



# Super B Lithium Batteries

January 22<sup>nd</sup> 2019

[www.super-b.com](http://www.super-b.com)



# Location & history



*Assembly & warehouse*



*R&D, engineering, sales & administration*



## History

- Started as engineering company (2004) for ASML, Philips, Airbus, NXP, and others
- Focused on new generation Lithium starter and traction batteries in 2007
- Merged with Lithium Werks in September 2018, split off in January 2019
- Subsidiary of Koolen Industries
- CEO: Kees Koolen (former Booking.com, Uber)
- Serving Automotive, Marine, UPS, Industrial and motorhome market



# Battery applications







# Product portfolio

- Super B's core competences: developing and manufacturing high quality advanced energy storage solutions
- Current technology: Lithium Iron Phosphate (LiFePO<sub>4</sub>), 12V modules & packs including battery management systems (BMS)
- Product range:



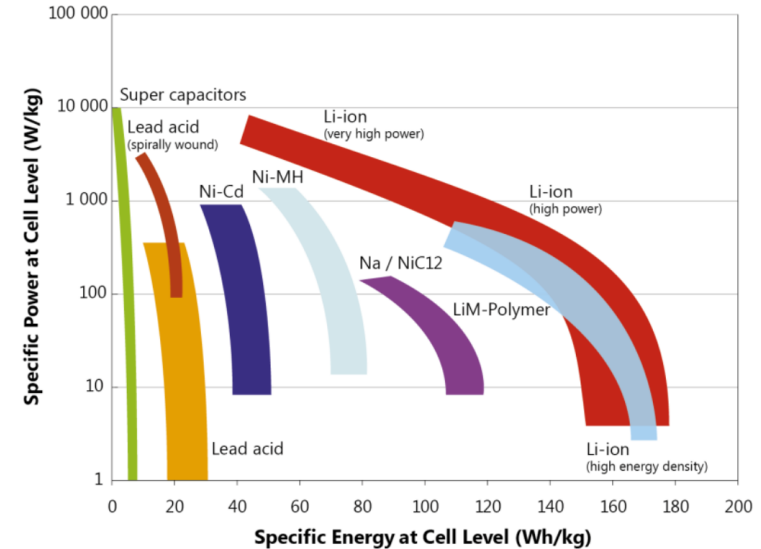
- Product roadmap: addition 105Ah / 210Ah / smart starter /...
- Cells, modules & packs:





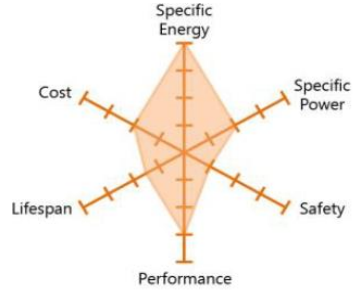
# LiFePO<sub>4</sub> technology

- **100% safe** and protected by integrated BMS
- Maximum **energy efficiency** & low self-discharge
- Significant **weight reduction** compared to lead acid
- **Fast charging**, fully charged within 1 hour at 1C
- **Charging** at low temperatures
- Proven **reliability** used for >20 years in satellites
- **Maintenance free** long lifetime, 5.000 cycles

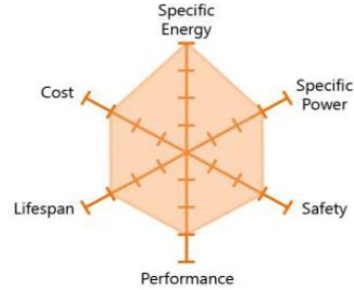




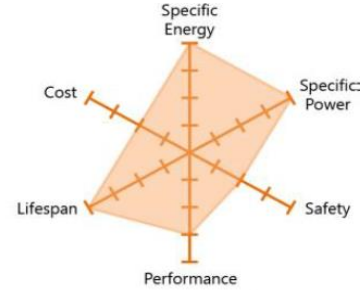
# LiFePO<sub>4</sub>: one of many Li-battery technologies



**Lithium cobalt  
(NCA)**



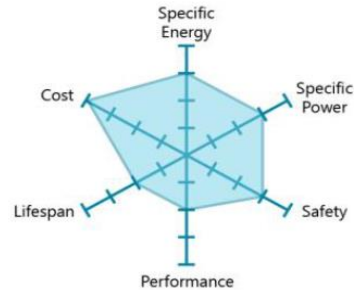
**Lithium nickel manganese cobalt  
(NMC)**



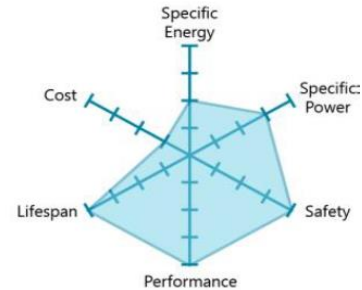
**Lithium nickel cobalt aluminium  
(NCA)**



**Lithium iron phosphate  
(LFP)**



**Lithium manganese spinel  
(LMO)**



**Lithium titanate  
(LTO)**



# Quality & safety: certifications



## MATERIAL SAFETY DATA SHEET

Super B lithium batteries

FILE NO.: MSDS\_SE

MSDS DATE: 1 Jun

### SECTION 1: IDENTIFICATION OF THE PRODUCT AND OF THE COMPANY

#### 1.1 PRODUCT IDENTIFIER

Description: SB12V160E-ZC  
Synonyms: Secondary (rechargeable) Li-Ion Battery, Lithium Iron Phosphate Energy Battery  
EAN code: 8718531360570  
Specification: 2060Wh, 160Ah, 12.9V  
Use: Traction Battery

#### 1.2 SUPPLIER

Manufacturer: Super B Lithium Power b.v.  
Address: Expolaan 50  
7556 BE Hengelo  
The Netherlands

Emergency telephone number: +31 (0)74820010

### SECTION 2: HAZARDS IDENTIFICATION

#### 2.1 CLASSIFICATION OF THE SUBSTANCE OR MIXTURE

##### Emergency overview:

The rechargeable Li-Ion battery cells described in this Safety Data Sheet are sealed units which are used according to the recommendations of the manufacturer.

The product should not be disassembled. Do not short circuit, puncture, incinerate, crush, immerse in temperatures outside the by the manufacturer declared temperature range of the product. If this occurs or battery vent/explosion/fire may follow, depending on the circumstances.

##### Routes of entry:

Risk of exposure will only occur if the battery cell is mechanically, thermally, or electrically abused or compromised. If this occurs, exposure to electrolyte solutions contained within the battery cell may occur contact, skin contact and ingestion.

##### Potential health effects:

- Eyes: Contact between the battery and eye will not cause any harm. Eye contact with the



Certificate Number: 18-GE

### Confirmation of Product Type Approval

Please refer to the "Service Restrictions" shown below to determine if Unit Certification is required for this certificate reflects the information on the product in the ABS Records as of the date and time the printed.

Pursuant to the Rules of the American Bureau of Shipping (ABS), the manufacturer of the below listed a valid Manufacturing Assessment (MA) with expiration date of 06-AUG-2023. The continued validity Manufacturing Assessment is dependent on completion of satisfactory audits as required by the ABS

And, a Product Design Assessment (PDA) valid until subject to continued compliance with the Rules used in the evaluation of the product.

The above entitle the product to be called Product Type Approved.

The Product Design Assessment is valid for products intended for use on ABS classed vessels, MODU which are in existence or under contract for construction on the date of the ABS Rules used to evaluate Product.

ABS makes no representations regarding Type Approval of the Product for use on vessels, MODUs built after the date of the ABS Rules used for this evaluation.

Due to wide variety of specifications used in the products ABS has evaluated for Type Approval, it is contract that; whether the standard is an ABS Rule or a non-ABS Rule, the Client has full responsibility continued compliance with the standard.

Product Name: Battery  
Model Name(s): SB12V160E-ZC & SB BCI-C1

Presented to:  
SUPER B LITHIUM POWER B.V.  
EXPOLAAN 50  
NL 7556 BE  
Netherlands

#### Intended Service:

Marine and Offshore Applications; Power Supply/Power Distribution.

#### Description:

Lithium Iron Phosphate (LiFePO4) Battery Type SB12V160E-ZC with BMS (external interruption device needed) made with glass fiber reinforced (GRFP) Casing, Aluminum / PE sandwich side panels. Battery Com

Produkte  
Products



Prüfbericht-Nr.: Test Report No.:	21218772-001	Auftrags-Nr.: Order No.:	E6 381 310 0255	Seite 1 von 7 Page 1 of 7
Kunden-Referenz-Nr.: Client Reference No.:	3266392	Auftragsdatum: Order date:	02.01.2014	
Auftraggeber: Client:	Super B bv, Mr. M.H. Doornekaamp, Diamantstraat 1e, 7554 TA Hengelo (ov), Netherlands			
Prüfgegenstand: Test item:	13.2 V / 160 Ah / 2.1 kWh - LiFePO4 wiederaufladbare Sekundärbatterien/ 13.2 V / 160 Ah / 2.1 kWh - LiFePO4 secondary batteries			
Bezeichnung / Typ-Nr.: Identification / Type No.:	Super B - SB12V160E-ZC - rechargeable Lithium Traction Battery Art.Nr. 871853160570			
Auftrags-Inhalt: Order content:	Altitude Simulation, Thermal Test, Vibration Test, Shock Test, External Short Circuit & Overcharge Test.			



June 1, 2018

### DECLARATION OF CONFORMITY

Manufacturer Name: Super B Lithium Power b.v.  
Address: Expolaan 50  
7556BE Hengelo  
The Netherlands

Product Description: Lithium Ion Energy / Traction Battery System  
Model Number(s) / Name(s): 8718531360662 SB12V160E-ZC  
8718531360570 SB12V160E-ZC

This declaration of conformity is issued under the sole responsibility of the manufacturer.

The object of the declaration described above is in conformity with the relevant Union harmonization legislation, and carries the CE marking accordingly:

Electromagnetic Compatibility (EMC) Directive 2014/30/EU  
Battery Directive 2006/46/EC  
General Product Safety Directive 2001/95/EC  
including their amendments

and conforms with the following standards:

IEC 62619:2017  
IEC 62620:2014  
IEC 62133:2012

This Declaration of Conformity applies to above-listed products placed on the EU market after:

June 1, 2018  
Date and Place of Issue

Marc Bergers, Chief Technology Officer



# Maritime application

- 2-3% world wide yearly CO2 emission caused by sea transport
- Without measures: increase to 17% in 2050
- Life time of a ship: 25-30 years: we need to act now!
- Diesel ban in European cities (road transport & vessels)
- Norway Fjords will become zero emission zones in 2026



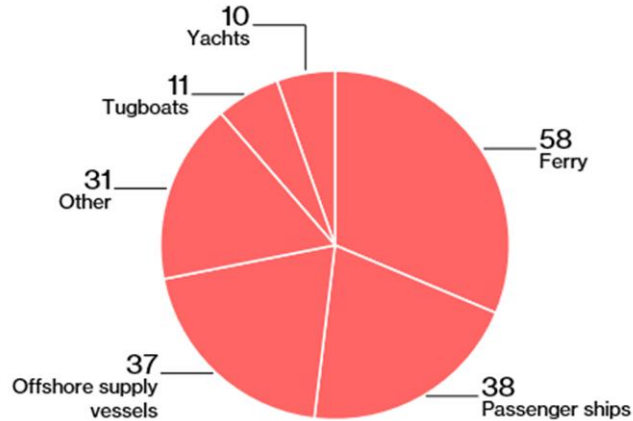




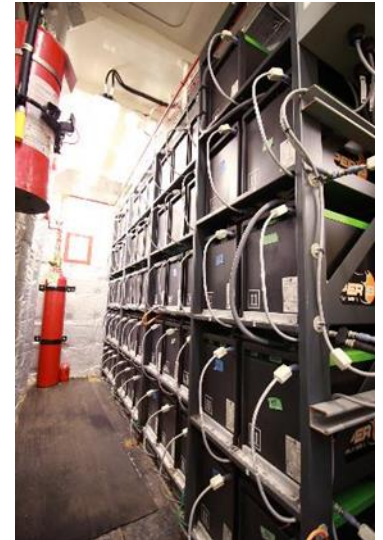
# Maritime situation

- 4.000 (5%) ships currently use some kind of electric means (Diesel-electric / hybrid propulsion / full electric)

Battery powered vessels either in operation or under construction around the world in 2018:



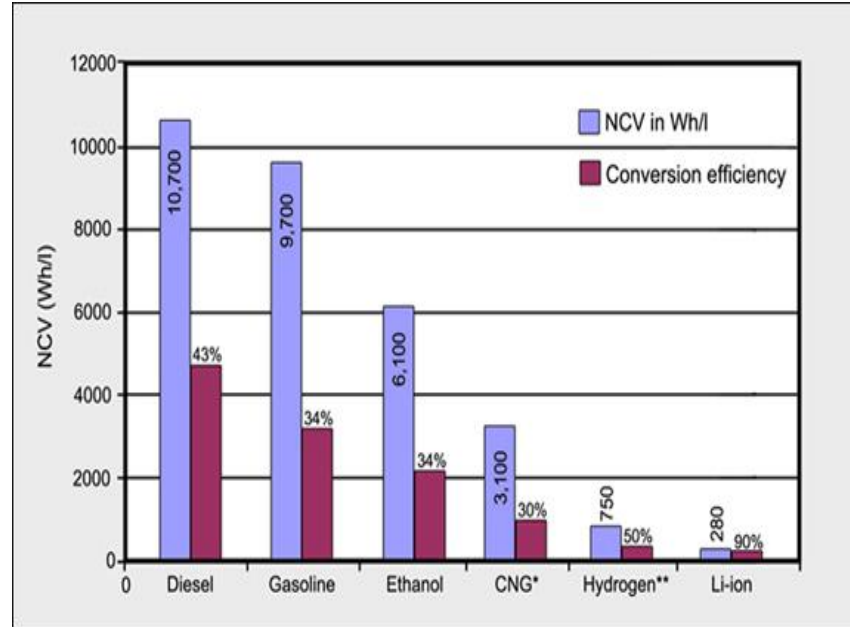
Source Maritime Battery Forum, DNV-GL Electric, plug-in hybrid, and hybrid vessels





# Maritime situation

- Batteries could be a suitable energy storage solution, but not in all cases
- ✓ Short sea shipping
- ✓ Ships for inland waterways (in Europe 7.300 ships)
- ✓ Off shore (eg dynamic positioning)
- ✓ Propulsion / house load / additional functions
- ✓ Additional energy system for ships while berthed



**Net calorific values.** Diesel and gasoline surpass hydrogen and Li-ion.

The conversion efficiency is thermal output and does not include friction and drag.

\* CNG (compressed natural gas) is 250 bars (3,625psi)

\*\* Hydrogen is at 350 bar (5,000psi)



# Maritime references

**Customer** BC Ferries  
**Country** Canada  
**Vessel type** Ferry  
**Battery system** 54S1P  
**Application** bow thruster  
**In service since** 2013



**Customer** Venø Faergen  
**Country** Danmark  
**Vessel type** Ferry  
**Battery system** 54S1P (113kW)  
**Application** Housseload  
**In service since** 2014



**Customer** SOIC  
**Country** Taiwan  
**Vessel type** Ferry  
**Battery system** 54S1P  
**Application** Diesel Hybrid drive  
**In service since** 2016





# Maritime references

**Customer** ICAT  
**Country** Croatia  
**Vessel type** Ferry  
**Battery system** 2x 4S3P + 8  
(2x 25kWh + 17 kWh)  
**Application** propulsion / house load  
**In service since** 2018



**Customer** Rederij P. Kooij  
**Country** Netherlands  
**Vessel type** canal cruise  
**Battery system** 11S7P (162 kWh)  
**Application** propulsion  
**In service since** 2018



**Customer** Lovers  
**Country** Netherlands  
**Vessel type** canal cruise  
**Battery system** 11S9P (208 kWh)  
**Application** Propulsion  
**In service since** 2016







# Maritime references



Various projects, also including distributors  
(Britmar, Oceanvolt, Marine Automation,  
Whisper Power Mastervolt and others)



## Contact details

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7556 BN Hengelo  
The Netherlands

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[www.super-B.com](http://www.super-B.com)



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