## **LIGHT VEHICLE** BATTERY SOLUTIONS





Made in Europe by Exide Technologies - Original Equipment Manufacturer

# THE FUTURE

### Bringing OE innovation to the independent aftermarket

Tudor is introducing its next generation of light-vehicle batteries. The range was developed in our original equipment business, and is specially optimised for the most advanced powertrain technologies coming to market now and in the years ahead. It provides unparalleled performance and the reassurance of a leading OE brand. We also offers a suite of professional accessories, allowing workshops to provide customers with the highest level of service.

### An indisputable trend

Very ambitious EU legislation targets restricting  $CO_2$  emissions have incentivised vehicle manufacturers to design much more efficient cars with modern engines, next-generation fuel-saving capabilities such as Start-Stop, battery management systems and smart alternators. The number of Start-Stop vehicles, all of which need OE-compliant AGM and EFB batteries, is increasing dramatically. While conventional powertrains still powered most of the car parc in 2018, the percentage of Start-Stop vehicles in Europe is growing rapidly every year.

### European car parc and changing powertrains

- In 2018, cars with Start-Stop powertrains accounted for approximately 35% of the total car parc in Europe
- By 2024, the majority (61%) of vehicles in the car parc will feature a Start-Stop system (Micro & Mild Hybrids)
- The number of cars with Start-Stop systems will have risen from 1% to 61% in just 15 years
- Significant replacement potential for OE-compliant AGM and EFB batteries in the aftermarket



\*IC = Internal Combustion Engine

Source: Company estimation, EU28+EFTA (European Free Trade Association inc: Iceland, Liechtenstein, Switzerland and Norway)

#### 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, Bentley, Citroen, Dacia, DS, Fiat, Ford, Hyundai,Jaguar, Jeep, Kia, Lancia, Land Rover, Mazda, Mercedes-Benz, Mitsubishi, Nissan, Opel, Peugeot, Piaggio, Porsche, Renault, Suzuki, Toyota, Volkswagen Group, Volvo

70% of European car brands work with our OEM batteries.

### **LIGHT VEHICLE** BATTERY RANGE

		Goost 20	Goost 20								
	AGM P.4		HIGH TECH P.7		TUDOR 70 Standard 70 Standard 700 8 STANDARD P.8						
	📾 START-SI		ස CC	NVENTIONAL							
VEHICLE REQUIREMENTS											
<b>START-STOP</b> POWERTRAIN	Recommended OE Replace	Replace Replace EFB Recommended OE Replacement									
NON START-STOP POWERTRAIN	Unless specified by vehicle manufacturer	Extra life for conventional vehicles	Carbon Boost® Faster recharge for high equipment level	Widest Range to fit almost 100% of car parc	Cost Effective for older and more basic vehicles						
REGENERATIVE BRAKING											
INTENSIVE URBAN USE											
POWER HUNGRY EQUIPMENT											

### **BATTERY** PERFORMANCE

CCA COLD CRANKING AMPERES	 	 	
CHARGE ACCEPTANCE*	 	 	
CYCLE LIFE	 	 	
EXTRA ENERGY**		 	

# TUDOR AGM



### For toughest electrical needs of Start-Stop vehicles

Continuous investments in R&D have allowed us to propose the latest innovative AGM batteries from OE also to the aftermarket. It features the new LifeGrid<sup>®</sup> technology, perfect for advanced Start-Stop systems where the battery needs to be quickly recharged through the energy provided by the regenerative braking system.

The new LifeGrid<sup>®</sup> technology, combined with high-capillarity glass mat separators, advanced lead-tin alloys and unique carbon additives in the active mass, provides consistent power and even longer battery life.

### AGM TECHNOLOGY

### Benefits

- Top charge acceptance
- Higher energy throughput over battery lifespan thanks to new LifeGrid® technology
- 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





Designed and built to endure continuous battery discharge and recharge of Start-Stop systems



Typical pattern of State of Charge during a journey with Start-Stop system

SEALED DOUBLE SECURITY LID with degassing outlet and flame arrestor Unique VALVE REGULATED VENTING	
TALL PLATE GROUP         with high compression         NEGATIVE PLATE         Framed negative plate         POSITIVE PLATE         New framed grid design with high-tech alloy. The high-capillarity glass mat separator provides extra absorption for maximum electrolyte volume and to avoid stratification.	
THE NEW LIFEGRID® NEW Our new grid design provides consistent power and longer battery life	Replace







### **OEM experience for the aftermarket**

First invented by our company in 2008, EFB batteries have come to play an increasingly crucial role for car manufacturers in order to reduce fuel consumption and emissions. Now we bring the latest OE generation to the aftermarket, featuring **Carbon Boost 2.0**.

The new Tudor EFB battery **supports all vehicles, with and without Start-Stop systems**, which have high cycling requirements. When installed in cars with a Start-Stop system, Tudor's new EFB battery shows an unmatched energy recovery and exceptional dynamic charge acceptance. The battery also benefits from a longer overall lifespan, when installed in cars with conventional powertrain.

### **EFB** TECHNOLOGY

### Benefits

- High dynamic charge acceptance over life of battery
- Extra energy for vehicles with and without Start-Stop systems
- Optimised regenerative braking functionality in vehicles with Start-Stop systems – ensuring maximum fuel savings and less CO<sub>2</sub> emissions NEW
- 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



Tudor EFB offers significant performance advantages over a conventional battery also when fitted into a car without Start-Stop system.





## **CARBON BOOST** 2.0

Carbon Boost<sup>®</sup> is our unique recipe for carbon additives on the negative plates that was first developed for our Start-Stop OEM batteries. Continuous investments in R&D, tighter emissions regulations and the increasing demands from the OEMs in regards to charge acceptance and energy availability have lead to the development of the new **Carbon Boost 2.0**.

Carbon Boost 2.0 uses improved carbon additives, combining an optimized surface structure with significantly better conductivity. This enables a better current flow within the battery, resulting in unmatched charge acceptance. It also helps to dissolve the lead sulfate deposits that usually consolidate on a battery's discharged negative plates, reducing its ability to charge back efficiently.



WITHOUT CARBON BOOST The plates are covered with sulfate





WITH CARBON BOOST Sulfate is reduced due to Carbon Boost technology



Coerer TUDOR EFB

The new EFB batteries feature Carbon Boost 2.0. with exceptional dynamic charge acceptance, offering important benefits for drivers, especially in intensive urban driving conditions.

### Benefits

- 75% more energy recovered in the same amount of time compared to older EFB
- Optimized regenerative braking functionality ensuring fuel savings and reduction of CO<sub>2</sub> emissions
- Longer overall lifespan

Carbon Boost was first introduced in the aftermarket High Tech range in 2014. The new Carbon Boost 2.0. brings performance to the next level.

Conton 20

TUDOR

HIGH TECH

### Benefits

DO

- Faster recharging (2 × times faster than other conventional batteries)
- Longer lifespan (higher average state-of-charge throughout battery life)



CHARGING TIME (T)

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.

### **WLTP** (WORLDWIDE HARMONISED LIGHT VEHICLE TEST PROCEDURE)

Strict new EU regulations have imposed a  $\rm CO_2$  emissions limit of 95g/km in vehicle homologation testing by 2021\*.

The WLTP test measures how much battery capacity is depleted in testing and converts it to equivalent fuel consumed and  $CO_2$  emitted. The battery should retain a high percentage of its initial capacity to help car makers avoid being penalized when passing certain thresholds. Since the recharging process accounts for only 8% of test duration, the battery needs to achieve the highest possible energy recovery in a short time. With Carbon Boost 2.0, the dynamic charge acceptance of EFB batteries is maximized, and

- $\bullet$  The battery accepts 75% higher average recharging current than previous generation
- It preserves a higher capacity at the end of the test (2,5 × less state-of-charge loss compared to previous generations)

<sup>\*</sup>Fleet average/bonus included

# TUDOR HIGH TECH Composition

The latest Tudor High Tech with Carbon Boost 2.0 now recharges up to 2 times faster compared to other conventional batteries, thanks to our proprietary application of carbon additives on the negative plates.

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.

The High Tech Carbon Boost battery is designed to withstand extreme temperature, power-hungry electrical equipment and intensive urban driving.

### Benefits

- New recycled plastic components to reduce by over 2.700 tons the emissions of CO<sub>2</sub>, and to save 8 million liters of water and 1.2 million liters of crude oil every year NEW
- Recharges up to 2 times faster compared to other conventional batteries
- Latest plate design for greater robustness and increased resistance to high temperatures
- Updated top label 'CAUTION' label to prevent conventional batteries to be installed on Start-Stop vehicles
- 30% extra starting power

- 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



SUPERIOR EQUIPMENT



#### 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.



### **TUDOR** TECHNICA

### Benefits

- Updated top label –'CAUTION' label to avoid conventional batteries to be installed on Start-Stop vehicles
- 15% extra starting power
- All-round battery for standard use
- Complete range covering almost 100% of car parc
- Original equipment experience inside



# TUDOR Standard X

### TUDOR STANDARD

#### **Benefits**

- Updated top label –'CAUTION' label to avoid conventional batteries to be installed on Start-Stop vehicles
- Economy solution
- Ideal for cars with basic power needs



#### INSTALLATION ADVICE ON TOP LABELS

We are the first in the market to add a distinctive, **'CAUTION' label on our High Tech, Technica and Standard** standard flooded batteries, to ensure that they are only fitted into cars that are **not** equipped with a Start-Stop system.

Trust the battery expert for trouble-free installation and enhanced customer satisfaction.





#### START-STOP





### The reliable secondary battery

Auxiliary batteries power the electrical equipment in certain cars, as a complement to the main starter battery.





### Benefits:

- 3 times higher cycle life
- Long shelf life
- VRLA (valve regulated) for leak-proof security

CAUTION

• Original equipment experience inside

# INNOVATIVE WORKSHOP TOOLS

We offer 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.



### CHARGING

consumers and professionals alike.

**BATTERY** CHARGER Exide chargers can be used on cars, boats and motorcycles, and are ideal for both

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.





### REPLACING

#### BRT-12 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.

\* Professional Motor Mechanic magazine Top Product Award 2013

### NEW

#### BATTERY FINDER ONLINE

The new Online battery finder features a modern interface and all-new user experience, it supports battery selection and fitting for the most comprehensive range of vehicle types such as cars, buses, trucks and motorcycles – plus, for the first time, construction and agricultural vehicles, ATVs, snow mobiles and jet skis.

www.exidegroup.com/eu/en/brand/tudor



# MORE THAN A MANUFACTURER **EXIDE RECYCLES!**



<b>TYPE</b> LIST
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	Tudor	Performances			Dimensions			Technical Characteristics		
	Code	Capacity Ah	CCA A (EN)	Container	L (mm)	W (mm)	H (mm)	Hold down	Polarity	Terminals
	TK508	50	800	G34	260	173	206	B7	ETN 9	1
	TK600	60	680	L02	242	175	190	B13	ETN 0	1
70	TK700	70	760	L03	278	175	190	B13	ETN 0	1
	TK800	80	800	L04	315	175	190	B13	ETN 0	1
AGM	TK950	95	850	L05	353	175	190	B13	ETN 0	1
10000000	TK1050	105	950	L06	392	175	190	B13	ETN 0	1
	TL550	55	480	L01	207	175	190	B13	ETN 0	1
	TL600	60	640	L02	242	175	190	B13	ETN 0	1
	TL604	60	520	D23	230	173	222	BO	ETN 0	1
	TL605	60	520	D23	230	173	222	BO	ETN 1	1
VIII O OINI	TL652	65	650	LB3	278	175	175	B13	ETN 0	1
	TL700	70	720	L03	278	175	190	B13	ETN 0	1
	TL752	75	730	LB4	315	175	175	B13	ETN 0	1
	TL754	75	750	D26	270	173	222	BO	ETN 0	1
EFD	TL800	80	720	L04	315	175	190	B13	ETN 0	1
	TL954	95	800	D31	306	173	222	Korean B1	ETN 0	1
	TL955	95	800	D31	306	173	222	Korean B1	ETN 1	1
	TL1000	100	900	L05	353	175	190	B13	ETN 0	1
	TL1050	105	950	L06	392	175	190	B13	ETN 0	1
	TK091	9	120	C54	150	90	105	BO	ETN 1	M12
	TK111	11	150	C55	150	90	130	BO	ETN 1	M04
	TK131	13	200	C56	150	90	145	BO	ETN 1	M04
	TK143	14	80	C76	150	100	100	BO	ETN 3	Screwed/Lug
AUXILIARY	TK151	15	200	C56	150	90	145	BO	ETN 1	Small taper post

#### START-STOP CONVENTIONAL

	Tudor	Perforn	nances	Dimensions			Technical Characteristics			
	Code	Capacity Ah	CCA A (FN)	Container	L (mm)	W (mm)	H (mm)	Hold down	Polarity	Terminals
	TA406	40	350	B19	187	127	220	B1	ETN 0	JIS taper post
	TA456	45	390	B24	237	136	227	B1	ETN 0	3+Adapter
	TA472	47	450	LB1	207	175	175	B13	ETN 0	1
	TA530	53	540	L01	207	175	190	B13	ETN 0	1
	TA612	60	600	LO2	242	1/5	190	B13	EIN1 ETNO	1
	TA640	64	640	1.02	242	175	190	B13	ETN 0	1
	TA654	65	580	D23	230	173	222	Korean B1	ETN 0	1
	TA680	68	650	S68	277	175	190	B13/Adapter	ETN 0	1
	TA681	68	650	S68	277	175	190	B13/Adapter	ETN 1	1
1 AAAAA	TA722	72	720	LB3	278	175	175	B13	ETN 0	1
HIGH TECH	TA754	75	630	D26	270	173	222	Korean B1+B6	ETN 0	1
	TA755	75	630	D26	270	173	222	Korean B1+B6	ETN 1	1
	TA770	05	760	LU3	2/8	175	190	B13 p12	ETNO	1
	TA052	90	720	1.04	315	175	190	B13	ETN 0	1
	TA954	95	800	D31	306	173	222	Korean B1	ETN 0	1
	TA955	95	800	D31	306	173	222	Korean B1	ETN 1	1
	TA1000	100	900	L05	353	175	190	B13	ETN 0	1
	TA1050	105	850	LH4	315	175	205	B13	ETN 0	1
	TB320	32	270	E01	178	135	225	B1	ETN 0	1
	TB356	35	240	B19	187	136	220	B0	ETN 0	3
	TP257	35	240	B19 B10	187	130	220	Korean BT Long	ETN U	3
	TB337	44	400	100	175	175	190	B13	ETN I FTN 0	1
	TB442	44	420	LB1	207	175	175	B13	ETN 0	1
	TB450	45	330	E02	220	135	225	B1	ETN 0	1
	TB451	45	330	E02	220	135	225	B1	ETN 1	1
	TB454	45	330	B24	237	136	227	BO	ETN 0	1
	TB455	45	330	B24	237	136	227	BO	ETN 1	1
	TB456	45	330	B24	237	136	227	BO	EIN 0	3
	TB457	45	330	B24	237	130	100	BU B13	ETNI	1
	TB500	50	450	1.01	207	175	190	B13	ETN 1	1
201	TB504	50	360	D20	200	173	222	Korean B1	ETN 0	1
A second	TB505	50	360	D20	200	173	222	Korean B1	ETN 1	1
And and a second second second	TB558	55	620	575	230	180	186	В7	ETN 1	SAE S side Terminal 3/8"
	TB602	60	540	LB2	242	175	175	B13	ETN 0	1
X U S	TB604	60	480	D23	230	173	222	Korean B1	ETN 0	1
TECUNICA	TB605	60	480	D23	230	173	222	Korean B1	ETN 1	1
TECHNICA	TB620	62	540	L02	242	175	190	B13	ETN 0	1
	TB021	02 70	540	LUZ D26	242	1/5	190	BI3 Koroon B1+B6	ETNIO	1
	TB704	70	540	D20	270	173	222	Korean B1+B6	ETN 1	1
	TB708	70	740	G78	260	180	186	B7	ETN 1	SAE S side
	TP712	70	670	1.02	200	175	175	D7	ETNIO	Terminal 3/8"
	TB740	74	680	1.03	278	175	190	B13	ETN 0	1
	TB741	74	680	L03	278	175	190	B13	ETN 1	1
	TB800	80	640	L04	315	175	190	B13	ETN 0	1
	TB802	80	700	LB4	315	175	175	B13	ETN 0	1
	TB852	85	760	LB5	353	175	175	B13	ETN 0	1
	TB858	85	800	G65	306	192	192	B1	ETN 1	EN taper post
	TB950	95	800	LU5	353	175	190	BI3 Koroop B1	EINU	1
	TB954	95	760	D31	306	173	222	Korean B1	ETN U	1
	TB1000	100	720	LH4	315	175	205	B13	ETN 0	1
	TB1100	110	850	L06	392	175	190	B13	ETN 0	1
	TC400	40	320	L00	175	175	190	B13	ETN 0	1
	TC412	41	370	LB1	207	175	175	B13	ETN 0	1
	TC440	44	360	L01	207	175	190	B13	ETN 0	1
	TC542	54	500	LB2	242	175	175	B13	ETN 0	1
Barriara versa a	TC550	55	460	LO2	242	175	190	B13	ETN 0	1
	TC652	60	440	D26	270	173	175	Korean BT+B6	EINI	1
	TC700	70	640	1.03	278	175	190	B13	ETNO	1
Standard Standard	TC900	90	720	L05	353	175	190	B13	ETN 0	1
STANDARD	TC904	90	680	D31	306	173	222	Korean B1	ETN 0	1
×	TC905	90	680	D31	306	173	222	Korean B1	ETN 1	1

**Tudor**<sup>®</sup> is a leading battery brand of Exide Technologies. **Exide Technologies**, with operations in more than 80 countries and more than 130 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.

- Global headquarters
   Manufacturing plants
   Recycling plants
   Distribution centers
- Main sales offices
- R&D centres

Manufacturing plants ISO 9001 and ISO 14001 certified Automotive plants IATF 16949 certified

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