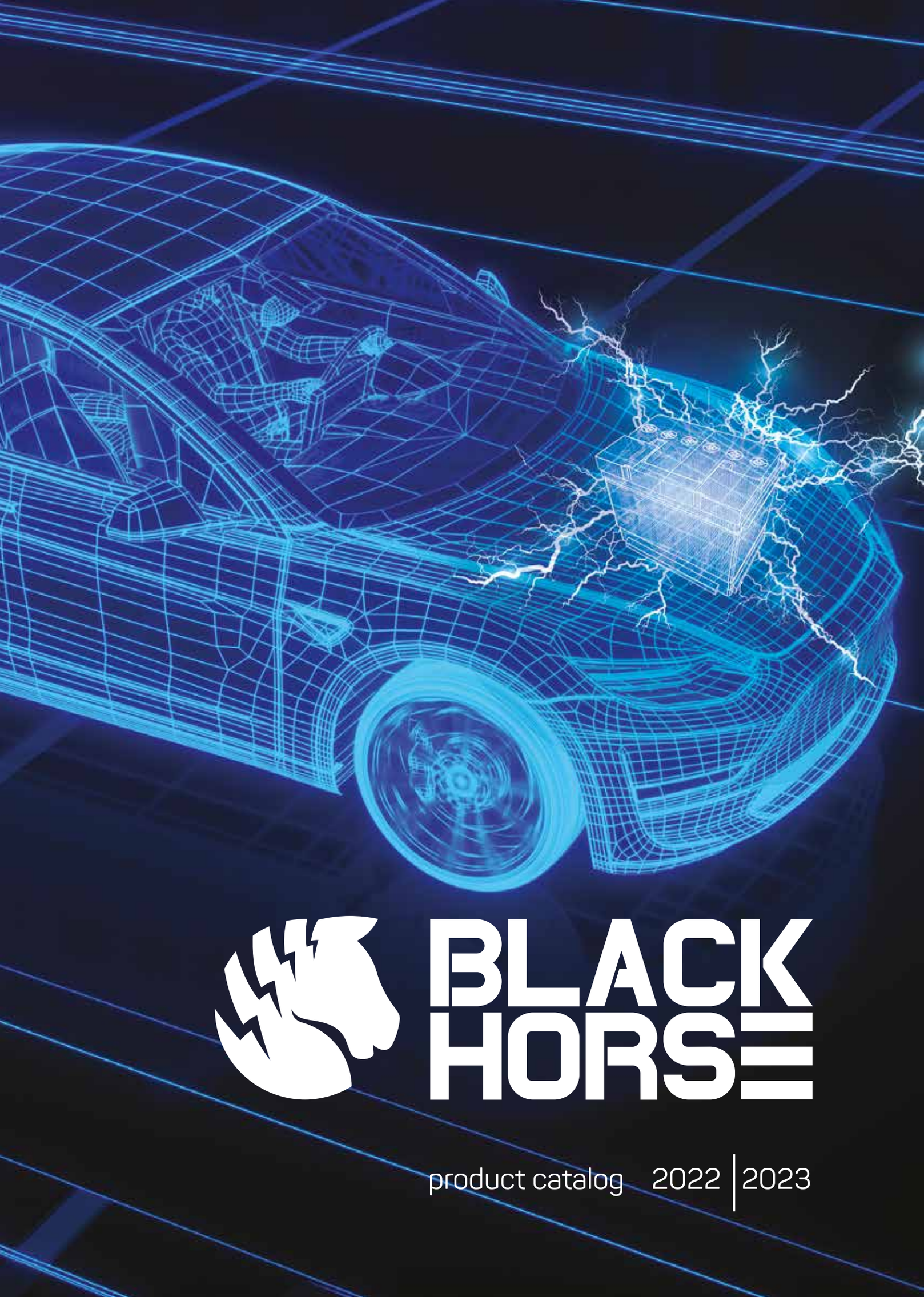
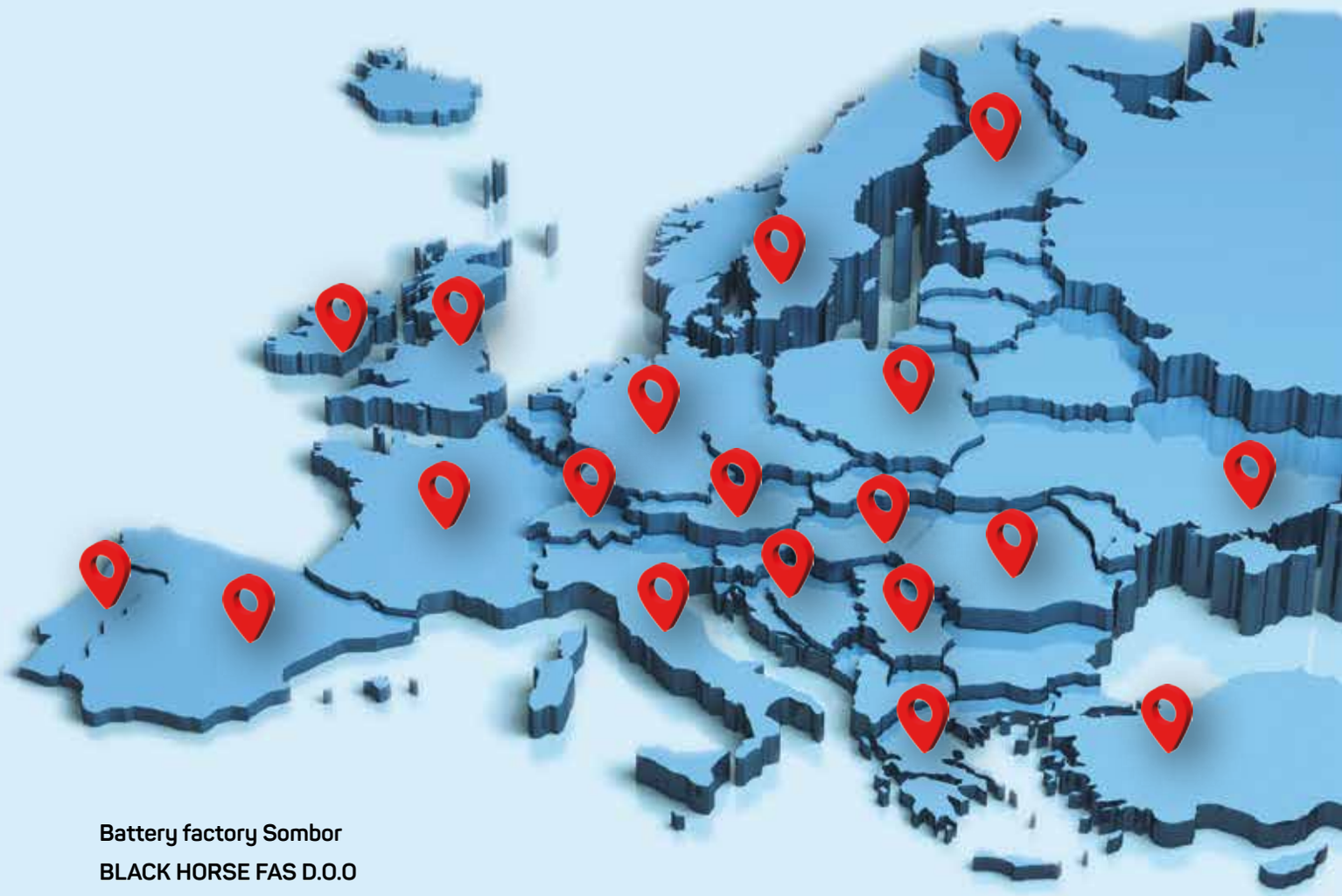


BLACK HORSE

product catalog 2022 | 2023

QUALITY THAT LASTS GENERATIONS



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ABOUT US

Black Horse is proud of its tradition that started in 1952. Today this is the international name in the battery industry on the markets of Europe, Asia and Africa.

The vision of Black Horse is providing a positive impulse to the development of the regions it operates in. Along with the good experience of consumers whose everyday lives it understands, shares and promotes, the energy with which this Company supplies vehicles is also a driver of positive energy in people.

The mission of Black Horse includes ultimate commitment to quality, with constant following of technological achievements, tradition as a basis and progress as continuity. Inspired by the environmental protection, the development of its employees and constant innovation for the benefit of consumers, Black Horse wants not only to follow, but also to create trends in the industry it belongs to.

This ambition is made possible by the capacity of 500,000 units of different types of batteries from the automotive, cargo, and military programme. This ranks Black Horse among the significant battery manufacturers in Southeast Europe, with the potential for further modernization and growth.

As the only battery manufacturer, Black Horse also fosters responsibility for sustainable development, with the use of recycled materials, reduced energy consumption and green alternatives wherever possible.

Tradition, innovation, dedication and quality embedded in the Company's DNA continue to contribute to the development of manufacturing performance. Fostering the partner trust, highly motivated employees and corporate social responsibility, Black Horse is surely heading towards the first position in Serbia and a stable place among the 3 leading brands in the Adriatic region.

Production

Black Horse invested in new continuous casting technology, proven to be exceptional in terms of battery quality compared to other systems. This system fits into the technological future of the battery industry.

By installing new equipment for the production of starter batteries, the Company joined contemporary and modern European factories. The production of calcium starter batteries was initiated by continuous casting of the negative and positive grids of calcium alloy and by continuous double-sided application of paste. The selected technology provides lighter, stronger batteries of superior quality.

The hybrid starter batteries for the truck program with special emphasis on "Heavy Duty" technology for difficult exploitation conditions particularly stand out.

The grids are produced on a highly productive, fully computerized casting machine of a renowned global manufacturer WIRTZ with many years of experience in the field of casting. The batteries manufactured with these grids have excellent performance in different weather conditions from -25°C to +50°C. The computer-designed continuous cast grid with a full frame ensures the mechanical strength of the thin support, finally reflected in the high resistance of the battery to vibrations during exploitation. The grid structure provided by casting technology shows exceptional resistance to corrosion during exploitation in conditions of increased temperature.

For the production of lead powder, as one of the key components in the battery, the equipment of Sovema, the renowned Italian manufacturer of mills was selected.

The Company's new assembly line for the production of batteries has been selected to meet the needs of battery quality and high productivity.

Separating the electrodes with a high-quality, thin, microporous polyethylene pocket separator eliminates any possibility of a short circuit during exploitation, with a simultaneous reduction of electrical resistance and increase of the battery's starting capacity at low temperatures. Covering the plates with a separator and stacking the parts is done on TEKMAX machines.

The coupling casting machine is made by TBS from the United Kingdom, the best company in the world in the production of such machines. The machine provides an excellent combination of quality, operational flexibility and speed. The lid is thermally glued onto the battery box on the last machine of the assembly line. Gluing is performed by melting the contact surfaces and joining under pressure. The other station of this machine tests the tightness between the cells and the tightness of the lid-box connection.

Since the quality of the delivered goods is the Company's first priority, each battery is tested on a final control device before delivery. This device tests the voltage of the battery without load, the battery capacity to withstand high current load, as well as testing the hermeticity of the battery box.

The device is controlled by software, so there are set reference values for each battery type that it needs to meet. In this way, the Factory ensures that customers will receive only a correct battery of guaranteed quality.


1
2

Laboratory

Within the Company, there are two laboratories: chemical and electrical.

In order to ensure the quality of the finished battery, the quality of the raw materials and materials used for its production is very important. Before their use in the production process, their quality is established in a chemical laboratory. At the same time, the product quality of individual stages of battery production is established here.

The control of purity of the embedded metal (pure lead and lead alloys) is of particular importance for the quality of the battery. With the spark-based optical emission spectrometer, analyses in the chemical laboratory have been improved in terms of the number of elements to be determined, speed and accuracy of their determination. The instrument analyses 16 elements in the sample with maximum precision in just 18 seconds. All the spectrometer functions are computer controlled.

The electrical laboratory, which has the capacity for all types of testing of lead starter batteries, also confirms that the batteries are of high and controlled quality. Modern equipment of the latest generation

enables the most precise tests, measurements and analysis of batteries. With the existing equipment, the electro-laboratory is able to perform the most stringent tests according to all global standards, such as: EN, DIN, IEC, VAZ, etc. In addition to regular tests, technical-technological tests are also carried out in the laboratory for the purpose of improving and reaching new technological solutions in production.

Quality

The Company operates within the Quality Management System ISO 9001:2015 and it is certified by Quality Austria.

IQNet®

THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

Quality Austria
has issued an IQNet recognized certificate that the organization:

Black Horse - FAS doo
RS-25000 Sombor, Gradina 3

for the following scope:
Production of starter and industrial batteries
EAC: 19

has implemented and maintains a

QUALITY MANAGEMENT SYSTEM

which fulfils the requirements of the following standard

ISO 9001:2015

This attestation is directly linked to the IQNet Partner's original certificate and shall not be used as a stand-alone document

Issued on:	2021-10-11
Validity date:	2024-10-07
Quality Austria certified since:	2018-10-08

Registration Number: AT-21331/0

PARTNER OF IQNet

Alex Stoichitoiu
President of IQNet

Mag. Friedrich Khuen-Belasi
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of Quality Austria

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BLACK HORSE STANDARD – KAMINA LID

Black Horse standard batteries are leading in our manufacture and sales. The best price–quality ratio.

As lead starter batteries of the new generation with Ca/Ca technology, they are suitable for all passenger and commercial vehicles with average energy consumption.

A wide range of types:

- **Range from 40 to 100Ah**
- **In housings from L0 to L5 (low and high)**
- **Low maintenance batteries**
- **High starting capacity in all weather conditions**
- **Radial calcium continuous cast grid with a frame**
- **High grid corrosion resistance and high mechanical stability**

BLACK HORSE MAINTENANCE FREE

Complementary to the Black Horse standard series. The best price-quality ratio.

As lead starter batteries of the new generation with Ca/Ca technology, they are suitable for all passenger and commercial vehicles with average energy consumption.

A wide range of types:

- **45 to 100Ah range**
- **In housings from L1 to L5 (low and high)**
- **MAINTENANCE FREE BATTERIES**
- **High starting capacity and high performance in all weather conditions**
- **Radial calcium continuous cast grid with a frame**
- **High grid corrosion resistance and high mechanical stability**
- **The possibility of installing a MAGIC EYE**

BLACK HORSE PREMIUM / BLACK HORSE PREMIUM MAGIC EYE

Black Horse Premium Energy batteries offer ultimate starting power that will meet the toughest energy requirements – without compromise.

They are intended for modern vehicles, equipped with a large number of electrical devices necessary for driver safety and comfort.

A wide range of types:

- **45 to 105Ah range**
- **In housings from L1 to L5 (low and high)**
- **Maintenance free batteries**
- **High starting capacity and high performance in all weather conditions**
- **Ca/Ca technology**
- **Radial calcium continuous cast grid with a frame**
- **High grid corrosion resistance and high mechanical stability**
- **Longer battery life**
- **The possibility of installing a MAGIC EYE**
- **Extended warranty**

MAGIC EYE

- battery **OK**
- battery **LOW**
- check and **CHANGE OUT**

BLACK HORSE PREMIUM EFB

They are intended for modern vehicles, equipped with a large number of electrical devices necessary for driver safety and comfort.

A wide range of types:

- **45 to 105Ah range**
- **In housings from L1 to L5 (low and high)**
- **Maintenance free batteries**
- **High starting capacity and high performance in all weather conditions**
- **Radial calcium continuous cast grid with a frame**
- **High grid corrosion resistance and high mechanical stability**
- **Longer battery life**
- **EFB technology**
- **The possibility of installing a MAGIC EYE**
- **Extended warranty**

BLACK HORSE ASIA

Black Horse Asia standard series batteries are specially designed for Asian and Japanese vehicles.

- **36 to 95Ah range**
- **In housings from NS40 to N70 (D31)**
- **MAINTENANCE FREE BATTERIES**
- **Reliability in extreme weather conditions**
- **Ca/Ca technology**
- **Minimal self-discharge**
- **High grid corrosion resistance and high mechanical stability**

BLACK HORSE ASIA PREMIUM

Black Horse Asia premium series batteries are specially designed for Asian and Japanese vehicles.

They combine high standards in terms of quality, reliability and life with specific requirements for Asian vehicles.

- **Range from 40 to 100Ah**
- **In housings from NS40 to N70 (D31)**
- **MAINTENANCE FREE BATTERIES**
- **Reliability in extreme weather conditions**
- **Ca/Ca technology**
- **Minimal self-discharge**
- **High grid corrosion resistance and high mechanical stability**
- **Longer battery life**
- **Extended warranty**

BLACK HORSE ASIA PREMIUM EFB

Black Horse Asia standard series batteries are specially designed for Asian and Japanese vehicles.

- 36 to 95Ah range
- In housings from NS40 to N70 (D31)
- MAINTENANCE FREE BATTERIES
- Reliability in extreme weather conditions
- Ca/Ca technology
- Minimal self-discharge
- High grid corrosion resistance and high mechanical stability
- Extended warranty

BLACK HORSE TRUCK

Black Horse Truck standard series standard series is basic in our production of truck batteries.

As a lead starter battery of the new generation, it is suitable for agricultural, commercial and cargo vehicles.

- **110 to 225Ah range**
- **The best price-quality ratio**
- **For vehicles with average energy consumption**
- **High grid corrosion resistance and high mechanical resistance**
- **Hybrid Sb/Ca technology**

BLACK HORSE PREMIUM TRUCK

Black Horse Premium Truck is the premium series in the production of truck batteries.

As a lead starter battery of the new generation, it is suitable for agricultural, commercial and cargo vehicles, for high performance and high demand for battery power

- **Range: from 190 to 225Ah in b type and c type housings**
- **Improved resistance to vibrations**
- **Longer battery life**
- **High grid corrosion resistance and high mechanical resistance**
- **Hybrid Sb/Ca technology**
- **Extended warranty**

What is a battery?

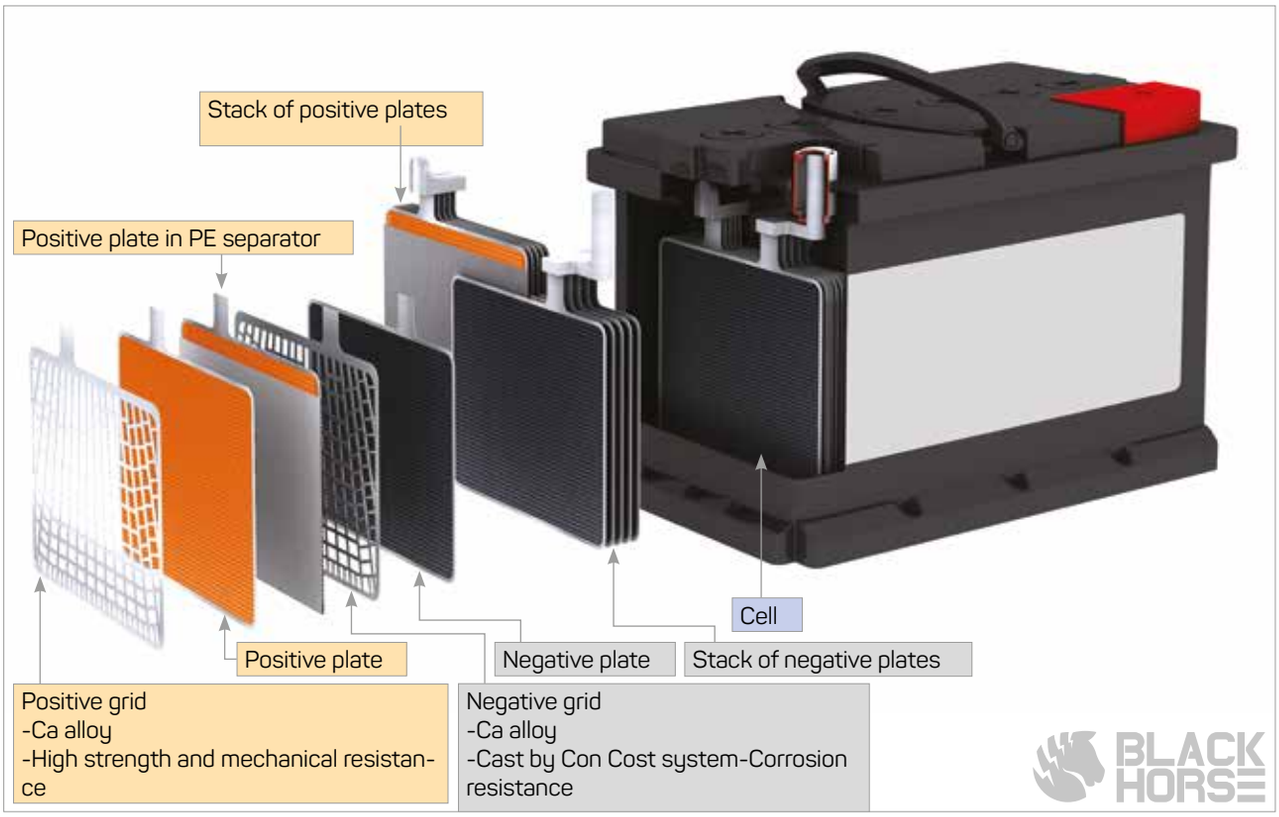
A battery is an electrochemical energy source that releases electrical energy in a controlled manner. All types of batteries contain positive and negative plates immersed in an electrolyte inside the box. All Sombor Battery Factory batteries are lead-acid, which means that the positive and negative plates are made of lead compounds contained in a diluted sulfuric acid electrolyte. Lead-acid batteries belong to the group of secondary batteries, which means that they can be recharged after discharge. Primary batteries can only be discharged once, and then they must be discarded; for example, flashlight and radio batteries.

How does a battery work?

The positive plate is made of lead dioxide, and the negative plate is made of sponge lead. When an electrical consumer (for example lights or a starter motor) is connected to the battery, current will flow through the electrolyte in the battery to power the consumer. This will lead to a chemical reaction inside the battery, whereby lead sulphate will form on both plates, i.e. the battery will be discharged.

The battery can be charged by supplying current from an external power source such as an alternator, dynamo or a charging unit. By connecting an external power source, lead sulphate is converted into starting materials, i.e. into lead dioxide and sponge lead.

As the battery charges, the electricity begins to decompose (hydrolyse) the water inside the electrolyte into its constituent elements hydrogen and oxygen, which are released as gas. This is why the battery gasses during charging.



What is a battery made of?

Grids

A grid made of lead alloy provides mechanical strength to the active material; pure lead is too soft. In addition to mechanical support for the active material, the grids are also used to conduct current when a consumer is connected to the battery.

Active material

The active material is made from a mixture of lead oxide and lead sulphate, which during the initial charge turns into lead dioxide on the positive plate, i.e. sponge lead on the negative plate. Negative active material also contains small amounts of additives that give the battery good discharge performance at low temperatures. The grid with active material is called plate.

Electrolyte

Electrolyte is a diluted sulphuric acid. It serves as a conductor for electrical ions between the positive and negative plates when the battery is charged or discharged. Acid also participates in the discharge reaction as sulphate ions chemically react with the active material to form lead sulphate.

Separator

A separator is an insulator placed between the positive and negative plates, preventing a short circuit between them. The separator needs to be microporous with very small holes so that the ions flowing from one plate to the other can pass through the separator. It needs to be resistant to high temperatures and conditions of strong acidic oxidation which occurs in the battery. Most of modern separators are made of microporous polyethylene which has the appropriate characteristics for use in batteries.

Box and lid

They are made of polypropylene, which is a light but strong plastic. Unlike other plastics, polypropylene is not brittle when cold, so it is resistant to impacts during handling. It is also resistant to acid and can handle various reagents (gasoline, diesel, brakes, antifreeze) that can usually be found on a vehicle.

Maintenance free battery

Thirty years ago, batteries lost water very quickly, so drivers had to check the electrolyte level inside the battery once a week; under regular operating conditions, modern maintenance-free batteries do not require water refilling during their lifetime.

In the same period, the battery life doubled from 2 to 4–5 years. The battery grids used to be made of lead alloy with 10% antimony in the past; the role of antimony was to give firmness to pure lead which belongs to soft metals. A negative consequence of adding antimony to the alloy was that a certain amount of antimony used to dissolve in acid, leading to water loss in the battery.

With the improvement of battery technology, it was possible to reduce the antimony content in the lead alloy from 10 to 1.5 per cent, so that low-maintenance batteries were obtained, requiring only an annual check of the electrolyte level.

The use of 0.1 per cent calcium in the lead alloy to impart strength represents a modern achievement that leads to a reduction in acid pollution and significantly reduces water loss, resulting in a maintenance free battery.

Instructions for use and maintenance of batteries

A battery needs to be clean and dry, and the terminals need to be coated with a thin layer of acid-free petroleum jelly or another suitable corrosion protection, and properly connected to the vehicle.
Before mounting/dismounting the battery from the vehicle, check whether there are coded devices or permanently powered devices on the vehicle. If there are, always leave mounting and dismounting of the battery to a professional. If there is no device with constant power supply, the sequence of assembly is the following:
Make sure to turn off all consumers and remove the ignition key, then remove the existing battery from the vehicle. Remove the negative terminal first, then the positive terminal. Check the clamps on the vehicle. They need to be whole and impeccably clean (replace or clean them if necessary). Carefully place the battery into the bearing and make sure to secure it mechanically (so that the battery does not get permanently damaged due to vibrations).
When placing the clamps on the terminals of the battery, make sure to loosen/spread the clamps sufficiently and do not hit clamps and terminals, as this may cause mechanical damage to the battery. Connect the positive connection to the positive pole, negative connection to the negative pole. The contact connections always have to be well attached and tightened, because in case of a weak attachment there is a possibility of sparks, which may lead to the battery explosion.

After mounting, make sure to check the charge on the vehicle, which for vehicles with an alternator needs to be between 13.8 and 14.4 V (if the charge is not within these limits, the fault needs to be rectified immediately to prevent damage to the battery). Please be advised to repeat this control every six months.

Pay particular attention to the contact of the mass with the vehicle chassis, because a bad mass (braid) can be the cause of improper battery charging, it can even cause the installation to catch fire.

In case of control, it is important to know that the battery is capable of working under a voltage of 12.5 V. – Keep the stored batteries in a dry and cool place (it is preferable that the room temperature be between 10°C and 20°C), and keep them on a pallet or a similar base. A stored and charged battery should be checked every 3–4 months and recharged if necessary.

Charging-topping up of batteries discharged during exploitation is done within 48 hours at the latest, otherwise the irreparable damage may occur.

Charging and recharging of the battery needs to be performed outside the vehicle. Charging is done with current I=0.1 Cn (e.g. for a 55Ah battery I=5.5A) up to a density of 1.275 +/- 0.01 gr/cm3. The temperature during charging must not exceed 55°C (in that case reduce the current by 50%). When charging with a constant voltage, the power source must not exceed 15.8 V. Never install the battery immediately after recharging or charging (the minimum resting time is 1–2 h).

Do not attempt any work or charging on hermetically sealed accumulators, but contact one of our authorized service centres upon the first starting problem.

NOTE: A battery may be recycled, so do not throw it away. Please hand over the used battery to designated recycling points.

Tips and maintenance

How does the cold affect the battery?

Winter is the riskiest season for battery life. When the temperature drops to "zero" and goes to "minus", the battery can lose up to 60 per cent of its capacity, and it can be completely damaged if the car is not driven at all.

The average life of a battery is four to five years, but it can be significantly shorter if the battery is not properly maintained. Therefore, it is necessary to remove the battery from the vehicle at extremely low temperatures, especially if it is not driven for a long period of time. In that case, the battery should be left in a dry and relatively warm room.

-You should know that at a temperature of zero degrees the battery loses capacity up to 40 per cent, and at "minus 18" up to 60 per cent. Although the battery is recharged while driving, it does not mean that the battery will be prevented from weakening if the engine is started and then kept running for ten minutes without moving, or if the vehicle is driven on short distances. Just starting the engine takes a large amount of electricity from the battery, which cannot be restored by "heating the engine" while standing still or by driving short distances – as they say in the Black Horse, the only domestic manufacturer of batteries in Serbia.

Like any device, the battery shows signs of ageing, and the most famous symptoms are certainly the intermittent sound of whirring when starting the engine, then very slow engine ignition when turning the key, dark headlights while the engine whirs, and/or normal lights when the engine starts. Such signs appear in batteries older than three years.
-Proper maintenance of the battery, particularly in cold weather, also involves the careful use of external devices that drain electricity from the battery, especially when the vehicle is not in motion.

First of all, this refers to the clock, alarm, and also other modern systems in cars. That is why we advise all drivers to turn off tablets, chargers, phones, audio accessories and other devices in the car, especially if the car is parked and if the weather is cold – they emphasize in the Black Horse.

Also, the recommendation for anyone who is not sure about the condition of their battery is to have it tested by a qualified mechanic and determine how much more it can last. The longevity of the battery is also affected by whether the clamps and cables are well attached and without corrosion.

Special Black Horse maintenance free battery series have a specific battery status indicator, the so-called "magic eye". Depending on the battery state, it will indicate whether the battery needs to be recharged or replaced.

How to extend battery life?

Many would like their battery to last longer than average, i.e. longer than four or five years, but we should have in mind that even that is quite a long period of time considering all the risk factors that can threaten its regular functioning. These are the different types of danger, from extreme weather conditions through forgotten headlights to frequent short drives, corrosion on clamps, faulty electronics, etc.

There is a misconception that only extreme cold damages the battery, because even extremely high temperatures lead to the formation of acid in it, taking away its functionality. The most optimal temperature conditions for regular operation of the battery are from 18 to 32 degrees, but of course this does not mean that the battery should be immediately "insulated" at somewhat lower or higher temperatures. In case of extreme temperatures, below minus 20 degrees or above 40 degrees, it is advisable to remove the battery from the car and take it to a dry room with an optimal temperature.

It is especially recommended for drivers who know that they will not drive a car for a long period of time.

Please consider that the battery is used up a lot when starting the engine. This means that if we drive the car frequently on short distances, it can do more harm than good to the battery.

The most important measures to enable a longer service life of the battery are regularly checking its exterior, cleaning, removing even the smallest corrosion and reacting to all signs of potential issues. In addition to cleaning the clamps, it is important to check whether the battery cables are loose, which can also lead to irregularities in its operation.

All electrical components in the vehicle that can remain on after the engine is turned off and "drain" current represent a danger for the battery. That is why it is important that all drivers, after turning off the engine, pay attention to whether they have turned off the headlights, interior lights, radio, etc. The electrical components on the vehicle should also not be turned on before starting the engine.

Finally, it is important to regularly check the electrical system on the car, which, if faulty, can cause the battery to discharge even while driving. For example, if the alternator is not working, it means that it will not recharge the battery while the engine is running. Because of this, the battery will discharge more and more with every kilometre driven.

How to properly preserve the battery?

The battery needs to be properly maintained and stored if we want it to serve the car for a long time. What's more, those who regularly take care of the condition of the battery will notice the signs of weakening of this device and react accordingly. Proper maintenance of the battery involves a series of actions, first of all, regularly charging the device, then servicing the vehicle, maintaining the appropriate temperature and cleanliness of the battery, as well as carefully starting the engine.

Fully charge the battery

Every devoted car owner should also have a battery charger, because it is very important to fully charge the battery as soon as possible after each discharge. It is important that the discharged battery is charged within 48 hours, because after that the battery can be permanently damaged.

THave in mind that not every charger fits every battery. That is why it is necessary, first of all, to select a suitable battery charger. Battery charging also has its own rules, so the charger should first be connected to the battery and then turned on at the appropriate voltage, depending on how discharged the battery is. Do

not charge frozen batteries or batteries whose temperature is higher than 45 degrees. Finally, stop charging if the battery gets hot – they advise in "Black Horse" FAS, the only domestic manufacturer of batteries. The simplest way is to divide the power of the battery of, for example, 100Ah by the power of the charger of 5Ah. This provides a figure of 20 hours of continuous charging required for a completely empty battery. Our recommendation is to buy a "smart charger" that will automatically stop charging when the battery is full and thus prevent it from being "overcharged".

Check the vehicle's electrical system

Regular vehicle servicing is also important for the battery life, which means, among other things, checking the vehicle's electrical system, without which there is no safe driving.

-If certain electrical devices, for example heaters, "drain" current of the car, the battery will wear out faster since more will be consumed when driving than usual – they warn from the "Black Horse".

Mind the battery temperature

The state of the battery depends a lot on the external temperature, which is why, as a rule, batteries that are stored in garaged vehicles in the summer and that are not exposed to such high temperatures last longer. Responsible drivers need to keep in mind that low temperatures are not suitable for the battery. Short drives in cold conditions are not good for the battery life.

Clean the battery

Proper care of the battery includes regular checking of its cleanliness. The battery should not have any rust or dust on its poles or connectors, let alone corrosion. It is recommended to clean the battery with a wire brush and anti-corrosion agent. The cleanliness of the battery clamps and poles should also be regularly checked, because when they are too dirty, the engine will not be able to start, regardless of the fact that the battery is full.

Start the engine properly

Battery longevity is also affected by the way we start the car engine.

-There are vehicles that are started in a specific way, and if this rule is not followed when starting the engine, damage or weakening of the battery may occur. For example, older cars, when starting in the winter, need the engine to be warmed up while standing still before starting so that it works properly in the course of driving and does not shut down – they say in the "Black Horse"

How to maintain the battery if you don't drive for more than three months?

Proper car maintenance means, among other things, starting the engine regularly, otherwise the battery will be damaged first. To keep the battery in optimal

condition, it is necessary to start the engine every two to three weeks and drive the car for at least 15 minutes in order to recharge the battery. Longer car rides are recommended in winter as the battery might not be able to recover its full capacity on short distances.

If you know in advance that you will not drive the car for at least the next three months, you need to remove the battery from the vehicle and keep it in a dry room where the temperature is not lower than 10 degrees nor higher than 40 degrees.

- You should know that when removing the battery from the car, you should first remove the clamp from the "minus" and then from the "plus". Whereas when returning the battery to the vehicle, first the "wire" should be connected to the positive pole, and then the second wire to the negative pole. At low or extremely

high temperatures, deep discharge of the battery inevitably occurs, after which this device will no longer be usable. Avoid completely discharging the battery because then the consequences are so severe that the working life of this device is drastically shortened – they warn from the "Black Horse", the only domestic manufacturer of batteries.

It is also very important that when the battery is removed from the car, the clamps are lubricated with Vaseline or another lubricant so that they do not rust. In that case, even if you do not drive the car or start the engine, you will not have any problems with the battery. Provided, of course, that the electrical equipment on the vehicle is fully operational.

It's especially problematic if you don't use newer car models for a long period of time, as modern four-wheelers have more complex electrical systems.

-Such systems can drain the battery in just three to six weeks if the vehicle is not started at all during that period. That is why it is recommended to reduce the number of electricity consumers in the vehicle. For example, the seat heaters or the CD player should be turned off while driving – they emphasize in the "Black Horse".

On the other hand, there are devices consuming power even when the car is not being driven. Those are, for example, alarm, CD or audio device, even a clock. All these devices do not consume large amounts of electricity in a day, but in a long period of time they can seriously damage the battery.

Otherwise, it is recommended to lock the car regardless of whether it is in a closed garage or outside, because in this case the battery discharges more slowly if the vehicle is not used for a long time.

Finally, you should also pay attention to whether the mechanical lock is functioning properly if the vehicle is locked remotely, because there is a risk that the battery will be discharged due to prolonged non-use of the car and you will not be able to get into your own car.

What are the most common causes of battery discharge?

The battery is one of the most important parts of the car and therefore it is very important to have it always available to the driver in full capacity. In order to achieve this, the vehicle owner must pay attention to all the causes that can lead to battery discharge, and there are at least seven of them.

Driver's negligence

Believe it or not, the most common cause of battery discharge is drivers, as it often happens that they turn

off the engine and leave the headlights, turn signals, interior lights or devices on.
-Such human error leads to a complete battery discharge overnight, which can certainly shorten its life. Even if the battery is recharged in that case, it might not be able to work optimally for a long time as if there was no error – they point out in the "Black Horse", the only domestic manufacturer of batteries.

Extreme conditions

The battery is most sensitive to extreme weather conditions, which means that neither extremely low temperatures below minus 10 degrees nor extremely

high temperatures above 40 degrees suit it.-Such circumstances lead to the formation of lead sulphate crystals, making it difficult to charge the battery, especially if it is

driven on short distances. A particularly dangerous situation is when the car is not driven for a long period of time in such extreme weather conditions, leading to the accumulation of lead sulphate, which can cause permanent damage. That is why it is recommended to vehicle owners to remove the battery from the vehicle if they do not plan to drive it for a long period of time, and leave it in a dry room where it is neither too cold nor too hot – experts advise.

Faulty charging system

The battery can discharge while driving if the car's charging system is faulty. This usually happens when the alternator

is not working properly. For example, the radio, lights, and automatic windows are powered directly from the alternator in most vehicles. If the alternator is faulty, the battery will discharge very quickly, almost in the course of driving.

Issues with electronics

A battery discharge can also occur when the engine is turned off.

-Such an issue occurs when electrical components

like the vehicle's alarm or clock continue to drain power from the battery even though the key is "off the contact". The optimal current consumption in such situations is 75 milliamps, but anything above that causes the battery to discharge. This can happen when there are defective fuses, relay switches, or if there are poor installations or improperly connected devices such as speakers, amplifiers, and GPS devices – they say in the "Black Horse".

Too short drives

Proper maintenance of the battery also means regular long drives. The battery starts discharging as soon as the engine starts, and the alternator needs a certain period time before it starts charging the battery. If the car is driven only for short distances, the battery will

inevitably be discharged and its life will be shortened.

Corrosion and loose cables

To work and charge properly the battery needs clean clamps, free of rust or corrosion. It is also important that the battery cables are not loose, which can affect the battery incomplete charging of the battery.

Old battery

The average life of a battery is four to five years.
-Older batteries no longer have the capacity to maintain a sufficiently high and optimal voltage in order for the electrical components in the vehicle to function properly. An older battery is especially problematic for modern cars that have more and more electrical components and therefore require a larger power supply – they conclude at the "Black Horse".

How to choose the best battery?

Without a high-quality and reliable battery, there is no safe and carefree driving. There is practically no driving at all, because if the battery is defective, you cannot even start the engine. However, starting the engine is not the only function of the battery, especially in today's modern cars with a large number of electronic and auxiliary systems. Such systems require a large amount of electricity, which is why it is important to buy a battery with the best characteristics for a certain type of vehicle.

It is a general opinion that older cars do not need a particularly strong battery because they have less electronics compared to more modern vehicles.

- Therefore, in such four-wheelers, the battery is consumed less, as it is used primarily for starting the engine, turning on the headlights, music device, safety equipment, etc. On the other hand, newer vehicles cannot be imagined without electronics – from ABS brakes, through airbags to engine control units. These are devices necessary for safe car driving. That is why these cars need a battery with a higher capacity – they emphasize in the "Black Horse", the only domestic manufacturer of batteries.

The advice to all drivers is to research all brands and types of batteries before purchasing, and analyse their characteristics with regard to the needs of their vehicle.

Battery size

Prvi kriterijum prilikom kupovine akumulatora je veličina. Akumulator koji kupujete mora da ima odgovarajuće dimenzije za automobile koji vozite. Na sreću, većina vozila mogu da prime akumulator različitih dimenzija.

Reserve capacity (RC)

This is a very important battery feature as it represents the time during which a battery may generate power in case of alternator failure, before losing the capacity necessary to start the engine.

Cold Cranking Amps (CCA)

Cold Cranking Amps is the amps value that a battery may support for 30 seconds at about -18°C until the battery voltage decreases to an unusable level.

Ampere and Ampere-hours

Amperes are the measuring unit for the quantity of electrons and/or the amperage flowing through the circuit. Ampere-hours (AH) stands for the battery capacity for energy preservation.

- The battery should have more Amps than Ampere--hours, as this indicates the current that the battery can transfer through the igniter to the flywheel of the engine and thus start the car. For older cars, a classic battery of lower power, such as 640A, and 77Ah is sufficient – as they emphasize at Black Horse.

Start-stop system

Modern cars with a start-stop system have to use the appropriate batteries for all the requirements of such a system, which are batteries labelled with AGM or EFB. The classic batteries cannot be used in cars with a start-stop system.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