantee[1]
- Warranty included[2]
- Remote support service
- End of life decommissioning

1. Sandvik provides upgrade kits as needed to ensure battery capacity is always at 60% of original or higher
2. Standard warranty conditions apply

EXTRA ITEMS

- Spare batteries
- Chargers
- Coolers

ON-SITE SUPPORT

- Maintenance technicians
- Parts supply
- Tools

NEW AFTON I LH518B

> "Sandvik LH518B has significantly more mucking power. In a traditional diesel loader, you have to rev the engine to get all your hydraulic power, whereas in the BEV it's the maximum amount of hydraulic power, right from the get-go. The instant torque is beneficial, both for mucking and for starting on a ramp. From a productivity and efficiency standpoint, it's miles ahead of the competition in terms of the diesel equivalent, in our experience."

Jeff LaMarsh, Mine Superintendent, New Gold's New Afton mine

SCAN THE QR CODE
TO LEARN MORE

PERFORMANCE RESULTS

RAMP WORK

	Diesel	BEV
Duration	4h 56m	4h 49m
Average speed	7.0km/h	11.4km/h
Buckets	37	45
Diesel	254.5l	0l
Energy use	2,545kwh	692kwh

PRODUCTION LEVEL WORK

	Diesel	BEV
Duration	3h 46m	3h 50m
Average speed	5.8km/h	7.3km/h
Buckets	35	40
Diesel	159.6l	0l
Energy use	1,596kwh	383kwh

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