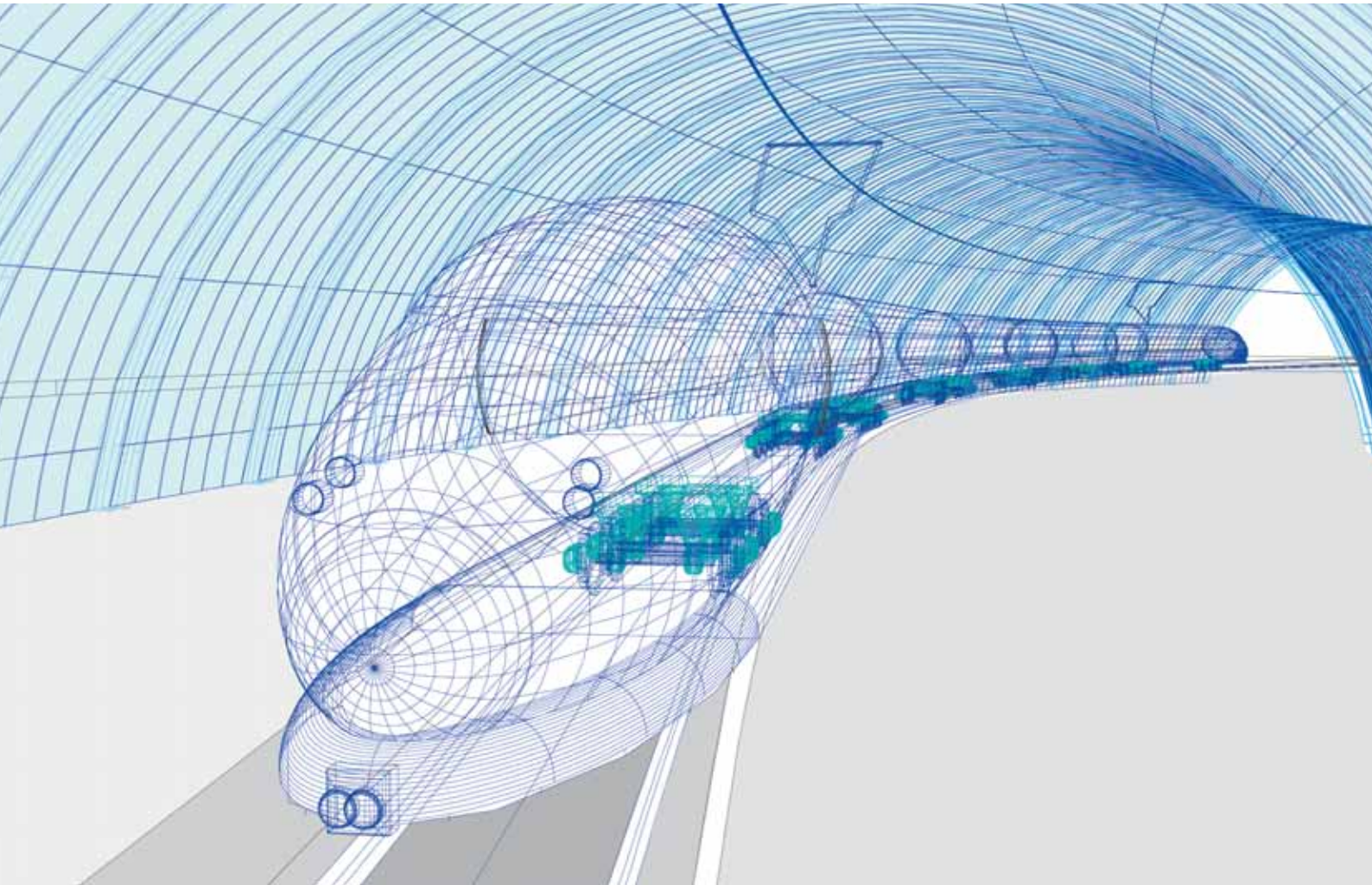


BAE *SPECIAL*

Batteries for Rail Traffic



ENERGY FROM BATTERIES



BAE *SPECIAL*

Batteries for rail traffic

Application

Lead acid batteries are used to provide back up power on board of railway vehicles. In cases of power shortages in locomotives and rail traffic these batteries provide control of the voltage and sustain the safety equipment, emergency

lighting and air conditioning. Additionally the lead acid batteries guarantee the ability to restart diesel locomotives and diesel run coaches.

Solutions through usage of acid batteries in rail traffic

BAE is a manufacturer of lead acid batteries for usage by the rail traffic industry. The product fulfils the needs of short- and long distance trains, locomotives, high-speed

trains and trams. Usually the batteries are built into battery trays or cradles. We can arrange and adjust sizes in accordance with our customer's wishes.



Usage of acid batteries in various technologies for rail traffic

The product range of BAE includes traditional lead acid batteries of the type PzS and gel batteries with fixed electrolytes of the type VRLA.

In the railway business this concerns the issue of part-cyclic burden with various depth of discharge.

The life span of the battery differs for each individual case. PzS batteries deliver the required energy for 4–8 years. The VRLA batteries generally reach a typical life span of 3–6 years.

The VRLA batteries are applied under strongly variation temperature conditions. The constant environment temperature can be up to 45 degrees Celsius. In the winter or in colder climates the batteries remain functional at temperatures of minus 20 degrees Celsius.

Technical Data

VRLA batteries

The measurements are recommended in the EN 60254-2. BAE also manufactures special types for special vehicles used in low rise building.

| Cell type | Capacity Ah C ₅ | Dimensions | | | | Weight kg |
|------------------------|--------------------------------------|------------|---------|----------|----------|--------------|
| | | W mm | L mm | H1 mm | H2 mm | |
| positive tubular plate | | | | | | |
| 2 PzV 110 | 110 | 47 | 198 | 340 | 370 | 9,0 |
| 3 PzV 165 | 165 | 65 | 198 | 340 | 370 | 12,7 |
| 4 PzV 220 | 220 | 83 | 198 | 340 | 370 | 16,7 |
| 5 PzV 275 | 275 | 101 | 198 | 340 | 370 | 20,5 |
| 6 PzV 330 | 330 | 119 | 198 | 340 | 370 | 24,2 |
| 7 PzV 385 | 385 | 137 | 198 | 340 | 370 | 28,0 |
| 8 PzV 440 | 440 | 155 | 198 | 340 | 370 | 32,0 |
| 9 PzV 495 | 495 | 173 | 198 | 340 | 370 | 35,6 |
| 10 PzV 550 | 550 | 191 | 198 | 340 | 370 | 39,7 |
| 2 PzV 150 | 150 | 47 | 198 | 445 | 472 | 11,6 |
| 3 PzV 225 | 225 | 65 | 198 | 445 | 473 | 16,4 |
| 4 PzV 300 | 300 | 83 | 198 | 445 | 474 | 20,7 |
| 5 PzV 375 | 375 | 101 | 198 | 445 | 475 | 25,3 |
| 6 PzV 450 | 450 | 119 | 198 | 445 | 476 | 30,3 |
| 7 PzV 525 | 525 | 137 | 198 | 445 | 477 | 35,1 |
| 3 PzV 330 | 330 | 65 | 198 | 594 | 621 | 26,1 |
| 4 PzV 440 | 440 | 83 | 198 | 594 | 621 | 32,8 |
| 5 PzV 550 | 550 | 101 | 198 | 594 | 621 | 40,1 |
| 3 PzV 375 | 375 | 65 | 198 | 696 | 723 | 30,3 |
| 4 PzV 500 | 500 | 83 | 198 | 696 | 723 | 38,0 |

Subject to technical alterations. Further cell types available at request.

Batteries and accessories

The VRLA batteries are maintenance free, as far as the refilling of water is concerned. Water should not and must not be refilled.

Battery trays and accessories



In rail traffic steel trays and cradles are used however the plastic trays which have a wide spread usage in Germany are also used.

The steel trays are welded constructions which are covered with an electrolyte resistant synthetic material. These are specially constructed for usage within vehicle.

The block boxes and trays are made of polypropylene expanded polystyrene and are in accordance with DIN 43579 part: 1, 2, 3 and 4.



Connection



The batteries can be depending on the usage connected through the use of specifically defined plugs and clamps. The specification and construction of on board terminals in accordance with DIN 43579 part 3 is also possible.

BAE has developed its own connection system for among other things like high currents up to 1600 A.

Temperature sensor



For an optimal charging process of the batteries we recommend the usage of temperature sensors. The temperature is measured at the cell block containers or at the poles for VRLA batteries. For the VLA battery the

temperature is measured directly in the electrolyte. It is possible to provide the battery with a completely assembled connection set inclusive a temperature sensor.

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Fire, Quality and environmental demands

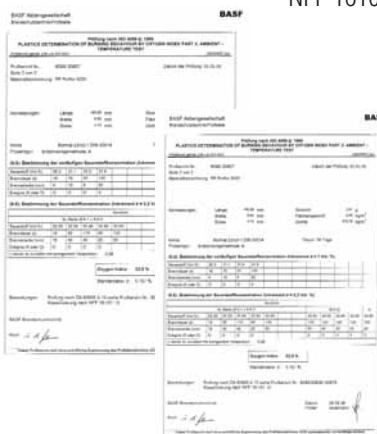
Because of the nature of passenger transport and the limited access to enter, escape or rescue passengers, especially in tunnels and bridges heightened safety demands are set to rail traffic products.

We participate in the enhancement of safety in rail traffic through the usage of materials that are; flame retardant or have a low flammability, are self extinguishing or produce limited amounts of smoke.

Fire safety requirements

At the customers request BAE produces rail traffic battery containers that fulfil the fire safety requirements NFF 16101/16102. The material of the containers is in

accordance with the French norm. In tests a flammability level 13 was authenticated and a toxicity level of F2.



High quality manufacturing

BAE manufactures batteries for railway application from the electrodes up to the finished battery. We manufacture in accordance with a quality management system and have a DIN EN ISO 9001:2000 certificate.

Our research and design department control the consistent quality of our products and design new batteries for specific usages.



Environmental Protection

BAE Batterien GmbH is environmental certified acc. to ISO 14001:2005. In accordance with this certificate we continually stride to improve our level of environment protection. Our processes are continually adjusted to

obtain the demands and goals set to improve and control environmental issues. We always except the return of used batteries for recycling purposes.



The Battery company BAE is a company with a long tradition. We have been producing batteries at this location for over 100 years.



The manufacturing of rail traffic batteries is an important market segment in which BAE is considered to be a specialist. We apply ourselves to fulfil new customer demands to not just deliver battery cells or blocks but also complete battery systems. We design solutions for integration of batteries in vehicles together with our

customers. The usage of lead acid batteries is a small investment. Not only are the acquisition costs low the maintenance fees are minor as well. Especially when using gel batteries as the refilling of water is not needed when maintenance is performed.

The lead acid batteries are produced according to the following norms:

DIN VDE 0510-1

EN 60254

DIN 43534

DIN 43539 Teil1 und Teil 5

DIN 43579 Teil 1 bis Teil 6

DIN 43582 Teil 1 und Teil 2

EN 61056 Teil 1 und Teil 2

DIN EN 61429

DIN EN 60077

BAE performs the calculation for ventilation of the battery boxes. To ascertain the correct measurements for the ventilation shafts we recommend a calculation based on DIN EN 50272-3.



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