# The shortcut to success.

TUDOR®

Battery solutions for commercial vehicles.


Creating the future – the Exide way:

Innovation | Reliability | Sustainability | High Performance

ENERGIZING A NEW WORLD

EXIDE® TECHNOLOGIES

tudor.se exide.nu

# The world is changing.
# That's why we are energizing a new world.

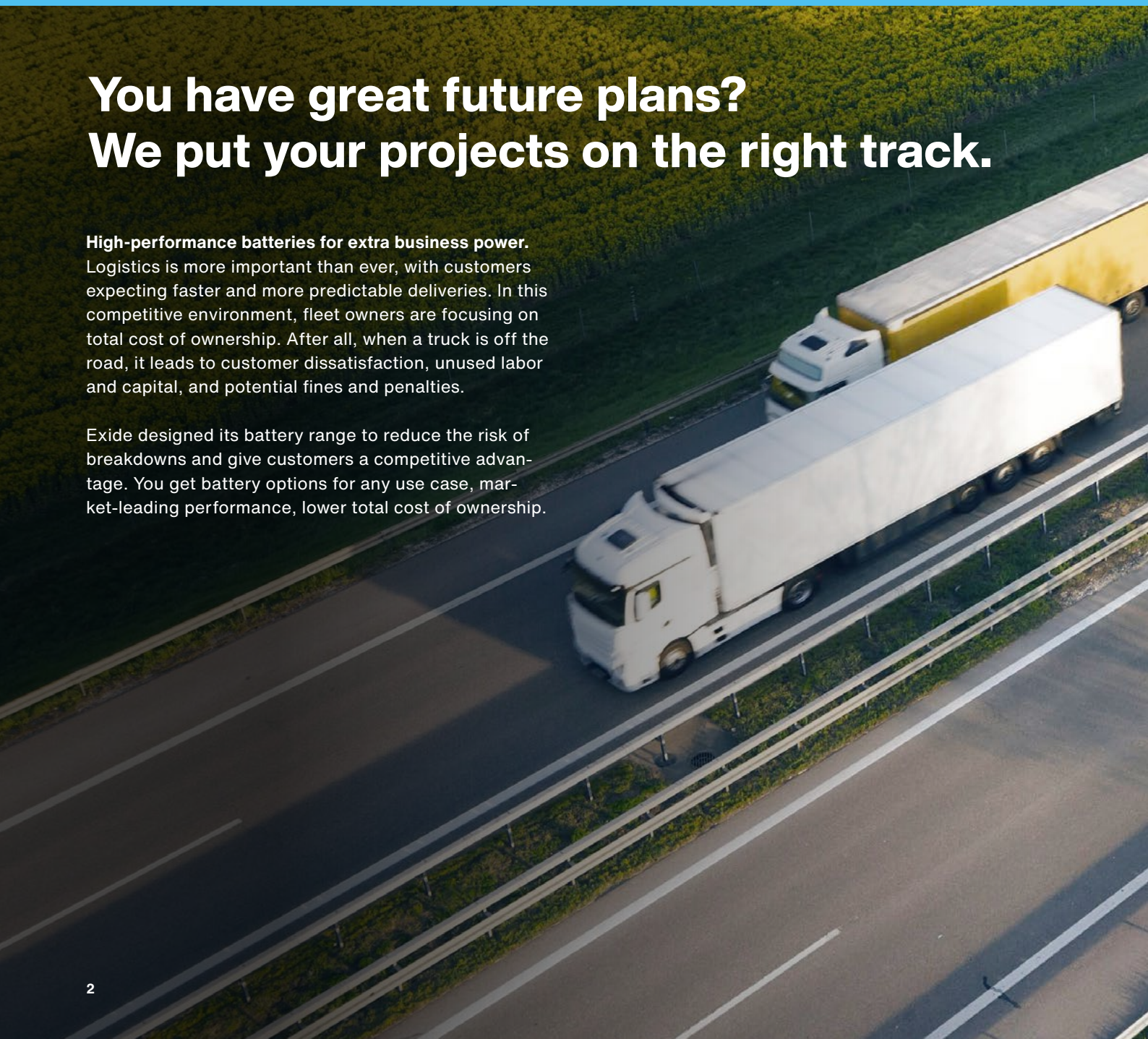
For Exide, now is the time to release new energies to move even more into the future. Our new alignment **"Energizing a new world"** is designed to convey this aspiration. We want to bring change to life, face challenges together with our partners, and develop solutions for today and tomorrow. **Let's create the future – the Exide way:**

**Innovation** is the engine of technology leadership. That's why we are constantly evolving, remaining self-critical, and continue to inspire our customers.

**Reliability** defines our business. This applies to our products as well as our innovative development, services, and partnerships. Our responsibility does not end with our products, but starts right there.

**Sustainability** is an important part of our responsibility. That's why we rely on renewable energies and intelligent recycling concepts.

**High Performance** is the standard we set for our products and services. All our solutions are best of class. This means our customers are optimally equipped for any task.



# You have great future plans? We put your projects on the right track.

**High-performance batteries for extra business power.** Logistics is more important than ever, with customers expecting faster and more predictable deliveries. In this competitive environment, fleet owners are focusing on total cost of ownership. After all, when a truck is off the road, it leads to customer dissatisfaction, unused labor and capital, and potential fines and penalties.

Exide designed its battery range to reduce the risk of breakdowns and give customers a competitive advantage. You get battery options for any use case, market-leading performance, lower total cost of ownership.

Equipment
ORIGINAL
Manufacturer

# Trusted by leading commercial vehicle manufacturers.

Exide has been supplying lead-acid batteries to car and truck makers for more than 130 years. We design the most technically advanced products in the industry, and were the first to introduce High Vibration Resistant (HVR) batteries for trucks back in 2008. Vehicle manufacturers trust the quality of our products and our commitment to excellence in manufacturing.

**Exide works with leading commercial vehicle manufacturers, including:**
AGCO group, Bobcat, Case, Claas, Evobus, Isuzu, Iveco, John Deere, Komatsu, Kubota, MAN, Mercedes Trucks, New Holland, Nissan, Renault Volvo Trucks, SAME Deutz-Fahr, Scania, Wacker Neuson, and many others...

# There are numerous challenges.
## And we have the right battery for each one.

As a true expert in OE batteries, Exide helps you select the right battery. For fleet owners and installers alike, it is vital to make the right choice for the conditions of use. Three important criteria to consider in battery performance are vibration resistance, cycling endurance, and cranking power.

### Three main factors when selecting the right battery.

**Vibration resistance**

For trucks with rear-chassis battery installations (e.g. Euro 5/Euro 6 trucks), robust and highly vibration-resistant batteries are mandatory to avoid breakdowns. Vibration resistance is also required for any vehicle operating on bad roads or rough terrain.

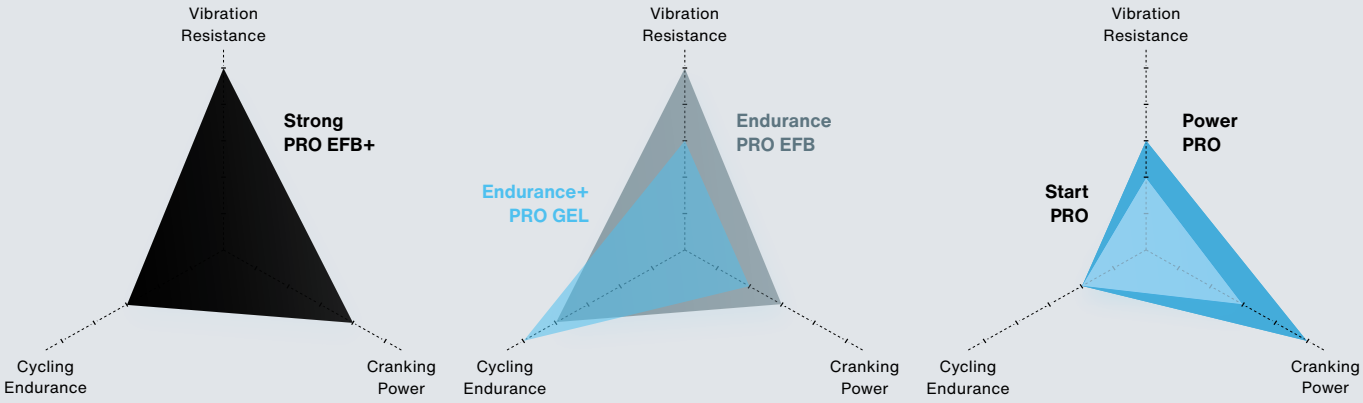
**Cycling endurance**

High cycling endurance is important in batteries for long-haul trucks with life on-board, commercial vehicles doing intensive urban deliveries, and any commercial vehicle with extensive energy requirements. This maximizes battery lifespan and ensures a safe battery start.

**Cranking power**

High cranking power allows for engine starts in cold climates and is particularly required by many agriculture and construction vehicles with reliable starting power needs.

### The perfect battery for every need.



# Range overview and features.

| Performance | Strong PRO EFB+ | Endurance PRO EFB | Endurance+ PRO GEL | PowerPRO | PowerPRO Agri & Construction | StartPRO |
|---|---|---|---|---|---|---|
| **Vibration resistance** | ■■■■■ | ■■■■■ | ■■■□□ | ■■■□□ | ■■■□□ | ■■□□□ |
| **Cycling endurance** | ■■■□□ | ■■■■□ | ■■■■■ | ■■□□□ | ■■□□□ | ■■□□□ |
| **Cranking power** | ■■■■□ | ■■■□□ | ■■□□□ | ■■■■■ | ■■■■■ | ■■■□□ |
| **Charge acceptance** | ■■■■■ | ■■■□□ | ■■■■■ | ■■■□□ | ■■□□□ | ■■□□□ |
| **Maintenance** | no maintenance | low maintenance | no maintenance | no maintenance | no maintenance | low maintenance |

# Battery recommendation by vehicle type & application.

| Type of vehicles | Application | Strong PRO EFB+ | Endurance PRO EFB | Endurance+ PRO GEL | PowerPRO | PowerPRO Agri & Construction | StartPRO |
|---|---|---|---|---|---|---|---|
| Long-haul modern trucks, standard trucks | Rear-chassis installation/ rough terrain, high vibrations | ✓ | ✓ 1 | | | | |
| Express delivery (lifters), city bus | Power-hungry equipment, deep cycling applications | ✓ | | ✓ 2 | | | |
| Long-haul modern trucks | Overnight stop/ hotel function | ✓ | ✓ 1 | | | | |
| Standard trucks or vehicles with large/highly compressed engines | Extreme climate and/or high CCA requirements | | | | ✓ | | |
| Tractors, construction machines | Special vehicles | | | | | ✓ 3 | |
| Standard trucks | Standard requirements/ older vehicle | | | | | | ✓ 3 |

1 Please top up the battery with distilled water if needed. The charging system must be compatible with Sb/Ca alloy. If these conditions are not met, choose the **Strong PRO EFB+.**

2 Endurance+ PRO GEL requires charging voltage limitation to max 14.4V. If not compatible, choose the **Strong PRO EFB+.**

3 Top up with distilled water when needed (depending on battery model)

# Smart tools & accessories

## Exide Charger WSC720

Exide WSC720 is designed to meet the growing needs of garages. It comes with the latest technology, including a temperature sensor to optimize charging performance and specific charging curves for AGM, GEL, and conventional. This ensures an excellent charge each time. WSC720 is suitable for batteries from 40–500 Ah, and is ideal for the challenges of a modern garage.

## **Battery Finder** Online & App

Best-in-class fitment information for all types of commercial vehicles. Find the right battery online at exidegroup.com or on-the-go with our Exide Battery Finder app.

Download on the App Store | GET IT ON Google Play

# **Strong**PRO EFB+

## Strong, stronger, EFB+.

Tudor's StrongPRO battery range is now stronger than ever. A new carbon-based formula of negative active mass enhances the rechargeability and charge acceptance of the StrongPRO EFB+ battery. Additionally, the HVR® (high-vibration-resistant) technology enables StrongPRO EFB+ to pass the extreme vibration tests under the new European V4 standard (EN 50342-1:2015).

A more robust and more lasting battery means reduced total service cost for fleet owners and truck drivers, allowing less replacements over the vehicle's service life and minimized risk of unexpected and premature battery failure.

### Benefits:

- Better rechargeability and charge acceptance than previous generation StrongPRO
- Better control over gassing and stronger anti-stratification effect
- Extremely robust – with HVR® technology, meeting V4 requirements
- Up to 70% savings on TCO within 2 years period when compared with standard batteries
- Maximum starting reliability after overnight stay
- OE experience inside
- First class safety features
- Maintenance free - no topping up

### Recommended type of vehicles / use conditions:

Long-haul modern/standard trucks with rear-chassis installations and/or hotel functions, express delivery, and city bus. Ideal for vehicle running on rough terrain, with power-hungry equipment and deep cycling applications.


**Reinforced container** wall with additional ribs*

**Labyrinth integrated** into the lid with flame arrestor and central degassing outlet for maximum safety

**Additional hot melt** application over the plategroup locking the cell group*

**3DX negative grids** with Carbon Boost® for super-fast recharge and improved cycling

**New extended side** and top fixation*

**Bottom plate** adhesion for extra fixation*

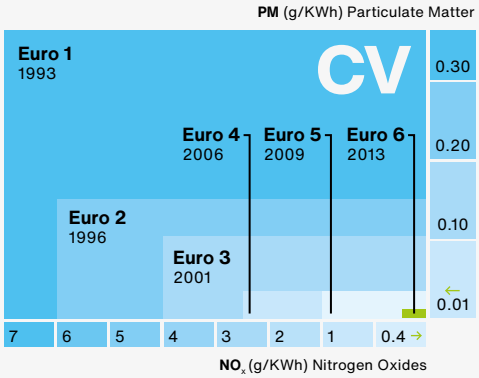
**Framed positive grids** with heavy-duty polyethylene separator and glass mat for homogeneous compression

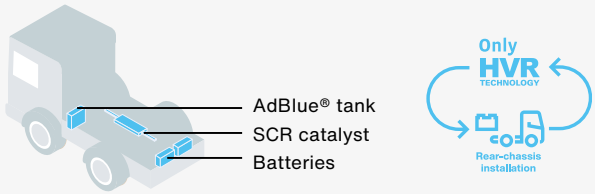
*Latest generation of Tudor's leading HVR® design, meeting V4 requirements (EN 50342-1:2015)

# HVR® Technology

**New features in the robust battery design.**
Several economic factors (higher fuel costs, higher road taxes, higher toll & parking charges, and higher charges to enter low emission zones) have led fleet owners to upgrade by purchasing new Euro 5 or Euro 6 vehicles, thus reducing particulate matter and NOx emissions. Many Euro 5/Euro 6 vehicles have a new chassis layout to integrate the Selective Catalytic Reduction (SCR) system and AdBlue tank, leading truck manufacturers to move batteries into the rear-chassis position.

**Emission standards as defined by EU directives**

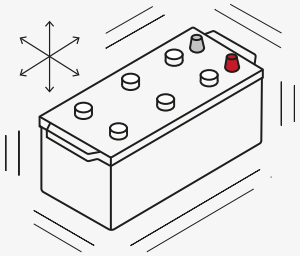


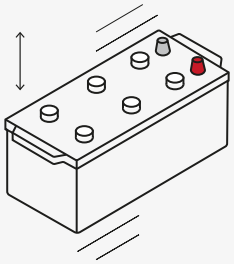

**New challenges, new solution.**
The lifespan of ordinary batteries is greatly reduced by higher vibrations at the rear of the chassis of the vehicle. Exide worked with truck manufacturers to develop the new High Vibration Resistant (HVR®) battery in the market, one of the first to meet the new V4* vibration test.

HVR guarantees a longer battery lifespan even when installed in the rear chassis of a truck.

* EN50342-1



**New three-axis test**
HVR technology allows Exide batteries to pass the strict V4* vibration test, which uses three-axis motion simulating real-life conditions.



**Single-axis test**
The V1-3 tests used single-axis vibration only.

# The Carbon Boost® Effect

**Exide's smart electrochemical solution for longer battery life.**
Early battery failures are common in commercial vehicles, caused by exposure to deep discharge conditions. Challenges to the battery include frequent starting and stopping for urban deliveries, and overnight heating and lighting for long-haul trucks. This strain leads to sulphation and acid stratification, damaging battery lifespan.

With Exide Carbon Boost®, unique carbon additives increase the speed at which sulphate particles dissolve. This leads to faster recharging, protection from sulphation and less stratification.
The carbon additives also promote controlled gassing during recharging, which keeps the electrolyte mixed and further reduces stratification.

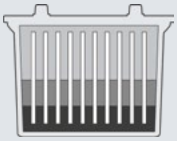
**The benefits of Carbon Boost:**
- Improved charge acceptance
- Faster recharging
- Reduced acid stratification
- Enhanced cycling endurance

**Sulphation:** Lead sulphate particles progressively cover the negative plates. This makes recharging less efficient, because energy is used to dissolve the lead sulphate.

**Without Carbon Boost®**
The plates are covered with sulfate

**With Carbon Boost®**
Sulfate is reduced due to Carbon Boost technology

**Acid stratification:** Sulphate particles turn into sulphuric acid during charging. This is heavier than the electrolyte, so it sinks to the bottom, creating a range of negative effects, including reduced capacity.



**Without Carbon Boost®**
Sulphuric acid sinks to the bottom of the cell

**With Carbon Boost®**
Controlled gassing mixes the electrolyte and reduces stratification

## **Endurance**PRO EFB

**As indestructible as our claim to develop the best solutions.**

Tudor's EndurancePRO range evolves: the "made for severe cycling" battery range features the innovative HVR® (High Vibration Resistance) design that assures an incomparable level of robustness and minimized risk of unexpected and premature battery failure. Not only does it guarantee excellent cycling performance and reduced stratification, the new EndurancePRO EFB battery now exceeds the highest requirements in the industry's reference vibration test (V4 level in EN50342-1 vibration test) and is perfectly adapted for installation in vehicles running on rough terrain.

Spare ORIGINAL Part

All this means less risk of breakdowns, more starting reliability, and longer lifespan.


### Benefits:

- Extremely robust – now with HVR® technology, meeting V4 requirements
- Perfect for deep cycling applications : 2x more cycle life compared to standard truck battery (advanced SHD technology with glass matt layers pasted on active mass) allowing excellent cycling performance (up to 200 cycles at 50% DoD)
- Improved durability
- OE experience inside
- Urban delivery
- Low maintenance

V4 HVR TECHNOLOGY HIGH VIBRATION RESISTANT GLASS MAT SHD TECHNOLOGY

### Recommended type of vehicles / use conditions:

Long-haul modern/standard trucks with rear-chassis installa-tions and/or hotel functions. Ideal for vehicle running on rough terrain. It requires water topping.

# **Endurance**+PRO GEL

## Ahead of its time.

Exide Technologies is the inventor of Gel technology, the ultimate choice for the most demanding commercial vehicles applications. Instead of being in liquid form, the electrolyte is fixed in a gel. This leads to unmatchable cycle life. The new Tudor Endurance+PRO GEL battery is highly robust, with best-in-class deep cycle properties. It allows unmatched safe depth of discharge of 90%, which improves Total Cost of Ownership (TCO) and minimizes the risk of breakdowns.

Equipment ORIGINAL Manufacturer

VRLA

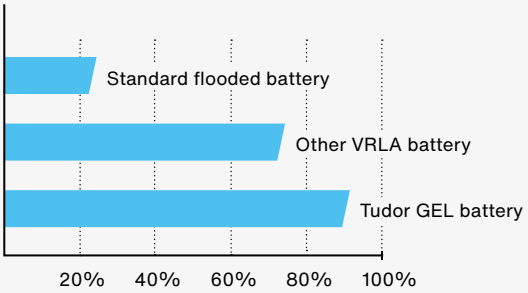
## Benefits:

- Supports hotel function
- 2x lifetime compared to equivalent AGM and 10x lifetime compared to equivalent standard flooded batteries
- High vibration resistant and valve-regulated technology for maximum safety
- 90% safe depth of discharge: perfect choice for all commercial vehicles
- Safe and reliable engine start at any time
- Reduces operating costs
- Maintenance free - no topping up

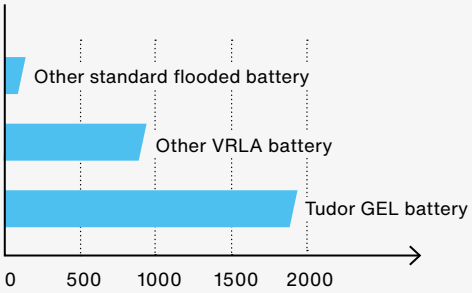
## Recommended type of vehicles / use conditions:

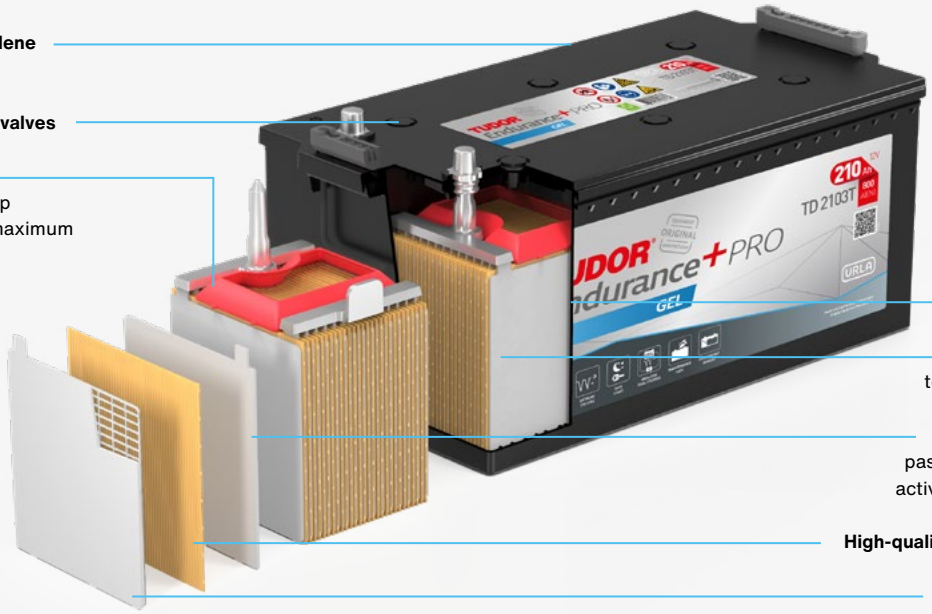
Express delivery trucks (with and without Dual Systems) and city bus with power-hungry equipment and deep cycling needs.

### Safe depth of discharge




### Cycling capacity




**Reinforced polypropylene container**

**Exide patented VRLA valves**

**Plastic wedge**
fixed to the plategroup with epoxy resin for maximum vibration resistance

**Special silica gel**

**Bottom hotmelt**
to stabilize the plategroup

**Negative full-framed grid**
pasted with special negative active materials with graphite

**High-quality GEL specific separator**

**Positive full-framed grid**

Image shows the TD2103T type

## **Power**PRO

### Impressive power at every start

HDX TECHNOLOGY


**Benefits:**

- Superior cranking power (more plates and active material to maximize grid surface)
- Robust and reliable design with hot melt fixation of plate groups
- Superior power
- Designed for extreme climates
- OE experience inside
- Maintenance free - no topping up

**Recommended type of vehicles / use conditions:**

Standard trucks or vehicles with large/highly compressed engine working in extreme climate and/or high CCA requirements.

## **Power**PRO Agri & Construction

### Choose the original part

Spare ORIGINAL Part


**Benefits:**

- Superior cranking power (more plates and active material to maximize grid surface)
- Robust design with hot melt fixation of plate groups
- Wide range including special types
- Superior power
- True OE Agri or Construction fit (original part)
- Maintenance free - no topping up

**Recommended type of vehicles / use conditions:**

Tractors and construction machines (agriculture, forestry, and construction machinery)

## **Start**PRO

### Reliable starting power for standard use

HD TECHNOLOGY


**Benefits:**

- Ideal for trucks without special requirements in terms of vibration resistance, cycling, or cranking power
- Robust and reliable design with hot melt fixation of plate groups
- Complete range covering almost 100% of vehicle parc, including special types
- Low maintenance - may need water topping up

**Recommended type of vehicles / use conditions:**

Strandard truck without specific vibration, cycling or cranking needs.

# Tudor commercial vehicle batteries type list

## **Strong**PRO EFB+

| Tudor | Performance | | Dimensions | | | Technical characteristics | | |
|---|---|---|---|---|---|---|---|---|
| Code | Capacity Ah | CCA A (en) | L (mm) | W (mm) | H (mm) | Polarity | Hold down | Box |
| TE1403 | 140 | 800 | 513 | 189 | 223 | ETN 3 | B0 | D04 |
| TE1853 | 185 | 1100 | 513 | 223 | 223 | ETN 3 | B0 | D05 |
| TE2353 | 235 | 1200 | 518 | 279 | 240 | ETN 3 | B0 | D06 |

## **Endurance**PRO EFB

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| TX1803 | 180 | 1000 | 513 | 223 | 223 | ETN 3 | B0 | D05 |
| TX2253 | 225 | 1150 | 518 | 279 | 240 | ETN 3 | B0 | D06 |

## **Endurance**+PRO GEL

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| TD851T | 85 | 350 | 349 | 235 | 175 | ETN 1 | B0 | D02 |
| TD2103 | 210 | 1030 | 518 | 279 | 240 | ETN 3 | B0 | D06 |
| TD2103T | 210 | 800 | 518 | 279 | 240 | ETN 3 | B0 | D06 |

## **Power**PRO

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| TF1202 | 120 | 870 | 349 | 175 | 235 | ETN 0 | B1 | D02 |
| TF1420 | 142 | 850 | 349 | 175 | 290 | ETN 0 | B0 | D03 |
| TF1421 | 142 | 850 | 349 | 175 | 290 | ETN 1 | B0 | D03 |
| TF1453 | 145 | 900 | 513 | 189 | 223 | ETN 3 | B0 | D04 |
| TF1853 | 185 | 1150 | 513 | 223 | 223 | ETN 3 | B0 | D05 |
| TF2353 | 235 | 1300 | 518 | 279 | 240 | ETN 3 | B0 | D06 |

## **Strong**PRO Agri & Construction

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| TJ1523 | 152 | 1130 | 513 | 189 | 223 | ETN 3 | B0 | D04 |
| TJ1723 | 172 | 1390 | 513 | 223 | 223 | ETN 3 | B0 | D05 |

## **Start**PRO

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| TG1008 | 100 | 680 | 413 | 175 | 220 | ETN 0 | B3 | D01 |
| TG1100 | 110 | 750 | 349 | 175 | 235 | ETN 0 | B0 | D02 |
| TG1101 | 110 | 750 | 349 | 175 | 235 | ETN 1 | B0 | D02 |
| TG110B | 110 | 950 | 330 | 173 | 240 | ETN 9 | B0 | G31 |
| TG1250 | 125 | 760 | 349 | 175 | 290 | ETN 0 | B0 | D03 |
| TG1251 | 125 | 760 | 349 | 175 | 290 | ETN 1 | B0 | D03 |
| TG1353 | 135 | 1000 | 514 | 218 | 210 | ETN 3 | B0 | DB9 |
| TG1355 | 135 | 1000 | 514 | 175 | 210 | ETN 3 | B3 | DB8 |
| TG1402 | 140 | 900 | 508 | 175 | 205 | ETN 0 | B1 | ATM |
| TG1403 | 140 | 800 | 513 | 189 | 223 | ETN 3 | B0 | D04 |
| TG1406 | 140 | 800 | 510 | 175 | 225 | ETN 4 | B3 | D08 |
| TG145A | 145 | 1000 | 360 | 253 | 240 | ETN 6 | B0 | F21 |
| TG1705 | 170 | 950 | 514 | 218 | 210 | ETN 3 | B3 | DB9 |
| TG1803 | 180 | 1000 | 513 | 223 | 223 | ETN 3 | B0 | D05 |
| TG1806 | 180 | 1000 | 510 | 218 | 225 | ETN 4 | B3 | D09 |
| TG2253 | 225 | 1200 | 518 | 279 | 240 | ETN 3 | B0 | D06 |
| TG2254 | 225 | 1200 | 518 | 279 | 240 | ETN 4 | B0 | D06 |

# Energy that goes beyond.


- Transportation plant
- Industrial plant
- R&D facility
- Recycling
- Global HQ
- Principle sales offices
  + sales offices and distribution centers across the world


All manufacturing plants **ISO 9001** certified

All automotive plants **IATF 16949** certified

All manufacturing plants **ISO 14001** certified

All manufacturing plants **ISO 50001** certified

Most manufacturing plants **ISO 45001** certified

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