

# Exide Training Graphic Assets

## Module 06 | (ML) Marine Leisure Batteries

Edition 2  
Revised 05.2021



# Introduction

## Module 06 | (ML) Marine Leisure Batteries

### Exide Lead-Acid Batteries Training Modules

- Module 01 | Lead-Acid Battery Basics
- Module 02 | Battery Evolution and the Environment
- Module 03 | (LV) Light Vehicle Batteries
- Module 04 | (CV) Commercial Vehicle Batteries
- Module 05 | (MC) Motorcycle Batteries
- Module 06 | (ML) Marine Leisure Batteries
- Module 07 | Battery Testing and Installation
- Module 08 | Battery Handling, Storage and Recycling
- Module 09 | Battery Aftermarket

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# Marine Leisure European Market

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**5.7 million**  
recreational boats\*



**5.4 million**  
leisure vehicles\*

\*International Boat Industry (2015) and  
European Caravan Federation (2018)



**Single Starter Battery**

for boat and motorhome engine starting

**One or more Supply Batteries**

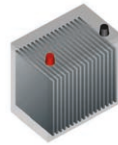
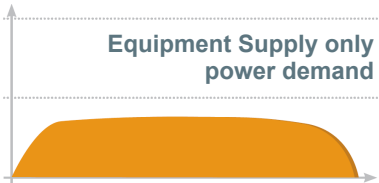
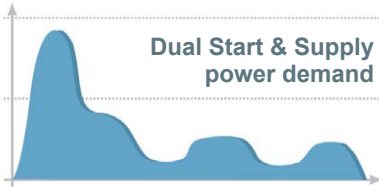
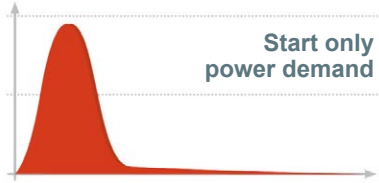
for lighting, communication and comfort loads

Pre-Covid-19 pandemic figures

**Future trends suggest significant increase in this type of activity**

# Comparing Starter and Supply Batteries

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### Starter Battery

Thinner plates allow for more plates in the battery. Better for short bursts of high energy needed for starting.



### Supply (Deep Cycle) Batteries

Thicker plates improve the cyclability for deeper and longer discharge.






















### Dual batteries for starting and supply needs

Available as Dual, Dual AGM, Dual Orbital AGM and Dual EFB

### Equipment batteries supply needs

Available as Equipment Standard Flooded, Equipment AGM, Equipment GEL and Equipment Li-Ion for greater Depth of Discharge

Caravan 		 	Cabin lighting and appliances	 	Cabin lighting and appliances
Motorhome 	 SLI	  	Engine cranking plus cabin lighting and appliances	 	Cabin lighting and appliances
Boat 	 SLI	  	Engine cranking plus cabin lighting and appliances	 	+ specialist marine equipment

SLI = Starting, Lighting (standard vehicle), and Ignition

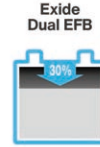
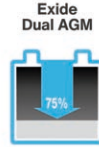
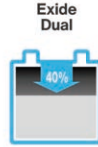
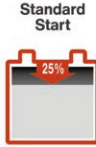
# Supply Batteries – energy needs formula

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### Average life



based on recommended  
Depth of Discharge (DoD)



### Recommended safe levels of battery discharge\*

Beyond these recommended levels: Deeper discharge = shorter average life. Shallower discharge = longer average life. \*Estimates based on depth of discharge at 20°C

### Supply needs calculator

Add up all devices (W) and estimate usage (h) between recharge

$$W \times h = Wh$$

Watts hours      Watt hours

25 × 4 = 100

300 × 1 = 300

40 × 3 = 120

35 × 2 = 70

80 × 6 = 480

Total devices = 1070

× 1.2 Safety margin + 214

Required Wh = 1284

### Exide supply battery options

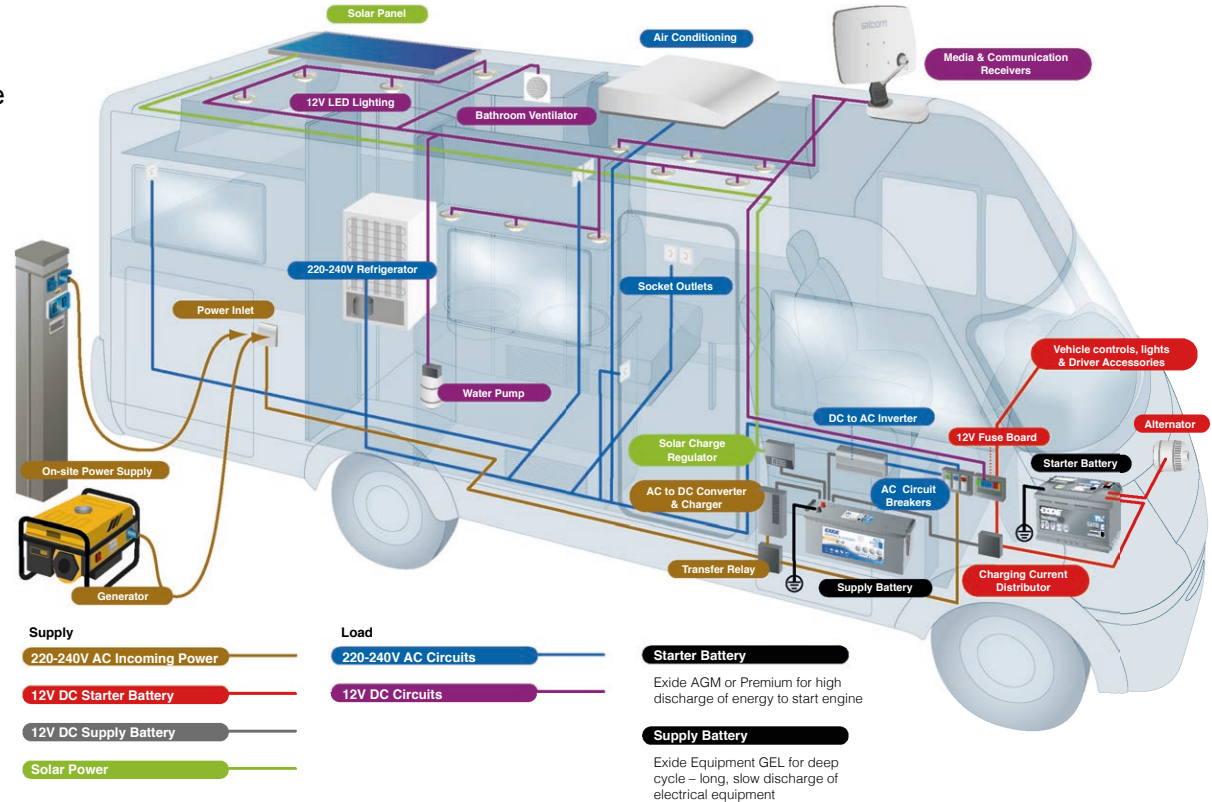
Exide DUAL	Exide Dual AGM	Exide Dual EFB	Exide Equipment AGM	Exide Equipment GEL	Exide Equipment Li-Ion
<b>450Wh/95Ah</b>	<b>900Wh/100Ah</b>	<b>850Wh/100Ah</b>	<b>800Wh/95Ah</b>	<b>1300Wh/120Ah</b>	<b>1600Wh/125Ah</b>
Number of batteries and total weight 3 × 23kg = 69kg	Number of batteries and total weight 2 × 32kg = 64kg	Number of batteries and total weight 2 × 26kg = 52kg	Number of batteries and total weight 2 × 26kg = 52kg	Number of batteries and total weight 1 × 39kg = 39kg	Number of batteries and total weight 1 × 15kg = 15kg
	Fast recharge time	Maximum charge acceptance		Smaller volume/weight ratio	Ultra light-weight with fastest recharge
	DNV GL certification			DNV GL certification	
<b>1350Wh</b>	<b>1800Wh</b>	<b>1700Wh</b>	<b>1600Wh</b>	<b>1300Wh</b>	<b>1600Wh</b>

The rated energy in Wh is calculated based on the safe DoD indicated above: 100Ah in AGM is equal to 900Wh because of allowed DoD is 75% (otherwise 100Ah at 12V would be 1200Wh)

# Electrical systems in a typical leisure vehicle

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Similar devices are found in a marine vessel with the addition of navigation equipment, electric winches and thrusters.



# Independent battery testing and verification

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DNV is the world's largest classification society, providing services for sea-going vessels.

Batteries approved for use at sea:  
Exide Start AGM, Dual AGM and Equipment GEL



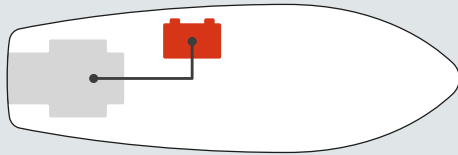
Some Exide leisure batteries are  
NCC verified and approved for  
use in motorhomes and  
caravans.



# Battery configurations for recreational boats

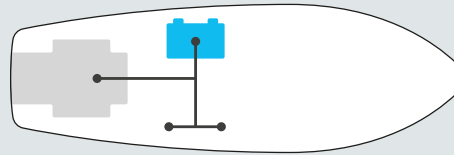
## Module 06 | (ML) Marine Leisure Batteries

### Engine only



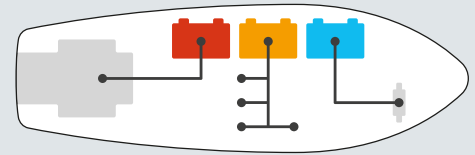
Single or bank of batteries provides engine starting power

### Engine & Equipment



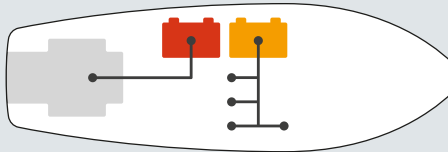
Single or bank of Dual batteries provide engine starting and equipment supply power

### Engine + Equipment + Other



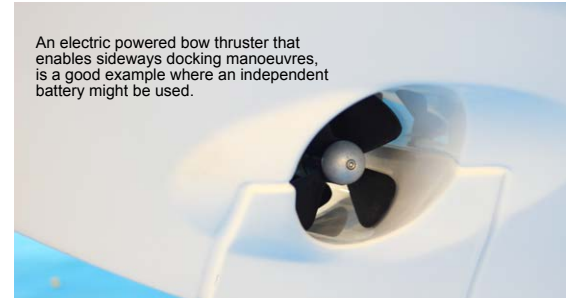
In addition to separate starter and supply batteries, independent batteries can provide direct power for high-demands of electrical winches, thrusters or trolling motors.

### Engine + Equipment



Separate batteries provide engine starting and equipment supply power

An electric powered bow thruster that enables sideways docking manoeuvres, is a good example where an independent battery might be used.





# Exide ML Start Batteries





## Module 06 | (ML) Marine Leisure Batteries

### Start

Standard flooded with plug venting.



#### Benefits:






-  Superior starting power
-  Absolutely maintenance free
-  Very low gas emission  
Spark arrestor & central degassing  
for safe gas conduction
-  Slight inclination

### Start AGM

Absorbent Glass Mat flat or orbital with VRLA venting.



#### Benefits:

-  Superior starting power
-  Absolutely maintenance free  
Suitable for long resting periods
-  Internal gas recombination  
No location constraints (cabin safe)  
Safe and clean (spark & spill-proof)
-  High inclination  
High vibration & tilt resistant
-  Up to 50% faster recharging



# Exide Dual Batteries

## Module 06 | (ML) Marine Leisure Batteries

### Dual

Standard flooded with central degassing



**Benefits:**



Start and supply



Low maintenance



Low gas emission  
To be installed in special container



Upright mount  
Medium vibration & tilt resistant



Top indicator for electrolyte & charge inspection (except ER660)

### Dual AGM

Absorbent Glass Mat flat or orbital with VRLA venting.



**Benefits:**



Extra start & supply



Absolutely maintenance free  
Suitable for long resting periods



Faster recharge  
Up to 50% faster recharging



High inclination  
High vibration & tilt resistant



Internal gas recombination  
No location constraints (cabin safe)  
Safe and clean (spark & spill-proof)

### Dual EFB

Enhanced Flooded Battery



**Benefits:**



Extra start & supply



Maintenance free



Maximum Charge Acceptance

# Exide Equipment Batteries

## Module 06 | (ML) Marine Leisure Batteries

### Equipment

Standard flooded with glass mat separators and plug venting.



#### Benefits:



- Superior cycling
- Low maintenance
- Slight inclination  
Medium vibration & tilt resistant
- Recommend installation in special compartments (due to gassing)

### Equipment AGM

Absorbent Glass Mat



#### Benefits:

- Superior cycling
- Internal gas recombination
- Maintenance free
- High inclination
- Faster recharging

### Equipment GEL

GEL (electrolyte fixed in gel) with venting.



#### Benefits:



- Extreme cycling (2 x AGM)
- Internal gas recombination  
No location constraints (cabin safe)  
Safe and clean (spark & spill-proof)
- High inclination  
High vibration & tilt resistant
- Absolutely maintenance free  
Suitable for long resting periods
- High energy density  
Space saving of up to 30%

### Equipment Li-Ion

Lithium-Ion technology

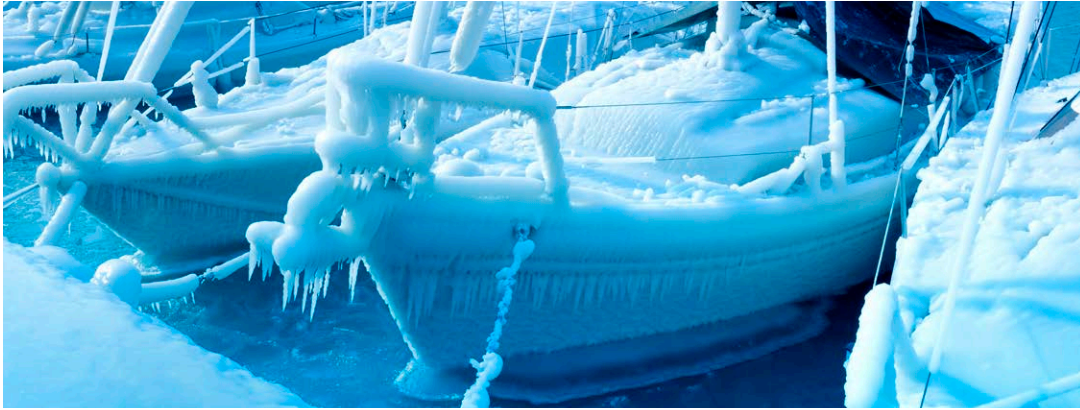


#### Benefits:

- Ultra light weight
- Extreme cycling (5 x GEL)
- Up to 50% faster recharging
- Ready to use
- Multiple positions
- Absolutely maintenance free  
Suitable for long resting periods

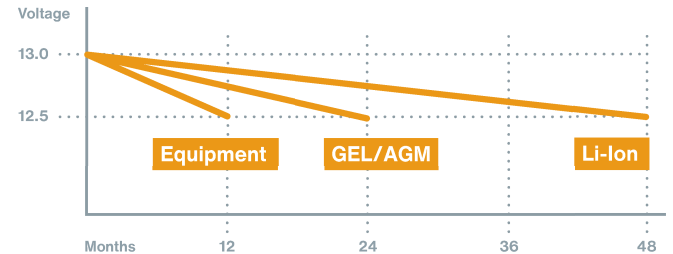
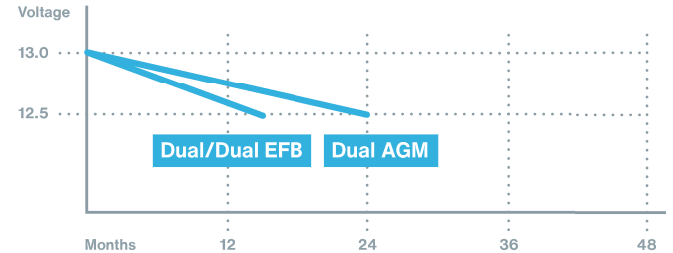
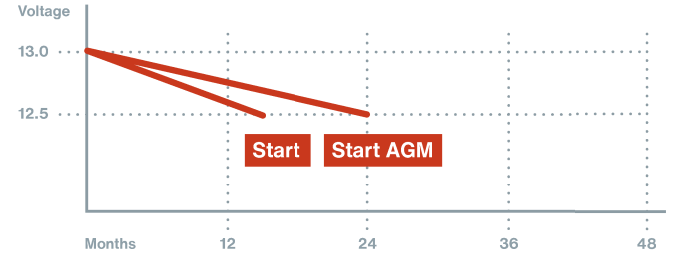
# Seasonal use – winter battery care

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- Fully charge batteries before any prolonged period of inactivity.
- Disconnect battery to avoid any parasite load (a small but continuous discharging load).
- Store as close as possible to an ideal temperature of 20° C. This may require removal from vehicle or vessel.
- Avoid battery freezing causing permanent damage.
- Connect battery to a trickle charger or top-up charge monthly.
- Only use a high quality charger designed for the specific battery type i.e. AGM, EFB, GEL or Li-Ion.

### Shelf life at 20°



# Exide Technical Guide Lead-Acid Batteries

Exide Technologies has been at the forefront of Lead-Acid battery innovation since 1880 to the current day. The company was the inventor of the world's first starter battery in 1912 and more recently the first manufacturer to introduce AGM and EFB battery technology into the European aftermarket.

Exide's expertise and knowledge enabled the publication of the easy-to-understand Exide Technical Guide. The latest edition is available to view and download as a PDF at:

[www.exidegroup.media/techguide](http://www.exidegroup.media/techguide)

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