

# Light Vehicle Battery Solutions

*Powering the road ahead!*

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[www.norwatt.es](http://www.norwatt.es)

Latest Start-Stop  
Technology

High Tech  
with Carbon Boost

Auxiliary

Accessories  
& Support



Made in Europe  
by Exide Technologies  
Original Equipment  
Manufacturer



# Powering the road ahead

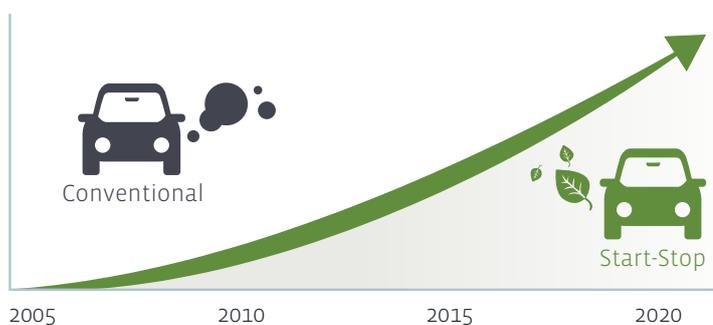
## Innovative battery solutions for the independent aftermarket

Tudor is introducing the next generation of light vehicle batteries to the aftermarket. Many ideas found in the new range were first developed in our original equipment business, where we design batteries for leading carmakers. The pioneering new range was designed to support the latest technologies, including Start-Stop and energy recuperation. This means powerful performance today and readiness for the future of the car parc.

## Getting ready for the future

The European car parc is changing at unprecedented speed. Legislators passed strict targets requiring carmakers to reduce CO<sub>2</sub> emissions to 130g/km by 2015 and 95g/km by 2021, representing a 40% reduction from the 2007 fleet average. These ambitious targets forced manufacturers to design much more fuel-efficient cars with modern engines and advanced powertrain features such as Start-Stop, battery management systems and intelligent generators, which no longer recharge batteries in continuous mode. These new technologies rely on advanced OE-compliant AGM and EFB batteries. Micro-hybrid vehicle production levels are already soaring in Europe. While cars with conventional powertrains still account for a majority of the car parc, the percentage of Start-Stop vehicles is accelerating rapidly every year.

### The evolution of the European car parc



- › 70% of cars produced today are equipped with Start-Stop systems and other advanced features that reduce fuel consumption and CO<sub>2</sub> emissions by 5% to 12%
- › Start-Stop vehicles make up 15% of the car parc today, and this is set to increase to 50% within the next five years
- › Start-Stop vehicles need AGM and EFB batteries that meet strict OE specifications
- › Both high quality conventional and Start-Stop batteries will be needed as the market evolves

## Trusted by leading carmakers

We have been supplying lead-acid batteries to carmakers for over 100 years. We design the most technically advanced products in the industry, and were the first to introduce Start-Stop technology to the European market in 2004. Carmakers trust the quality of our products and our commitment to excellence in manufacturing.

Our company works with leading car manufacturers, including:

**Alfa Romeo, BMW, Citroën, Dacia, Fiat, Jaguar Land Rover, Lancia, Mini, Nissan, Peugeot, Renault, Saab, Suzuki, Toyota, Volkswagen Group, Volvo**





# NEW!

## Light Vehicle Battery Solutions



### Start-Stop

**NEW!**

#### AGM

Latest OE Generation  
*pg.3*

**NEW!**

#### EFB

Latest OE Generation  
*pg.4*

**NEW!**

#### Auxiliary

*pg.9*



### Conventional

**NEW!**

#### High Tech

Carbon Boost  
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#### Technica

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#### Standard

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### Accessories and Support

#### Battery Selector

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#### Charger

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#### Battery Replacement Tool

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#### Battery Finder

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**NEW!**

#### QR Codes

*pg.8*



# Start-Stop AGM

## Choose the original

Our company invented the first Start-Stop AGM battery back in 2004. Our technology has evolved rapidly ever since, with each new generation making large gains in efficiency and performance. We have invested millions into advanced manufacturing facilities and are one of the world's top suppliers of AGM batteries. We are able to meet the stringent requirements of carmakers, giving the aftermarket confidence in the quality of our products.

Tudor's Start-Stop AGM battery uses high-performance components and materials, including high-surface glass mat separators, advanced lead-tin alloys and unique carbon additives in the active mass. It is ideally suited to cars with Start-Stop and/or regenerative braking systems. This new-generation AGM battery also supports sailing as well as other intelligent fuel-saving features.

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**NEW!**

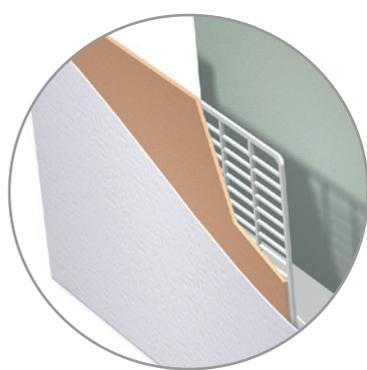
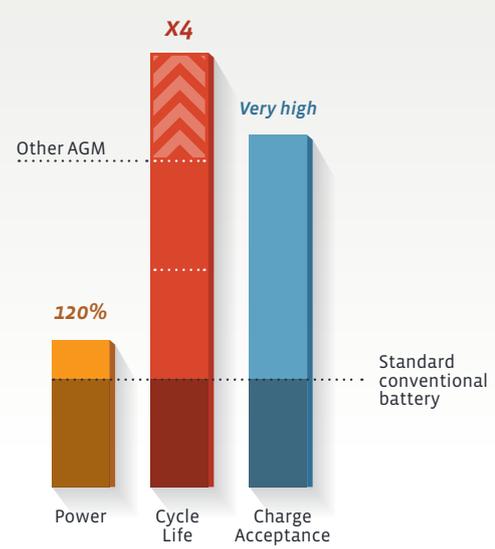
## AGM technology

### Benefits:

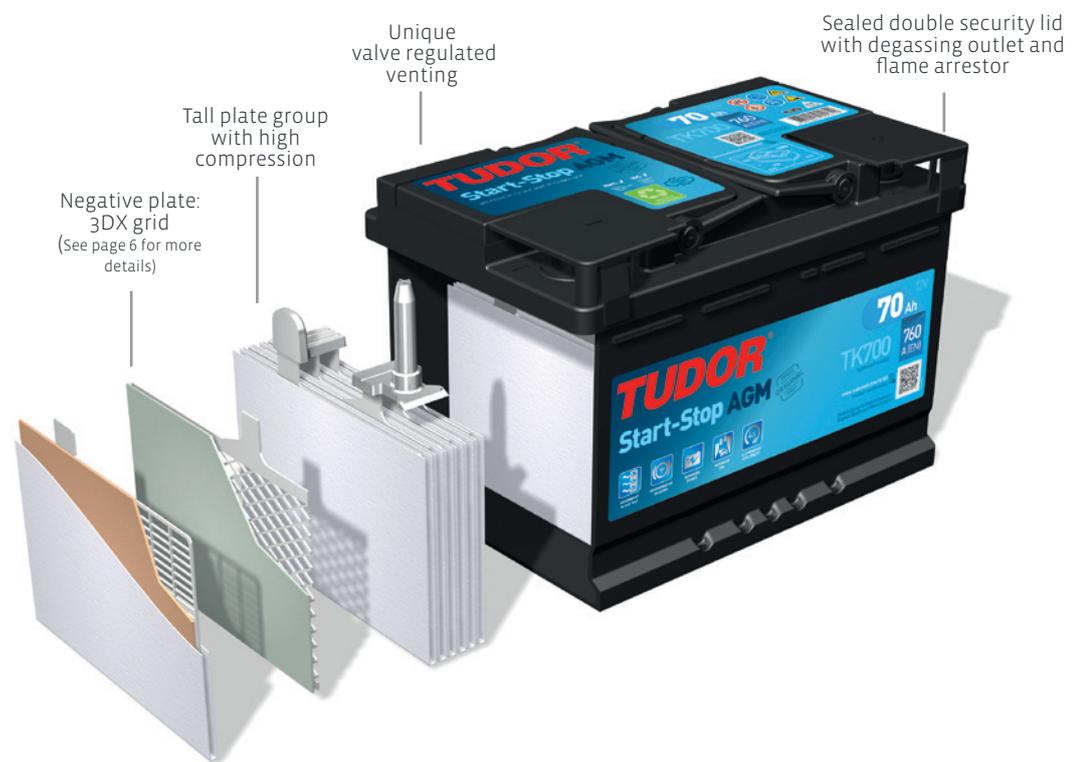
- › Top charge acceptance
- › Now 4 times higher cycle life
- › Optimised for partial state of charge operations
- › Ideal for large cars, SUVs, vans and vehicles with Start-Stop and power-hungry electrical equipment
- › Top-level safety features and absolutely no free acid
- › Recombinant VRLA (valve regulated)
- › Latest generation approved by car manufacturers
- › Great car parc coverage from a limited number of SKUs
- › Long shelf life



### Key Performances



Positive plate:  
Framed grid with high-tech alloy. The high-capillarity glass mat separator provides extra absorption for maximum electrolyte volume and to avoid stratification.





# Start-Stop EFB

## A step ahead

We invented the first EFB\* battery in 2008, helping European car manufacturers to reduce fuel consumption and emissions for small to mid-sized cars. Our technology is now considered the most advanced in the industry, driven by our investment in R&D and the experience we have gained from working with leading carmakers.

The latest-generation EFB battery offers significantly improved charge acceptance and cycle life, a result of key breakthroughs in lead alloys and unique carbon additives that came from our R&D efforts. Tudor's Start-Stop EFB batteries enable Start-Stop, regenerative braking and other powerful fuel-saving features.

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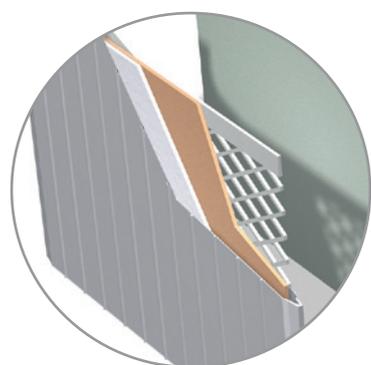
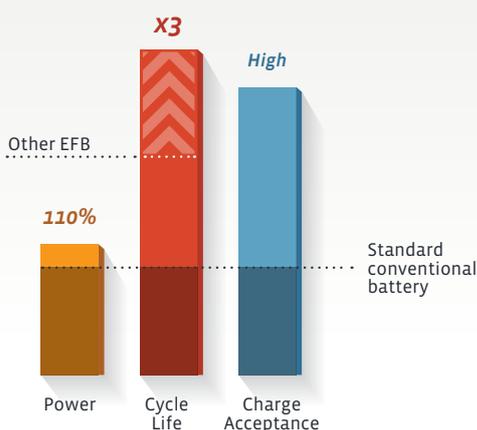
**NEW!**

## EFB technology

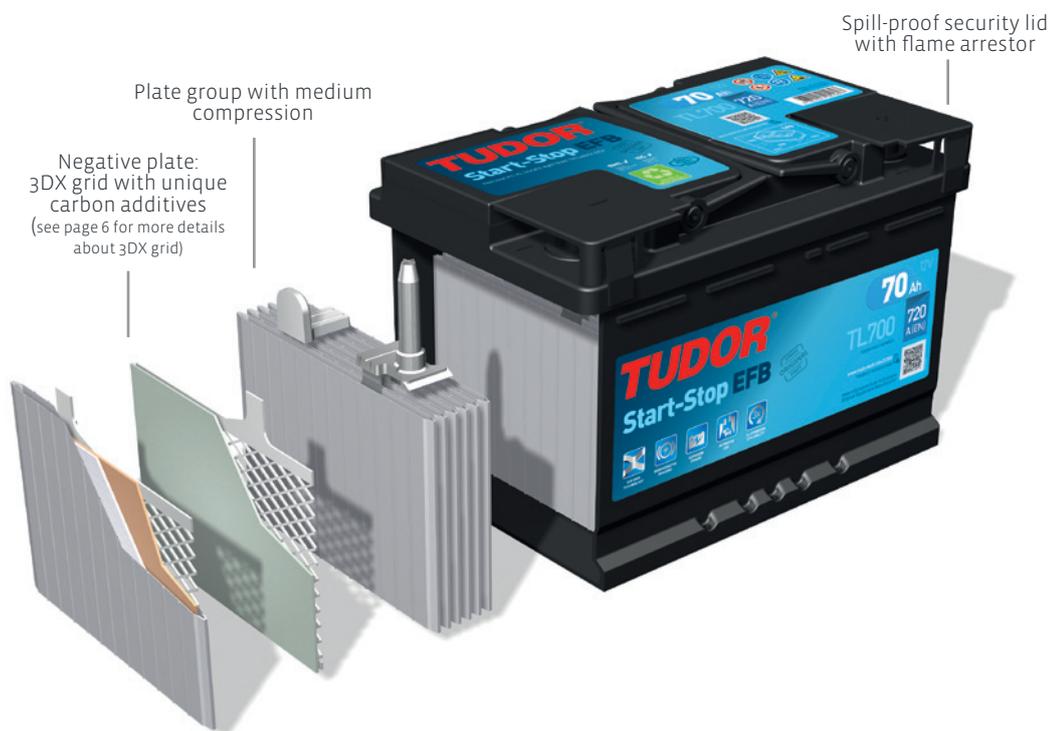
### Benefits:

- › High charge acceptance over life of battery
- › Now 3 times higher cycle life
- › Optimised for partial-state-of-charge operations
- › Ideal for small to mid-sized cars with Start-Stop and other fuel-saving features
- › High-level safety features
- › Optimal operation in engine compartment
- › Latest generation approved by car manufacturers
- › Great car parc coverage from a limited number of SKUs
- › Long shelf life

### Key Performances



Positive plate: 3DX grid and advanced glass mat retainer covering active mass



\* EFB is the technology name defined by CENELEC in 2012

# Tudor High Tech **CARBON BOOST**



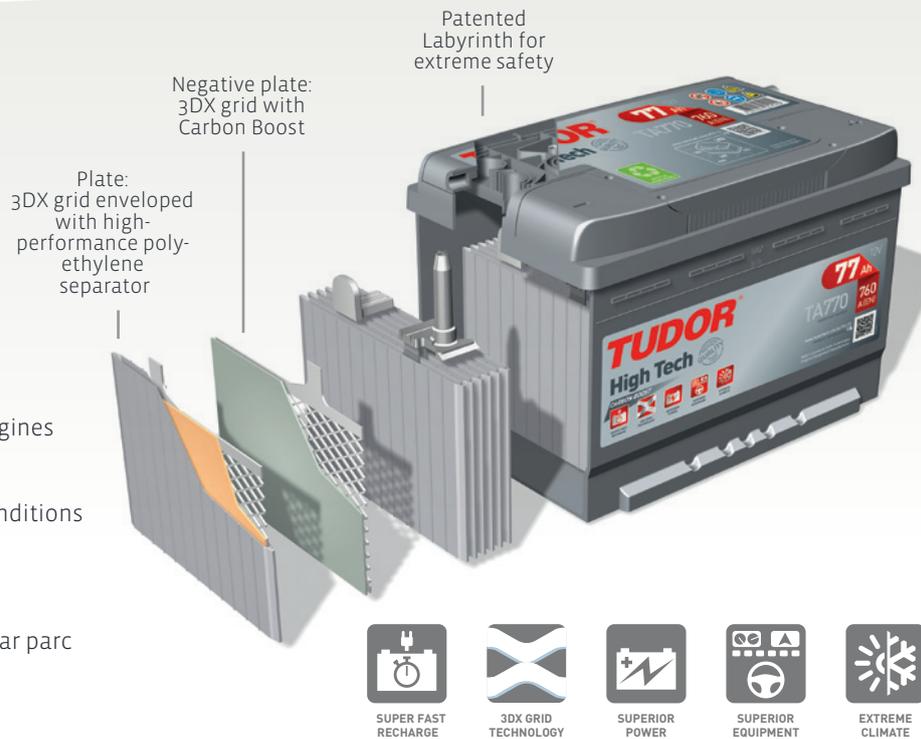
The new High Tech Carbon Boost battery recharges up to 1.5 times faster due to our proprietary application of carbon additives on the negative plates. This technique was discovered during the development of our AGM and EFB ranges, leading to improved charge acceptance and a significant reduction in charging times. The High Tech Carbon Boost battery is designed to withstand extreme temperature, power-hungry electrical equipment and intensive urban driving.

**NEW!**

## Tudor Carbon Boost Technology

### Benefits

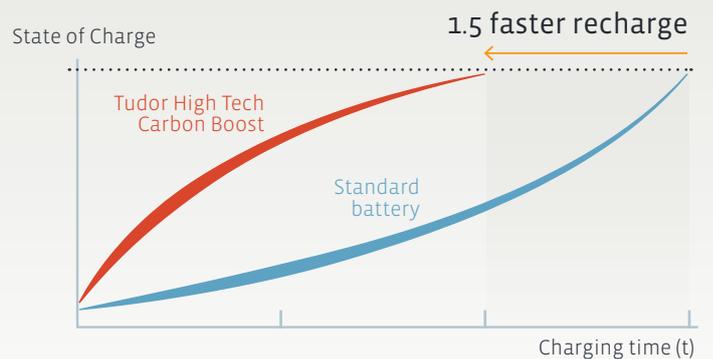
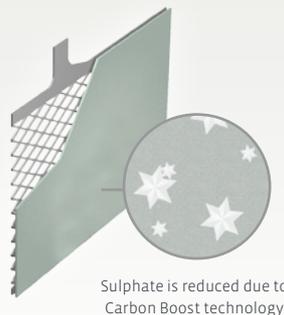
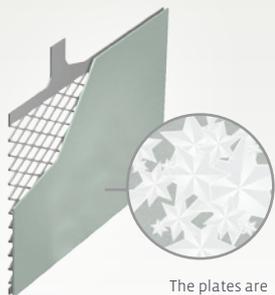
- › 30% extra starting power
- › Recharges up to 1.5 times faster
- › Ideal for highly equipped cars with powerful engines and demanding electrical needs
- › Ideal for extreme weather and urban driving conditions
- › Original equipment experience inside
- › Meets OE requirements
- › Comprehensive range covering around 90% of car parc



## The Carbon Boost Effect

Without Carbon Boost

With Carbon Boost



Lab tests show that it takes significantly less time to recharge an Tudor High Tech Carbon Boost battery than a standard battery under the same conditions.

During discharge, non-conductive sulphate particles progressively cover the negative plates, isolating them from the electrolyte. This means a lot of the energy intended to recharge the battery is needed to dissolve the sulphate, which makes charging less efficient. The high-surfaced carbon additives in Tudor's High Tech Carbon Boost battery provide superior conductivity, dissolving the sulphate particles much faster.



High Tech Carbon Boost has improved charge acceptance and recharges up to **1.5 times faster** than standard batteries. While battery failure remains the number one cause of car breakdowns\*, fast recharging considerably reduces the risk of breakdowns by helping the battery retain a healthy state of charge for longer.

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## Tudor Technica

### Benefits

- › 15% extra starting power
- › All-round battery for standard use
- › Complete range covering almost 100% of car parc
- › Original equipment experience inside

## Tudor Standard

### Benefits

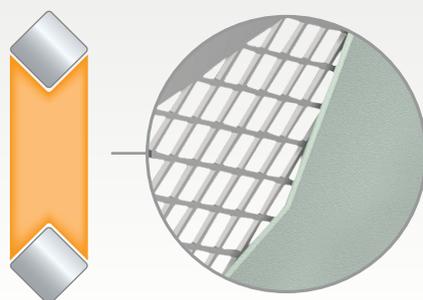
- › Economy solution
- › Ideal for cars with basic power needs

## 3DX Grid – the secret in every Tudor battery

Other grid



3DX grid



The reinforced 3D diamond mesh ensures that the active mass stays fixed on the mesh, resulting in better electrical performance and longer lifespan.

### Benefits

- › Superior active mass adhesion for longer service life
- › Improved electrical conductivity for higher power delivery
- › Special pure quality alloys for maximum lifespan and performance
- › High resistance to vibration and corrosion
- › Eco-friendly production
- › Consistent high quality due to fully automated manufacturing process



### Did you know? - Things that drain your battery

**Cold weather** significantly impairs battery performance. But it is during the cold season that more energy is needed for light and heating.

**Hot weather** accelerates self-discharge, grid corrosion and active material shedding. It could lead to shorter service life if batteries are not reinforced for extreme climates.

In **urban environments** the engine is often turned off or idle, and the electrical system may consume more power than the alternator can supply. This puts extra pressure on the battery.

**Power-hungry electrical equipment**, such as media players or navigation equipment, put extra pressure on the battery.

# Battery Selector

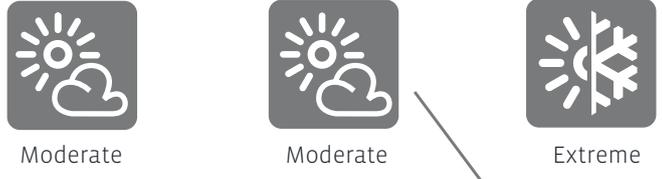
## Conventional

## Start-Stop

Power required by Engine



Climate



Equipment



Driving condition



**Standard**

The economy solution for older cars with basic equipment



**Technica**

The reference battery



**High Tech**

The high-performance battery

Always replace your battery with a new battery that uses the same technology.



AGM



EFB

Never use conventional batteries on a Start-Stop car. Start-Stop powertrains work very differently from those on standard cars. Only AGM and EFB batteries can withstand the frequent cycling that Start-Stop powertrains perform.

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**Did you know !**

You can use Start-Stop batteries on cars with Conventional powertrains. Special vehicles like taxis, ambulances and police cars require batteries with high cycling endurance, making Start-Stop batteries an ideal choice. The same applies to cars with power-hungry electrical equipment and cars used primarily in urban environments.

Avoid early battery failure and save money in the long run by choosing AGM or EFB batteries. They come with 3-4 times higher cycle life than standard batteries.

# More than batteries

We have a comprehensive range of accessories and support. We help you test, charge, select, replace and recycle batteries – everything workshops need to keep work in house, provide quality service and grow profitability.

## Testing



**Battery Tester**

Tudor offers a range of easy-to-use testers that work with all types of batteries.

Battery ok?




## Charging



### Battery Charger

Exide chargers can be used on cars, boats and motor-cycles, and are ideal for both consumers and professionals alike. Workshops use the device to ensure customers leave with a fully charged battery every time.

## Selecting



### Battery Finder App

Search by car model, VIN or registration number to quickly find the right battery on the go.



### QR Code

Want to find out more? Scan the QR code on the label and get more information right away. No more waiting until you get home.



### Web Catalogue

Find the right battery from your computer, using our web catalogue powered by TecDoc on [www.exide.com](http://www.exide.com).

**NEW!**

## Replacing



### Battery Replacement Tool

Our award-winning\* Battery Replacement Tool comes pre-loaded with battery codes, and makes it easy to replace batteries and clear faults from the dashboard.



### Tudor recycles!

What to do with old batteries? Subscribe to our recycling programme. We pick them up and reward you for your environmental consciousness.



# Type List

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	Tudor	Performances		Dimensions (in mm)			Technical Characteristics			
	Code	Ah	A (EN)	Container	Length	Width	Height	Polarity	Terminals	Hold Down
 AGM	TK508	50	800	G34	260	173	206	9	1	B7
	TK600	60	680	L02	242	175	190	0	1	B13
	TK700	70	760	L03	278	175	190	0	1	B13
	TK800	80	800	L04	315	175	190	0	1	B13
	TK950	95	850	L05	353	175	190	0	1	B13
	TK1050	105	950	L06	392	175	190	0	1	B13
 EFB	TL604	60	520	D23	230	173	222	0	1	B0
	TL600	60	640	L02	242	175	190	0	1	B13
	TL652	65	650	LB3	278	175	175	0	1	B13
	TL700	70	720	L03	278	175	190	0	1	B13
	TL752	75	730	LB4	315	175	175	0	1	B13
	TL800	80	720	L04	315	175	190	0	1	B13
 Auxiliary	TK091	9	120	C54	150	90	105	1	M12	B0
	TK111	11	150	C55	150	90	130	1	M04	B0
	TK151	15	200	C56	150	90	145	1	Small taper	B0

NEW!

## Start-Stop Auxiliary

Tudor is launching its Auxiliary range on the aftermarket, building on experience gained through our original equipment business. Auxiliary batteries power the electrical equipment in certain cars, as a complement to the main starter battery.



### The reliable secondary battery

#### Benefits

- › 3 times higher cycle life
- › Long shelf life
- › VRLA (valve regulated) for leak-proof security
- › Original equipment experience inside



ABSORBENT GLASS MAT



INTENSIVE USE



3 x STANDARD CYCLABILITY



#### Did you know?

We also produce batteries for commercial vehicles, motorcycles, boats and caravans. Contact your local sales representative or visit [www.exide.com](http://www.exide.com) to find out more.

www.norwatt.es

	Tudor	Performances		Dimensions (in mm)			Technical Characteristics			
		Code	Ah	A (EN)	Container	Length	Width	Height	Polarity	Terminals
 <p>High Tech</p>	TA386	38	300	B19	187	136	220	0	3 + Adapt.	B1
	TA456	45	390	B24	237	136	227	0	3 + Adapt.	B1
	TA472	47	450	LB1	207	175	175	0	1	B13
	TA530	53	540	L01	207	175	190	0	1	B13
	TA612	61	600	LB2	242	175	175	0	1	B13
	TA640	64	640	L02	242	175	190	0	1	B13
	TA654	65	580	D23	230	173	222	0	1	Korean B1
	TA722	72	720	LB3	278	175	175	0	1	B13
	TA754	75	630	D26	270	173	222	0	1	B9
	TA755	75	630	D26	270	173	222	1	1	B9
	TA770	77	760	L03	278	175	190	0	1	B13
	TA900	90	720	L04	315	175	190	0	1	B13
	TA954	95	800	D31	306	173	222	0	1	Korean B1
	TA955	95	800	D31	306	173	222	1	1	Korean B1
TA1000	100	900	L05	353	175	190	0	1	B13	
 <p>Technica</p>	TB320	32	270	E01	178	135	225	0	1	B1
	TB356	35	240	B19	187	127	220	0	3	B0
	TB356A	35	240	B19	187	140	220	0	3	Korean B1
	TB357	35	240	B19	187	127	220	1	3	B0
	TB440	44	400	L00	175	175	190	0	1	B13
	TB442	44	420	LB1	207	175	175	0	1	B13
	TB450	45	330	E02	220	135	225	0	1	B1
	TB451	45	330	E02	220	135	225	1	1	B1
	TB454	45	330	B24	237	127	227	0	1	B0
	TB455	45	330	B24	237	127	227	1	1	B0
	TB456	45	330	B24	237	127	227	0	3	B0
	TB457	45	330	B24	237	127	227	1	3	B0
	TB500	50	450	L01	207	175	190	0	1	B13
	TB501	50	450	L01	207	175	190	1	1	B13
	TB504	50	360	D20	200	173	222	0	1	Korean B1
	TB505	50	360	D20	200	173	222	1	1	Korean B1
	TB602	60	540	LB2	242	175	175	0	1	B13
	TB604	60	390	D23	230	173	222	0	1	Korean B1
	TB605	60	390	D23	230	173	222	1	1	Korean B1
	TB608	60	640	G75	230	180	186	1	SAE S	B9
	TB620	62	540	L02	242	175	190	0	1	B13
	TB621	62	540	L02	242	175	190	1	1	B13
	TB704	70	540	D26	270	173	222	0	1	B9
	TB705	70	540	D26	270	173	222	1	1	B9
	TB712	71	670	LB3	278	175	175	0	1	B13
	TB740	74	680	L03	278	175	190	0	1	B13
	TB741	74	680	L03	278	175	190	1	1	B13
	TB758	75	770	G78	260	180	186	1	SAE S	B7
	TB788	78	850	G65	306	192	192	1	1	B1
	TB800	80	640	L04	315	175	190	0	1	B13
TB802	80	700	LB4	315	175	175	0	1	B13	
TB852	85	760	LB5	353	175	175	0	1	B13	
TB950	95	800	L05	353	175	190	0	1	B13	
TB954	95	720	D31	306	173	222	0	1	Korean B1	
TB955	95	720	D31	306	173	222	1	1	Korean B1	
TB1100	110	850	L06	392	175	190	0	1	B13	
 <p>Standard</p>	TC400	40	320	L00	175	175	190	0	1	B13
	TC412	41	370	LB1	207	175	175	0	1	B13
	TC440	44	360	L01	207	175	190	0	1	B13
	TC542	54	500	LB2	242	175	175	0	1	B13
	TC550	55	460	L02	242	175	190	0	1	B13
	TC605	60	440	D26	270	173	222	1	1	B9
	TC652	65	540	LB3	278	175	175	0	1	B13
	TC700	70	640	L03	278	175	190	0	1	B13
	TC900	90	720	L05	353	175	190	0	1	B13
	TC904	90	680	D31	306	173	222	0	1	Korean B1
	TC905	90	680	D31	306	173	222	1	1	Korean B1



Passionate by victory,  
Exide is powering the speed  
of BMW Motorsport.

Official Partner of  
**BMW Motorsport**

**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 fulfil the highest quality standards, while minimising 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.



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**Tudor Battery Finder**

