KVT-Fastening is an expert for high-quality, special fastening applications and offers engineering solutions based on the wide product portfolio of the leading manufacturers in the market. KVT-Fastening is part of the Bossard Group.

BOSSARD
Proven Productivity

KVT
SOLUTIONEERING
A BOSSARD COMPANY

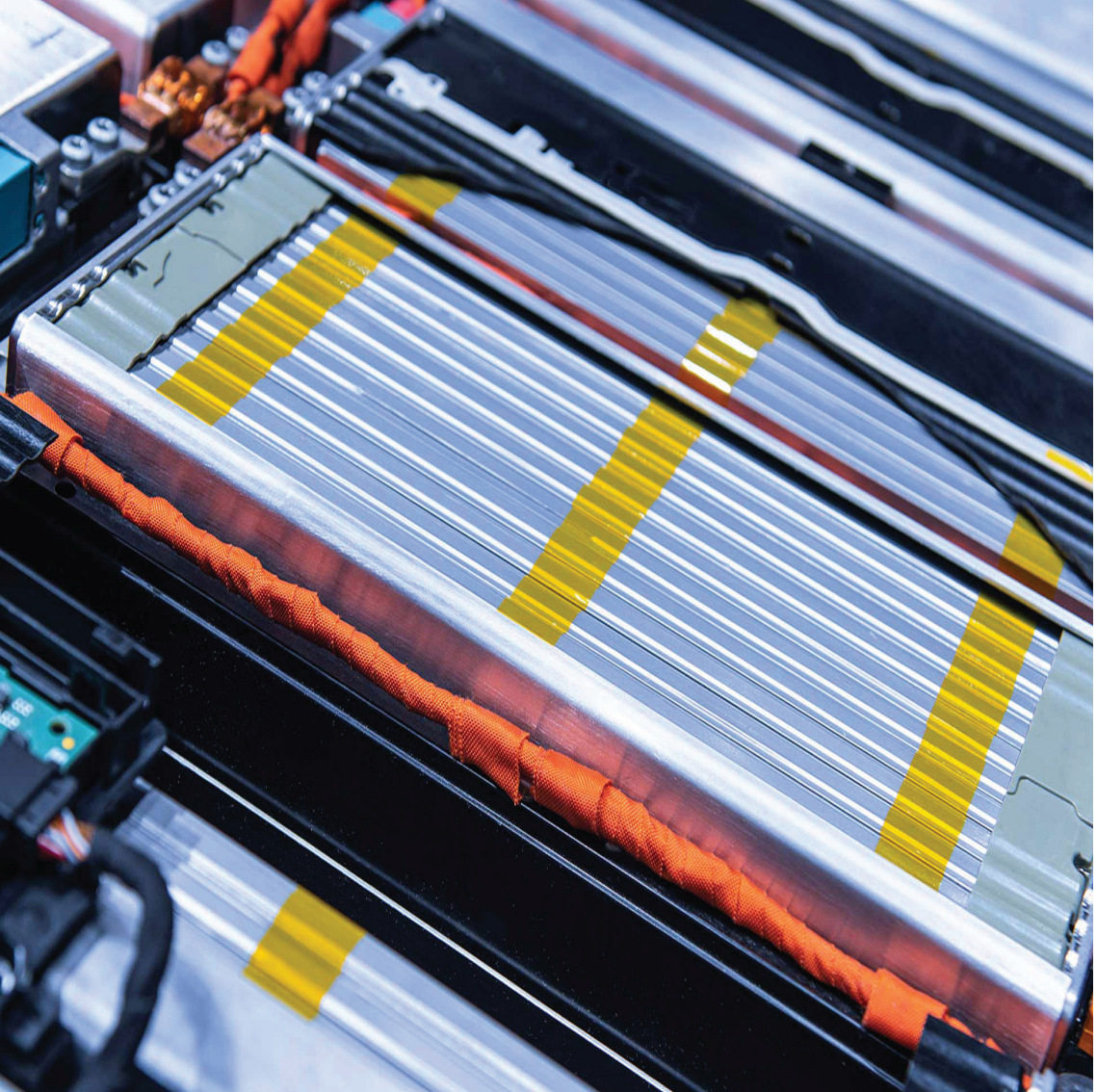
MANUFACTURING THE HIGHEST-QUALITY EV BATTERY PACK STARTS FROM THE SMALLEST PARTS

Electric Vehicles (EV) are one of the fastest-growing markets in recent years due to the increasing pressure on sustainable solutions and lowering carbon emissions.
The latest "Skateboard" platform is the new norm for many electric vehicles. The modular skateboard design can be the basis of various vehicles with minimal effort for the redesign.

Correct fastener design and choosing the right fastener is the key to the success of the modularity and lifespan of the skateboard platform. Using the serviceable fasteners for the modules and components which will need maintenance or updating in the future could not only extend the battery pack durability but also save a lot of maintenance work. Designing in the reversible fastening increases the possibility to retrieve the undamaged parts and results in better sustainability.

From our year-long experience in fastening and assembly, we suggest you to consider the following three steps when it comes to fastening of your EV battery pack:

1. CONSIDER THE FASTENER DESIGN FROM THE 1ST DAY
2. ENSURE THE PERFORMANCE OF THE FASTENER
3. AVOID INSTALLATION PROBLEMS AND INCREASE ASSEMBLY EFFICIENCY



CONTENT

1 CONSIDER THE FASTENER DESIGN FROM THE 1ST DAY [1]

TIP1. UTILIZE THE AVAILABLE RESOURCES [3]

TIP2. INVITE EXPERTS TO COOPERATE FOR A RELIABLE PROJECT [4]

RECOMMENDED FASTENERS FOR EV BATTERY [4]

2 ENSURE THE PERFORMANCE OF THE FASTENER [6]

3 AVOID INSTALLATION PROBLEMS AND INCREASE ASSEMBLY EFFICIENCY [7]

THE PATH TO FACTORY 4.0 WITH THESE CORE COMPONENTS OF SMART FACTORY ASSEMBLY [8]

CONSIDER THE FASTENER DESIGN FROM THE 1ST DAY.
CHOOSE THE RIGHT FASTENERS

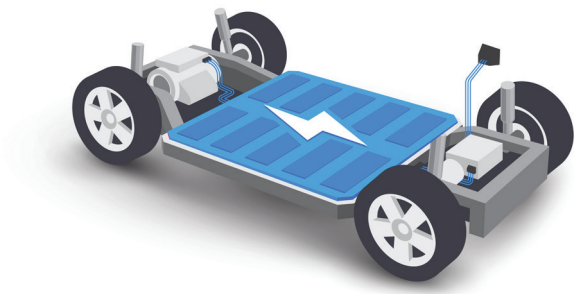
TIP1. UTILIZE THE AVAILABLE RESOURCES

Design your EV battery pack focusing on fasteners from the very beginning. Bossard's knowledge of assembly methodologies, fastening joints, and technical resources can be the game-changer for your success. It is worth taking care of practical tools useful in designing, not only physical ones. You have several resources at your disposal in the form of calculators, databases, tables, and conversion factors. Their greatest advantage is the fact that they are available online, i.e. from anywhere in the world, which is particularly important in the era of remote work.

CAD design module

Advanced fastener design tool. It includes 2D, 3D, and animated models of the Bossard catalog items and other smart features to help you choose the fasteners for your project.

CAD Online Portal



Online calculators and converters

Advanced fastener design tool. It includes 2D, 3D, and animated models of the Bossard catalog items and other smart features to help you choose the fasteners for your project.

Length Converter

Tightening Torque Converter

Pressure Converter

Force Converter

Metric & inch converter for fasteners

Hardness Converter

Technical database

You will find an extensive database of technical information on the products: conversion tables, hardness comparisons, general tolerances and mechanical properties of different types of fasteners, and much more. The thematic White Papers, prepared by Bossard engineers, are also an excellent source of professional knowledge.

ONLINE RESOURCES

TIP2. INVITE EXPERTS TO COOPERATE FOR A RELIABLE PROJECT

Even perfectly trained, you can't be an expert at everything. The main thing is to know who and what to ask.

For several years, we have been seeing a great need for professional consulting in the field of industrial assembly technology on the market, which is why we decided to develop and introduce a **6-module package of Assembly Technology Expert** services to Bossard's offer. We offer technical support at every stage of product development, including the early stages of design.

WHAT IS OFFERED IN EXPERT DESIGN SERVICE?

Choose from a huge portfolio of over a million products

Professional online design and calculation tools

Fasteners optimally matched to your design and production requirements

EXPERT DESIGN SERVICE

RECOMMENDED FASTENERS FOR EV BATTERY

From our wide range portfolio of over a million products and our know-how in fastening since 1927, we have selected the recommended fasteners for the electric vehicle industry, including the application on EV battery packs.

EMBEDDING AND SURFACE BONDING FASTENERS

Reliable mounting in soft and composite materials

- Intelligent fasteners with high torque and tear out strength in soft materials
- Can be surface-mounted with adhesive or completely embedded
- Invisible integration into the application material

THREADED INSERTS FOR THERMOPLASTIC HOUSINGS

Lightweight inserts with high pull-out strength

- Provide strong thread in thin materials
- Usable for thermoset and thermoplastic materials
- Various installation opportunities

CLINCHING FASTENERS

Easy to install – superior performance

- Extremely stress-resistant even in very thin sheets
- Ideal also for coated surfaces
- No damage or bulging on the back of the component
- No recutting of threads

MULTIFUNCTIONAL SCREW

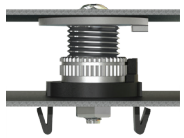
Reliability and efficiency

- Fewer single parts for faster processing times
- Reliable and durable fastened joints
- Suitable for feeding in automated assembly

TOLERANCE COMPENSATION SYSTEMS

Solid and tension-free connection of two components

- Used both for the external connection of the battery case to the body and for fastening the battery modules inside the battery case
- The comparatively large components are connected to the car body precisely and without deformation
- The use of coolant (liquid gap filler) in the battery can be reduced. This leads to a significant saving of the cost-intensive coolant and reduces the weight and cycle times



NUT/WASHER ASSEMBLIES

Preassembled washer saves time and cost

- Retaining clamp load even with high temperature changes

SEMS SCREWS

Screw-bolt/washer combinations for busbar assemblies

- Conical washers prevent loss of clamp load caused by temperature fluctuations that are common in high voltage joints
- Flat washers prevent embedment into soft materials like copper, which are often used in busbar assemblies

SEALING

Additional corrosion protection

- Protects against corrosion, moisture and much more from entering battery components and assemblies
- Applied directly on the fastener, so fewer parts like O-rings, gasket seals and sealants are needed
- Sealing Gaskets can be used as a protective edge on sheet metal and ensures secure sealing of the enclosure

FASTENERS FOR ELECTRIC VEHICLE

ENSURE THE PERFORMANCE OF THE FASTENER
TEST THE FASTENERS IN THE ACCREDITED LABORATORIES

Quality assurance is the top priority for the production of the EV battery pack. A single loose or broken fastener could lead to an irreversible disaster. That is why testing the performance of every single fastener is critical in the design phase to avoid manufacturing mistakes.

In the fastener industry, this is done in technically advanced laboratories equipped with the most modern test and measurement devices. There you can check all the key parameters: hardness, the thickness of the coating, and other mechanical properties of the fasteners, including their resistance to compression and stretching.

An overview of the most common testing procedures and further details can be found here:

- Spectral analysis
- Friction coefficient test
- Torque analysis
- Loosening analysis
- Tensile and compression strength testing
- Corrosion analysis (Salt spray test, Kesternich test)
- Ultra-sonic preload measuring
- Hardness test/hardness profile measurement
- Coating thickness measurement

EXPERT TEST SERVICE

Bossard Quality Centers

14 ultra-modern research laboratories around the world dedicated to testing key parameters of the quality and safety of mechanical connections. All our quality centers are accredited and certified according to ISO / IEC 17025.

AVOID INSTALLATION PROBLEMS AND INCREASE ASSEMBLY EFFICIENCY

In the assembly process of a battery pack, while many assembling steps are done by the robots directly, there are still inevitable manual assembling steps. In the manual assembling process, the consistency of the assembly quality is the key.

Did you know that 70% of fastening failures are caused by the assembly and design errors? Application errors during assembly often lead to major damage and consequential costs later on.

Many parameters play a role in the assembly of fasteners, from the operation of the torque wrench and the lubrication of screw connections to the selection of the assembly tool and its parameterization, to name just a few. There is a high probability that the causes of problems can be found here.

For example, if you change the type of assembly tool, the screw joint may behave differently and you will no longer achieve the desired clamping force. So it's good to know whether or not to lubricate under the head and threads in this case. If no attention is paid to such details during assembly, later failures in the product in operation can hardly be avoided.

What if all the tools are digitally connected and preset with the required force and torque, and the assembly instruction is interactively guiding the assembly worker through each step, while all the data is tracked in case of any error happens? This manual assembly workstation can not only achieve the highest consistency of the assembly quality but also provides transparency for continuous improvement and increase efficiency.

Smart Factory Assembly is the exact solution.

[7]

THE PATH TO FACTORY 4.0 WITH THESE CORE COMPONENTS OF SMART FACTORY ASSEMBLY

Digital and interactive work instructions:

The centrally editable and adaptable work instructions simplify variant management significantly. The assembly worker is guided through the assembly process and work steps are automatically documented.

Connected smart tools and devices:

With Smart Factory Assembly, all relevant assembly tools such as intelligent screwdrivers, pick-to-light, presses or measuring equipment are connected and can interact with the system.

Traceability of quality data and continuous process improvement:

The production data is traceable at product / order level and and the relevant production data can be reviewed at any time. The gained transparency about the assembly process allows for simple and quick analyses and fast improvement implementation.

The visualization of the assembly steps drastically reduces the training of personnel and exposing them to different assembly jobs. Assembly errors can be practically reduced to 0.

SMART FACTORY ASSEMBLY

WOULD YOU LIKE TO CONSULT OUR EXPERTS FOR THE FASTENING OF YOUR EV BATTERY PACK?

We are happy to offer you our know-how and support your EV battery pack design and production in the best possible way.

TALK TO US NOW