

TENSOR

INDUSTRIAL BATTERIES / MOTIVE POWER



TENSOR POWER THAT PAYS

Reduce Total Cost of Ownership for Heavy-Duty Applications

TENSOR is the next generation of lead-acid battery. It was designed specially to reduce total cost of ownership, combining exceptional performance, capacity and energy efficiency. The battery draws on GNB's decades of experience with high-performance batteries for the most challenging applications, such as submarines.

Advantages Over Conventional Traction Batteries

- **Better performance** due to high power density
- **Longer running times** due to high energy content and efficient energy recovery
- **Longer operational life** due to low operating temperature
- **Higher energy cost savings** due to excellent energy efficiency
- Suitable for **fast charging** and **multi-opportunity charging***

And more

- Fast charging (complete recharge in 4h)*
- Multi-opportunity charging possible*
- Increased transshipment performance (>50%) at low temperatures
- Maximum performance in heavy-duty applications
- Performance reserves for high current demands

Benefits

TENSOR batteries offers longer running time, fast charging capability* and efficient energy use. These batteries perform exceptionally well in heavy-duty applications, once considered the reserve of internal combustion forklifts. The battery's impressively low operating temperature gives it a much longer lifespan, allowing businesses to depreciate their investment over a longer time period.

TENSOR excels when maximum performance is required, including cold-storage applications, outdoor operations and other demanding environments. TENSOR also offers impressive charging performance. It can be fully recharged within 4 hours*, allowing businesses to minimize the need for replacement batteries and the labor costs associated with frequent battery changes.

* from 20% to 100% state of charge with GNB's unique Z-profile (see page 4)

TENSOR CORE BENEFITS

up to
+14%

Energy Savings

more than
+10%

Operational Life

up to
+27%

Productivity



TENSOR

AREAS OF APPLICATION

The heavier the duty the tougher the TENSOR

With impressive power output, energy content and performance at low temperatures, TENSOR offers unparalleled performance in a range of very demanding applications:



High-rack facilities /
Narrow aisle



Cold storage /
Outdoor applications



Accessory equipment /
Additional electrical consumers



Heavy-duty applications /
Heavy trucks



24/7 applications



Seasonal business /
Activity peaks

Available TENSOR Cells

STANDARD			CELL DIMENSIONS*			TENSOR				
EPzS cell type	Height h1** [mm] Height h2*** [mm]	Length (l) [mm]	TCSM cell type	Cell weight**** [kg]	Nominal capacity [Ah]	Energy content***** [Wh]	Running time plus*****			
3 EPzS 270	463 / 493	65	585 TCSM	17.3	300	585	+20%			
4 EPzS 360	463 / 493	83	730 TCSM	22.0	375	730	+13%			
5 EPzS 450	463 / 493	101	1025 TCSM	27.0	525	1025	+27%			
6 EPzS 540	463 / 493	119	1170 TCSM	31.0	600	1170	+20%			
7 EPzS 630	463 / 493	137	1315 TCSM	36.1	675	1315	+16%			
8 EPzS 720	463 / 493	155	1610 TCSM	41.0	825	1610	+24%			
9 EPzS 810	463 / 493	173	1755 TCSM	45.6	900	1755	+20%			
10 EPzS 900	463 / 493	191	2050 TCSM	50.3	1050	2050	+27%			
3 EPzS 375	573 / 603	65	760 TCSM	20.1	390	760	+13%			
4 EPzS 500	573 / 603	83	975 TCSM	25.0	500	975	+9%			
5 EPzS 625	573 / 603	101	1285 TCSM	33.1	660	1285	+15%			
6 EPzS 750	573 / 603	119	1520 TCSM	38.0	780	1520	+13%			
7 EPzS 875	573 / 603	137	1715 TCSM	44.5	880	1715	+9%			
8 EPzS 1000	573 / 603	155	2030 TCSM	50.7	1040	2030	+14%			
9 EPzS 1125	573 / 603	173	2195 TCSM	56.9	1125	2195	+9%			
10 EPzS 1250	573 / 603	191	2570 TCSM	63.0	1320	2570	+15%			
3 EPzS 465	713 / 743	65	955 TCSM	25.5	495	955	+16%			
4 EPzS 620	713 / 743	83	1235 TCSM	31.7	640	1235	+12%			
5 EPzS 775	713 / 743	101	1620 TCSM	41.7	840	1620	+18%			
6 EPzS 930	713 / 743	119	1910 TCSM	48.6	990	1910	+16%			
7 EPzS 1085	713 / 743	137	2190 TCSM	53.6	1135	2190	+13%			
8 EPzS 1240	713 / 743	155	2545 TCSM	63.6	1320	2545	+16%			
9 EPzS 1395	713 / 743	173	2835 TCSM	71.3	1475	2835	+15%			
10 EPzS 1550	713 / 743	191	3240 TCSM	79.9	1680	3240	+18%			

* width (w) 198mm
**** filled and charged // tolerance +/-5%

** over cell lid
***** average discharge voltage 1.95 Vpc

*** total height incl. connector and screw
***** according to the GNB driving profile

TENSOR

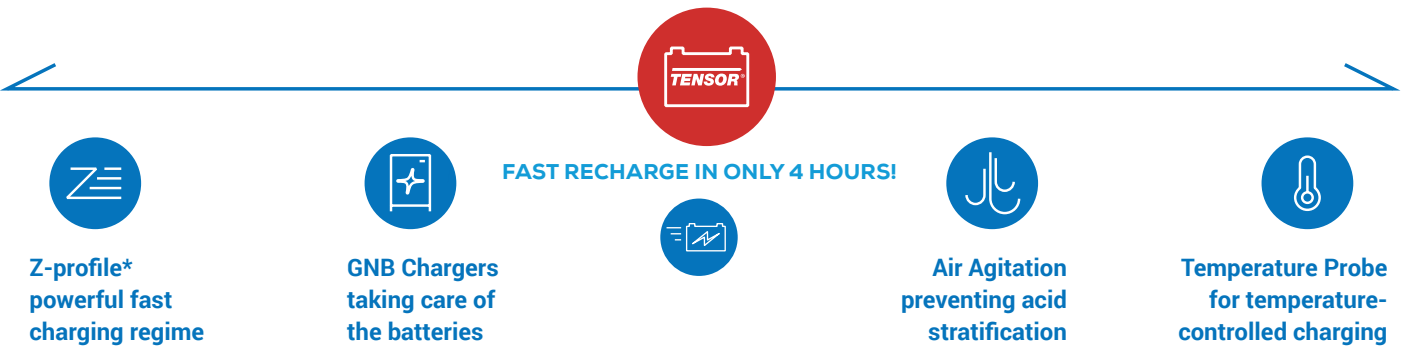
THE FAST-CHARGING BATTERY

Fast Charging of TENSOR Batteries

TENSOR batteries can be fully recharged from 80% depth of discharge in just 4 hours. This is possible due to excellent charge acceptance and leads in addition to lower operating temperatures and less energy loss.

The TENSOR Fast-Charging Package

All components of the GNB fast-charging package work together to produce efficient, reliable, high-performance charging.



*Multi-Charging Characteristic Z-Profile

The sophisticated charging regime (Z-profile), air agitation and temperature probe work together to support TENSOR's fast-charging capabilities. This setup enables frequent fast-opportunity charging of TENSOR batteries during available downtime. The air agitation effectively prevents acid stratification and keeps the battery powerful and healthy.



TENSOR FAST CHARGING & OPPORTUNITY CHARGING



Multi-shift Applications

For standard batteries in multi-shift applications, battery changes are normally required. TENSOR can decrease the number of changes or eliminate the need for battery changes entirely, depending on the application:

Scenario 1



**TENSOR fulfills two shifts
No changing of batteries required**

Scenario 2



**TENSOR works more
Less changing of batteries required**

Scenario 3



**TENSOR opportunity-charging model
No changing of batteries required**

THE OPERATING HOURS CHAMPION

With a TENSOR battery on board, trucks can run significantly more hours per charging cycle. This means that even for the same cyclic life the total operating hours will be much higher compared to standard batteries. Moreover, thanks to the lower average operating temperature of TENSOR, the overall battery lifetime will be increased as well. Those unique features make TENSOR technology the unbeaten operating hours champion in intralogistics.

TENSOR



Up to 7,500 truck hours*

STANDARD
LEAD BATTERY



Up to 6,000 truck hours*

* based on 1,500 cycles

**TENSOR
REDUCES TOTAL
COST OF OWNERSHIP**

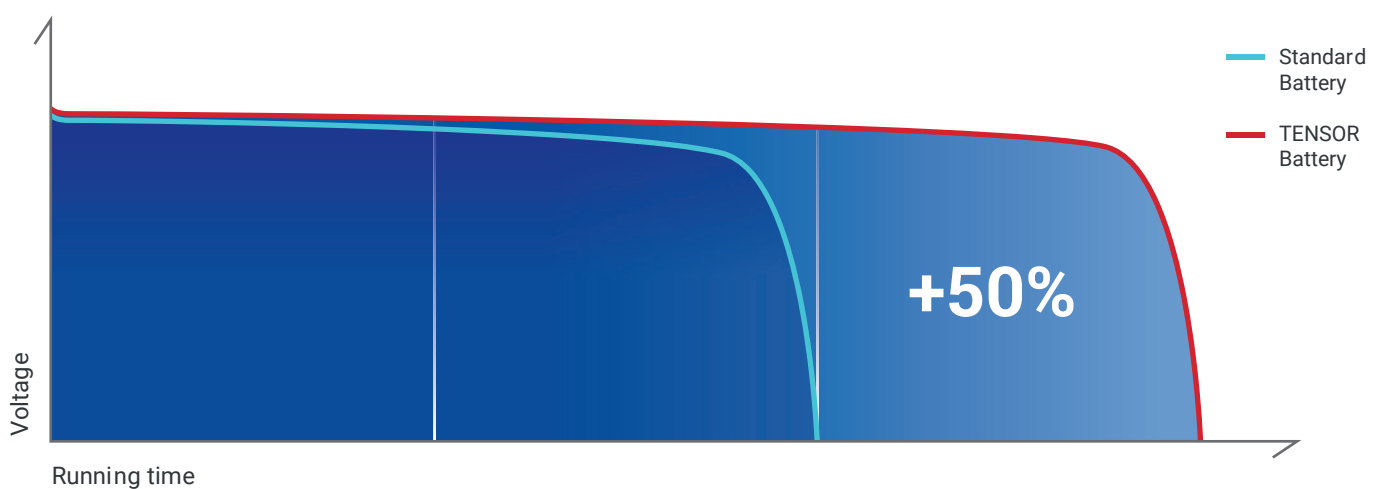
TENSOR

THE BATTERY FOR COLD ENVIRONMENTS

Cold Store

Batteries in cold environments typically suffer from lower performance and capacity. TENSOR batteries can withstand the cold. These batteries remain **powerful in low temperature areas**, vastly outperforming standard batteries.

Extended Running Time At Low Temperatures



At freezing temperatures, standard traction batteries show significant capacity loss. This reduces operating efficiency because of the time wasted when batteries need to be changed. Low temperatures have far less effect on TENSOR batteries, leading to longer operating times and more productivity for your business.

Outdoor applications

Batteries powering industrial trucks in outdoor applications are exposed to a wide range of temperatures – from high in summer to freezing in winter. TENSOR batteries remain powerful even at low temperatures minimizing the effects caused by variations in temperature.

TENSOR batteries are the right choice for outdoor all applications!



TENSOR
POWERFUL AS
A POLAR BEAR

TENSOR THE ENVIRONMENTALLY FRIENDLY BATTERY



Robust And Powerful

TENSOR technology was designed for modern trucks (three-phase motors, energy recovery systems) and heavy-duty applications. It has a track record of strong, robust performance in the all challenging environments. TENSOR uses lead-acid chemistry, while major innovations from GNB have allowed it to push through the limitations of standard forklift batteries.



TENSOR
MOVING **ELECTRIFICATION**
FORWARD



VS



Heavy-Duty Applications

Internal combustion forklifts were once required for heavy-duty application. Not any more. In fact, more and more battery-powered heavy-duty forklifts are entering the market. TENSOR delivers the power and performance required for these demanding tasks.



Reduce Emissions

By switching to electric forklifts, businesses can reduce carbon dioxide, nitrogen oxide and soot emissions. TENSOR is designed to make the switch easy, providing the power and performance typically associated with internal combustion forklifts. Switching to electric allows business to improve conditions for employees, meet environmental targets and reduce noise pollution.



Environmentally Friendly Battery

TENSOR batteries have a longer lifespan than standard traction batteries. Charging and discharging are tuned for maximum efficiency, so you save substantially on energy costs. The batteries are also fully recyclable. For any business that wants to minimize environmental impact, there is no better choice than TENSOR.

Exide Technologies, with operations in more than 80 countries and more than 120 years of experience, is one of the world's largest producers and recyclers of lead-acid batteries. The company develops state-of-the-art energy storage solutions for the automotive and industrial market. Leading car, truck and lift truck manufacturers trust in Exide Technologies as an original equipment supplier. Exide also serves the aftermarket through a portfolio of successful and well-known brands.

Exide Transportation manufactures batteries for light and commercial vehicles, as well as agricultural and marine leisure applications. Industrial markets – under the division **GNB Industrial Power** – include efficient energy storage solutions for motive power applications such as lift trucks, cleaning machines and other commercial electrical vehicles, and network power applications such as telecommunications systems, renewables, and uninterruptible power supply (UPS).

Exide's engineers have always been at the forefront of bringing important innovations to the industry. Exide's ISO/TS-certified manufacturing facilities ensure that customers receive products that are produced with maximum efficiency and fulfill the highest quality standards, while minimizing impact on the environment.

Exide's extensive sales and distribution network provides quality service and delivers on time to its customers. Its world-class recycling facilities ensure that batteries will be reused, helping to make a positive contribution to the environment. Exide also provides services, accessories and energy consulting to its clients.



All production facilities ISO 9001 certified
 Automotive plants ISO/TS 16949 approved
 Manufacturing plants ISO 14001 certified

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