

# Marshall

TO SERVE AND PROTECT



Comprehensive Power Solutions for Every Application

Marshall batteries offers the most comprehensive range of batteries for automotive, marine, traction, industrial, telecommunication, security, UPS, solar, and Hybrid vehicle batteries. Marshall automotive and marine batteries are produced by world's largest vehicle battery manufacturer in Spain, Germany and South Korea supplying approximately 140 million batteries every year to bespoke car manufacturers and aftermarket retailers.

## TECHNOLOGY ADVANTAGE

Marshall batteries are manufactured utilizing patented gas/liquid separator technology which provides for one of the lowest self-discharge rates, making it the most convenient, maintenance free battery for consumer usage. These batteries also take advantage of state of the art DURAFRAME stamped grid technology frame design allowing for superior power with increased durability when compared to the competition.

## CONFIDENCE IN CONSISTENT QUALITY

Marshall batteries are manufactured utilizing a strict quality management system where quality control is carried out every 2 hours where an 11-step quality control process, including work monitoring, charge-discharge testing, and final product testing, is performed to eliminate production defects and ensure superior performing products consistently and reliably. Marshall batteries are manufactured in facilities with approved ISO 9001, ISO 14001, ISO/TS 16949 certificates and in accordance to EN 50342-1 as well as numerous other regulatory and government quality of excellence awards



## OFFERING MOST ADVANCED PRODUCTS

In order to prepare for the upcoming trends and demands of future consumers, Marshall batteries place great importance on continuous development of their product portfolio through improvement of their manufacturing procedures and technologies leading to cutting edge products with a wide range of application offered.

In response to the growing demands of customers, Marshall batteries are continuously being developed to include batteries for Taxi, Automotive electronic accessories, Recreational Vehicles, Telecommunications, Security, UPS, Solar, and Hybrid Electric cars, a core technology empowering many of the clean driven applications. We are excited to be offering the aftermarket battery for many of today's Hybrid Electric vehicles commonly used today.

# DURAFRAME GRID



Presenting DURAFrame® Grid Technology: the key to a more powerful, more durable and more reliable battery.

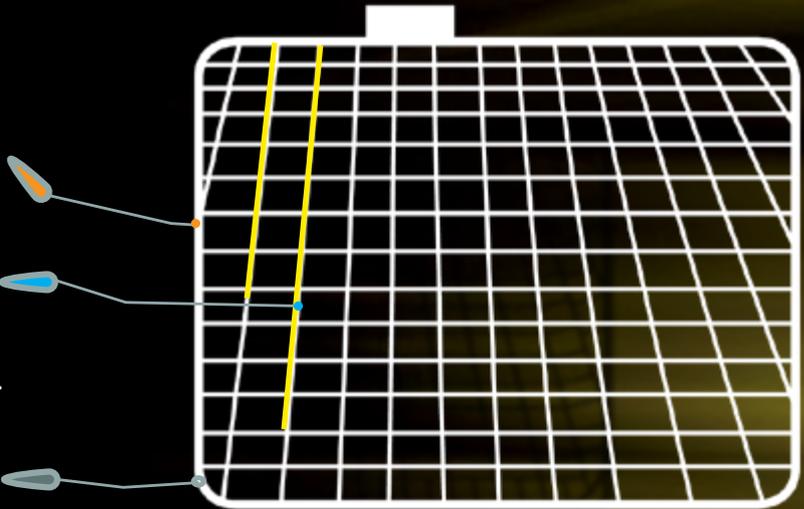
Grids are the backbone of a battery. And just like a backbone, a better structure means better performance. Today, there's no better grid than DURAFRAME.

DURAFRAME is a more advanced kind of positive grid technology that improves the performance of the car battery. It's designed to combat the common causes of premature battery failure.

**Structurally strong.**  
Built for strength, DURAFRAME patented grid technology is up to 66% more durable and more corrosion-resistant than other grid designs.

**Patterned for power.**  
The DURAFRAME grid design provides superior cranking power with up to 70% better electrical flow than other grid technologies.

**Clean construction.**  
DURAFRAME manufacturing uses 20% less energy and produces 20% fewer greenhouse gases than other manufacturing methods.



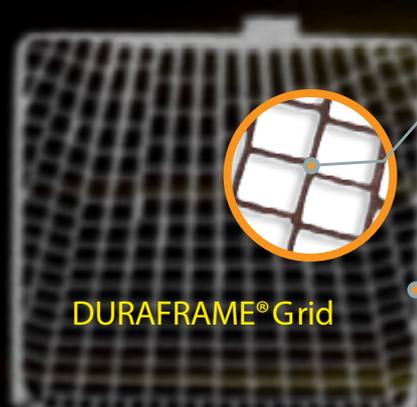
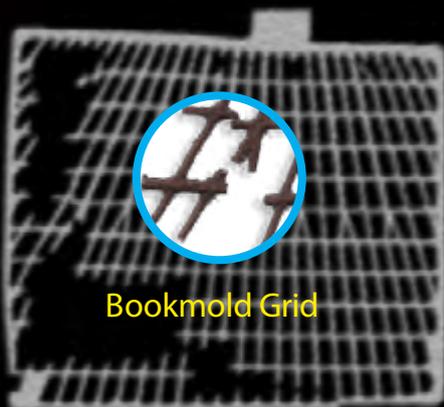
## SUPERIOR ELECTRICAL FLOW & POWER

Electricity flows in a battery as electrons travel along the grid. DURAFRAME grids are designed with a straight, wide pathway, while the optimized pattern provides the shortest, most direct route possible for electrons to move freely and efficiently.

In fact, the flow of electricity through DURAFRAME grids was compared with other grid types through computer simulation. DURAFRAME grid technology delivered better electrical flow than other grids which results in higher power yield.

## PROVEN DURABILITY IN EXTREME CONDITIONS

We conducted a long-term, side-by-side test in the heat and constant stop-and-go conditions of taxicabs. After 40,000 miles, the DURAFRAME grid was still going strong while the other grid showed significant damage.



### Less Corrosion

The precision of the DURAFRAME manufacturing process creates a more durable metal, which helps minimize corrosion.

### Fewer Fractures

Real-world testing proves that a DURAFRAME grid will suffer fewer fractures than other grid designs.

## COMPREHENSIVE TECHNOLOGY RANGE

### START-STOP

This market leading product is designed especially for high performance, premium Start-Stop vehicles with regenerative braking and other fuel-saving technologies. With this battery they will perform at their peak, time and time again.



- \* Start-Stop Applications
- \* (AGM & EFB) Technology
- \* Spill-Proof
- \* 3X Cycle Life
- \* Corrosion Resistant acid stratification
- \* Meets / Exceeds OE Requirements
- \* MADE IN GERMANY



### THERMOTEC

Best all-round replacement battery with best in class starting power and cold start performance with large load capacity. This high quality product is ideal for all vehicle types capable of handling extreme heat and cold climates.



- \* 50% Thicker Grids
- \* 30% Longer Life
- \* Heatshield Technology
- \* Duraframe Grid Technology
- \* Silver Calcium
- \* Meets OE Requirements
- \* MADE IN SPAIN & GERMANY



With Heatshield Technology



### MAGNUM-PRO

Excellent workhorse product for cars with standard levels of electrical equipment demanding superior starting, consistent power offering absolute reliability.

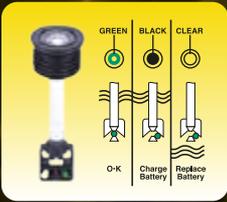


- \* Standard Grid Plates
- \* Duraframe Grid Technology
- \* 100% Cold Cranking Power
- \* Meets OE Requirements
- \* MADE IN SPAIN & GERMANY



# AUTOMOTIVE : MAGNUM

1



## Hydrometer

•at full charge, the electrolyte specific gravity is 1.280 while at 50% of charge considered the minimum serviceable condition, the specific gravity is typically 1.220, In a typical situation when the specific gravity drops to 1.100, the battery is fully discharged.

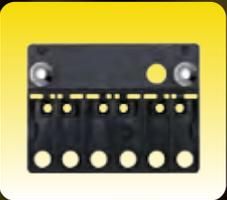
2



## Heat-Sealed Covers

•prevents leakage and contamination.  
•adds to case strength and rigidity.  
•include permanent flame arresters to prevent an accidental explosion from external sparks or flame.  
•have hydrometer built in for faster checking.

3



## Exclusive Patented Liquid Gas Separator

•prevents electrolyte losses by collecting electrolyte vapor and returning liquid to the reservoir.  
•vents allow the battery to "breathe" during temperature changes and charging

5



## Low-Resistance Envelope Separators

•encapsulate negative plates  
•improve vibration durability  
•prevent "treering" and internal shorting between positive and negative plates

6



## Centered Cast-on Plate Straps

•stronger than the thinner gas-burned conventional connectors.  
•reduce the lever action movement resulting from road shock.

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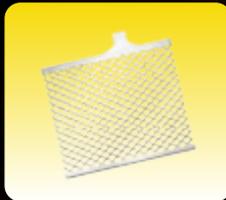
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## Flame Arrester

•safety system  
•prevents possibility of explosion from spark of outside  
•minimizes acid-leakage  
•prevents inflow of dust

7



## Wrought Lead-Calcium Grids

•offer considerable strength  
•resistant to grid corrosion  
•over-charge resistant  
•minimal gassing and water usage  
•less self-discharge  
•resist thermal runaway

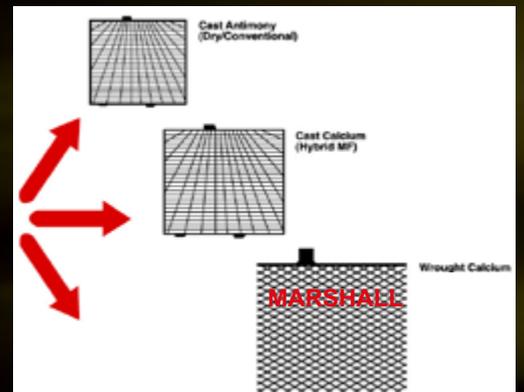
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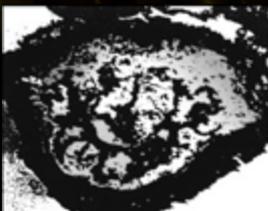
## Polypropylene Case

•reinforced design is precisely tailored to support the battery elements for resistance to vibration and road shock damage.  
•material is light weight, exceptionally strong, durable and resistant to handling and impact damage.

CAST GRID TECHNOLOGY		WROUGHT GRID TECHNOLOGY
TYPE	Cast Antimony (Dry/Conventional)	Cast Calcium (Hybrid MF) <b>MARSHALL</b>
Technology	<ul style="list-style-type: none"> <li>•Large Grain Size</li> <li>•Poor Resistance to Deep Corrosion</li> <li>•Poor Resistance to "Buckling"</li> <li>•Loss of Physical &amp; Electrical Integrity</li> <li>•Poor Resistance to Cycling</li> <li>•Poor High Temperature Performance</li> </ul>	<ul style="list-style-type: none"> <li>•Fine Grain Structure</li> <li>•High Resistance to Corrosion</li> <li>•High Resistance to "Buckling"</li> <li>•Retain Physical &amp; Electrical Integrity</li> <li>•Eliminates Electro Chemical Effect of Arsenic-Antimony(Gassing, Water Loss, Self-Discharge)</li> <li>•Improved High Temperature Performance</li> </ul>
<b>ONE YEAR GRID COMPARISON</b>		
	Cast Grid	Wrought Grid
	<ul style="list-style-type: none"> <li>•Deep Penetrating Corrosion</li> <li>•Reduced Electrical Performance</li> <li>•Reduced Physical Strength (Broken Grid Wire-Loss of Electrical Contact)</li> </ul>	<ul style="list-style-type: none"> <li>•No Deep Intergranular Corrosion</li> <li>•No Loss in Performance</li> </ul>

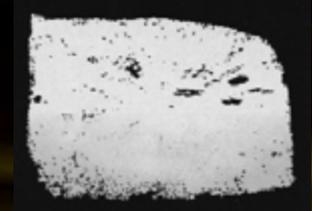


## Cast



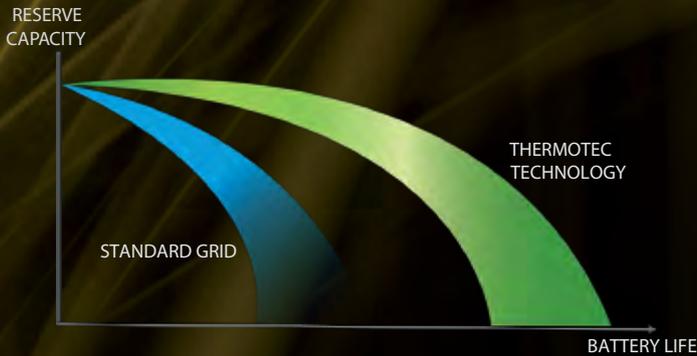
## ONE YEAR GRID CORROSION

## Marshall Wrought



# AUTOMOTIVE : THERMOTEC

## DESIGNED TO WITHSTAND EXTREME CLIMATES



Marshall Thermotec batteries are manufactured utilizing Silver-Calcium impregnated DURAFRAME grid technology which enhance the battery's ability to resist the destructive corrosive effects of harsh climate temperatures. This is further enhanced by designing and utilizing thicker plates and separators to ensure maximum protection against plate corrosion and premature battery failure. A second feature of Silver-Calcium alloy is its enhanced electrical conductance which results in greater starting power for today's highly accessorized vehicles. In short, THERMOTEC batteries are simply the best all round solution for vehicle owners driving in hot climate regions providing superior power and enhanced durability and battery life !

\* **30% longer battery life**

\* **25% Increased Power**

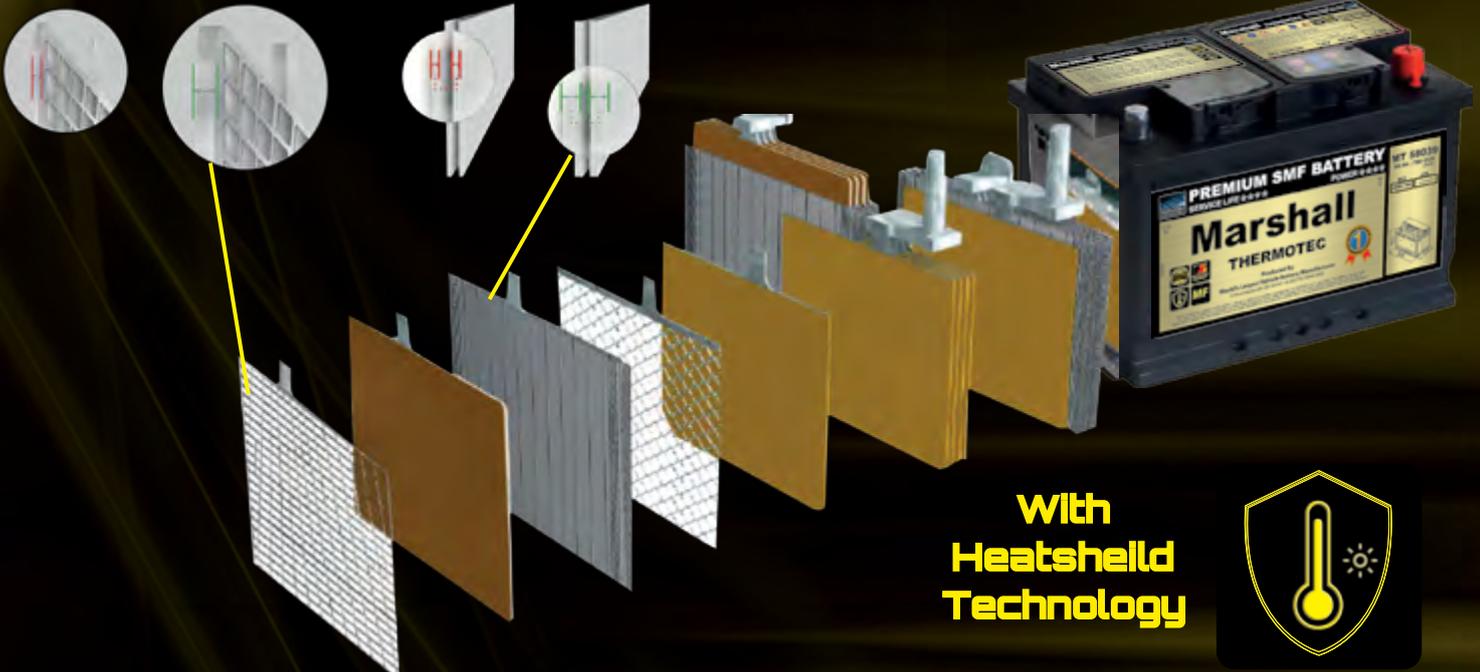
\* **Meets OE Performance Standards**

\* **Made in Spain & Germany**

**+50%**

**+50%**

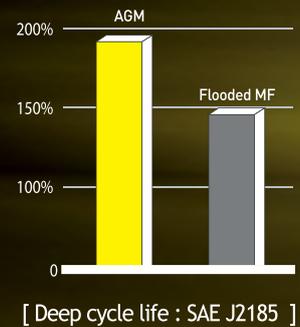
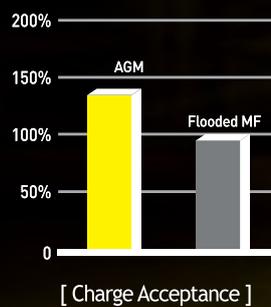
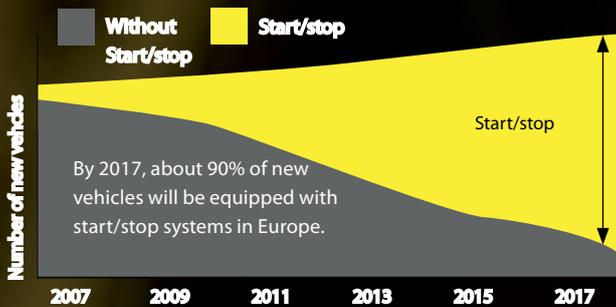
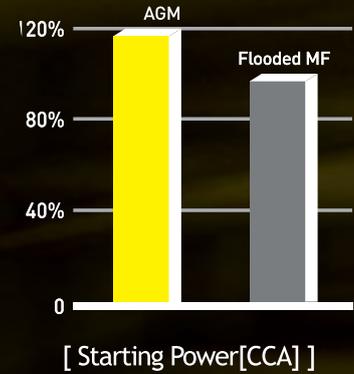
STANDARD



# AUTOMOTIVE : START-STOP

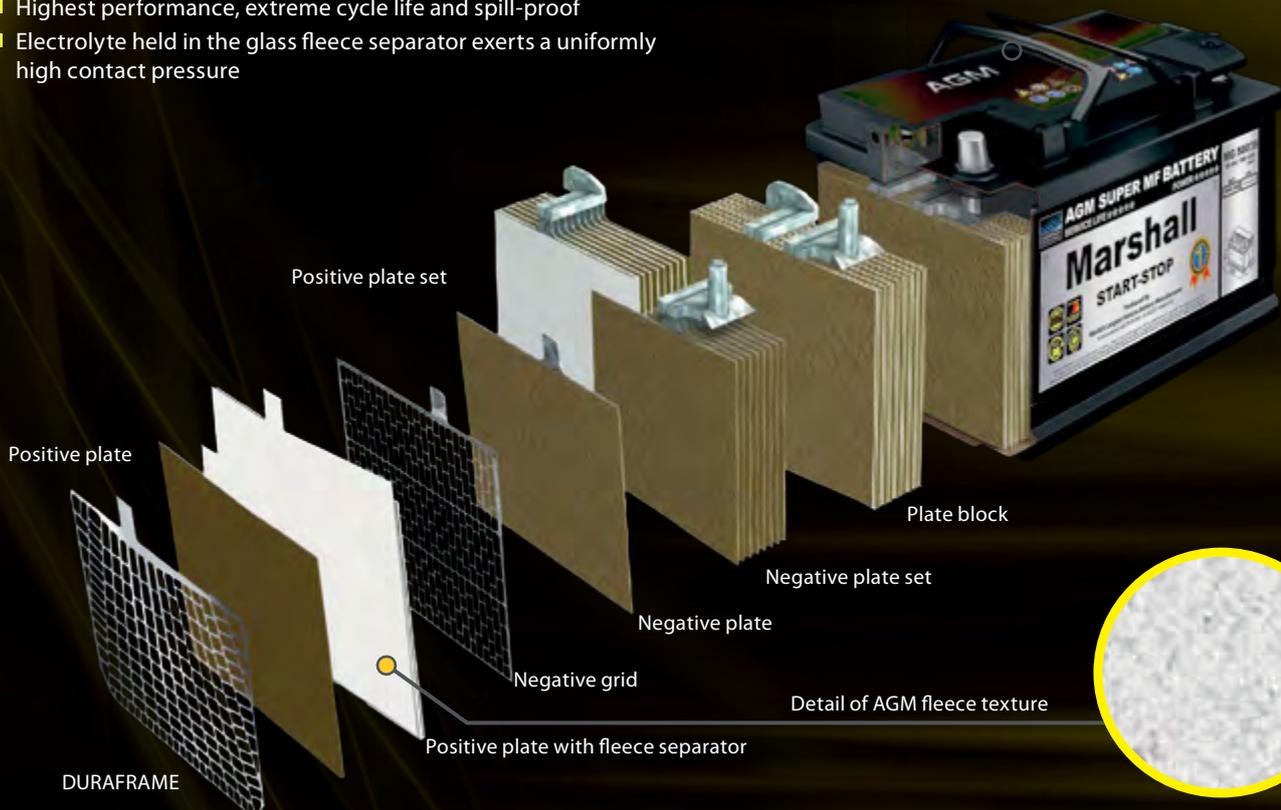
## ULTIMATE POWER & DURABILITY

Characteristics		start-stop	Starting
		AGM	Flooded MF
Main Application	Engine Start-Stop	○	X
	Regenerative Braking	○	X
Battery Technology	Enhanced Plate	○	X
	AGM Separator	○	X
	Gas Recombination	○	X
	Plate-group Compression	High	None
Performance	Starting Power	120%	100%
	Charge Acceptance	140%	100%
Cycle Life		400%	100%
Safety	Handling	100% leak-proof (Spill-proof to 180°)	Spill-proof to 45°
	Maintenance Free	Best	Very Good
Environment Friendly	Fuel Efficiency	5% ~ 10%	None
	CO <sub>2</sub> Savings	Best	Standard



- Constructed with advanced Absorbent Glass Mat (AGM) technology
- Perfect for vehicles with advanced technology like regenerative braking
- AGM technology prevents corrosion due to acid stratification
- Highest performance, extreme cycle life and spill-proof
- Electrolyte held in the glass fleece separator exerts a uniformly high contact pressure

**\* Made in Germany**



# AUTOMOTIVE : COMMERCIAL

## FULL RANGE OF COMMERCIAL TRUCK BATTERIES

Labyrinth-lid technology

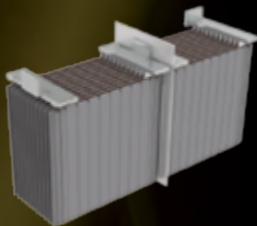
returns condensed water to the battery



Integrated single point venting in the Labyrinth lid allows safe discharge of any gasses produced, while integral flame arrestors protect the battery from sparks and flames.



Robust frame connections to protect against vibration and cracking in rough road conditions ...



The robust safety caps work like a breakwater inside the battery and ensure maximum spill protection even when faced with strong vibrations. maximum spill protection.



MADE IN GERMANY



**NICKEL METAL HYDRIDE (NiMH) BATTERY  
HYBRID VEHICLE TECHNOLOGY**



Item	Unit	Value	
Model	—	ET72650	
Nominal Voltage	V	7.2	
Nominal Capacity	Ah	6.5	
Rated Capacity	Ah	6.0	
Dimensions	Width	mm	285
	Height	mm	106
	Thickness	mm	19.6
Weight (appro.)	Kg	1.10	
Resistance (appro)	mΩ	18	
Peak charge current (25°C)	A	90A	
Peak discharge current (25°C)	A	120A	
Work Temperature	Charge	°C	-20 ~ +40
	Discharge	°C	-20 ~ +50



# MARINE & RECREATIONAL

## OPTIMA AGM & SpirelCell Technology

OPTIMA® is a registered trademark of Johnson Controls International and is manufactured by JCI.

### OPTIMA® BlueTop®

The BLUETOP high-performance AGM battery is the perfect marine battery for boats with trolling motors, extensive electronic systems, and works well for RVs with creature comforts that tend to drain batteries quickly.



### OPTIMA® YellowTop®

The YELLOWTOP high-performance AGM battery is ideal for trucks with winches, vehicles with high-demand electronics and audio systems, commercial vehicles and heavy equipment. It also functions well as a forklift battery, tractor battery, or for other applications.



### OPTIMA® RedTop®

The REDTOP high-performance AGM battery is ideal for trucks, SUVs, hot rods, street cars and other high-performance applications that require a spill-proof starting battery.



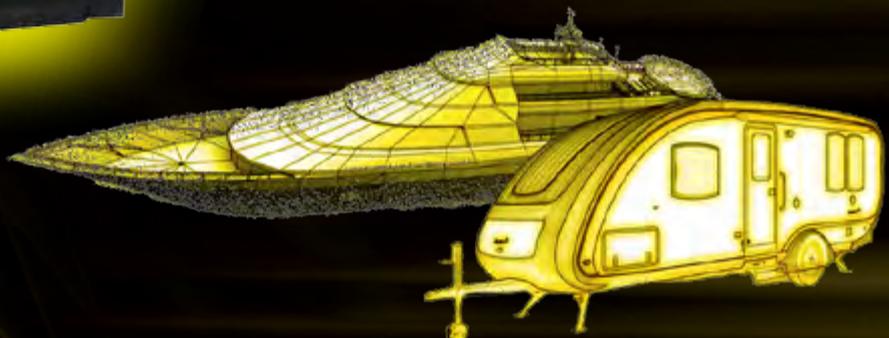
## START-STOP DUAL USE

Ideal for high-performance electric boats, yachts and motorhomes AGM technology for superb shock and vibration resistance  
Exceptionally long lasting: up to eight times the cyclic stability of conventional batteries (up to 800 cycles @50 % DOD).  
Tough, leak-proof construction Ideal to power your heavy loaded electrical systems and traction applications



## MAGNUM MARINE

Professional Starter is purpose made for all marine starter applications, it can also service minimal electrical system requirements, such as inflatable boats and smaller rigged-hull boats. With a high energy output, it delivers outstanding performance, time after time, with no maintenance required.



## WARRANTY

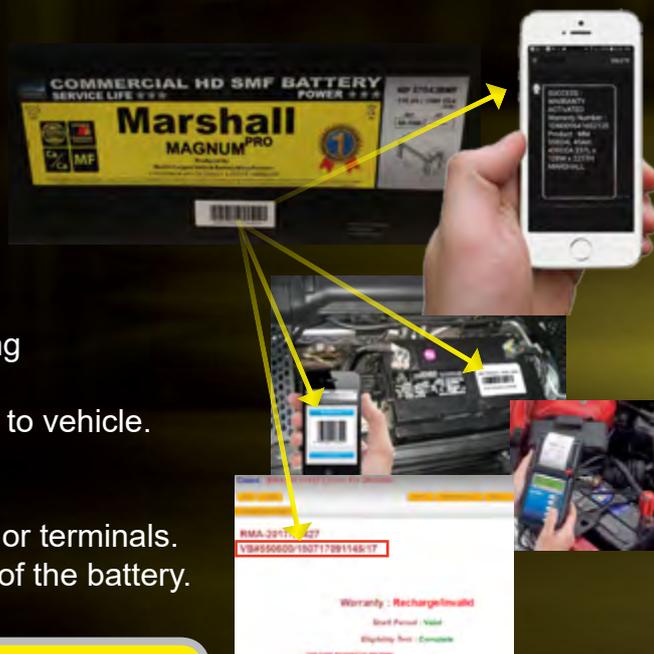
Marshall Batteries are backed by Cutting Edge, Data Driven Warranty System



All Batteries are supplied with warranty periods based on the climate conditions of the country in which they are sold in. For example in North America and Europe batteries generally have 3-5 years warranty where as in harsher climates such as gulf countries where the summer temperatures can reach as high as 50 degrees celcius, the warranty period can range from 12 months or higher depending on the range and technology chosen. To accurately track product warranty, all Marshall batteries are supplied with a registered unique serial number which can be found affixed on the battery as well as on the Instruction for Use which accompanies every battery. Once the battery is purchased and installed, the warranty must be registered via SMS or by the service center installing the battery so that the start of the product warranty can be formally initiated. If the battery fails prior to warranty expiry period, the battery maybe replaced or prorated credit applied depending on the terms of warranty for the particular battery bought.

**The following conditions void the battery warranty which is intended for private vehicle:**

1. Missing / miss-matching warranty serial number on battery and the one on IFU / Warranty Card.
2. Tampering or Evidence of removal or warranty serial number from battery .
3. Vehicle alternator or any other electrical defect affecting battery charging or proper functioning.
4. Wrong application of battery size/capacity/technology to vehicle.
5. Commercial use of such as Taxi, Driving School, etc without fleet contract.
6. Swollen battery or physical damage to battery casing or terminals.
7. If battery function can be restored fully by recharging of the battery.



## STORAGE & QUALITY MONITORING

### STORAGE

- Store Batteries upright.
- Batteries should not be directly exposed to the sun.
- Keep batteries clean and always store in a cool (<30°C) place.
- Batteries Discharge Faster in Humid Conditions.
- Never drop, never overthrow.
- In all cases, (First In, First Out) storage procedure should be applied.
- Smaller Batteries Discharge Faster than Larger Batteries
- If Battery Open Circuit Voltage (OCV) falls below 12.4V recharge immediately.

### QUALITY MONITORING

Battery performance and life depends on battery charge condition prior to installation. To ensure optimum battery performance & durability for consumers, battery charge & storage care must be managed to reduce potential claim rate risk due to discharged batteries being installed into service. Test batteries from each production lot, every 3 weeks to monitor the OCV, and ensure batteries are in good condition before they are shipped out to supply chain and retailers.

- Routinely Check VOLTAGE, CCA, & storage TEMPERATURE
- If Battery charge is less than 75%, Charge to avoid sulphation.
- Load test battery for 15 sec, if load test Voltage is less than 9.6V , Recharge.

Approx Charge	OCV
100%	12.75V
75%	12.40V
50%	12.20V
25%	12.00V
Discharged	11.90V

# NON-AUTOMOTIVE BATTERIES

## WIDE RANGE COVERING ALL APPLICATIONS

\* 10 Product Series

\* 400 Battery Types

### \* International Certifications

- \* ISO 9000 Approval, FN:q3105105131
- \* ISO14001 CTC04912E10302ROM
- \* OHS MS18001 04912S10150ROM
- \* UL Approval, FN:MH28204
- \* VDS Approval
- \* BS Approval
- \* KS Approval, FN:KS C 8519
- \* CE Approval, FN G2M20201-102-E-16



Marshall industrial batteries utilize the most advanced equipment and continual innovation in product technical design and production process. The QC department consists of IQC, IPQC, QA, QE, OCQ, laboratory and testing subsidiaries which strictly meets ISO 9001 quality management system requirements from in-house material to batteries out of the warehouse to ensure the products are under the strict audit in the whole process.

Marshall Industrial product defect rate is lower than 0.1% . Marshall Batteries utilize strict quality controls to ensure raw material purity and specification compliance resulting in high product performance and quality, long life, and low self discharge rate advantages.



# RENEWABLE ENERGY STORAGE

## STANDARD SERIES (FP, LFP, CFP TYPES)

### General Features

- \* Nonspillable
- \* Sealed Maintenance Free
- \* High Reliability
- \* Exceptional Deep Discharge Recovery
- \* Low Self-Discharge
- \* Long Service Life
- \* Solid Copper Terminals
- \* Tank-formed Plates
- \* Computer-aided Design & Manufacturing
- \* UL, CE, VDS Approved

### Typical Applications

- \* Telecommunications Equipment
- \* Electronic Instruments
- \* Fire Alarm
- \* Security Devices
- \* UPS Systems & Devices
- \* Emergency Lighting

**Voltages: 2V, 4V, 6V, 8V, 12V, 16V, 24V, 36V**

**Capacity: 0.3 AH - 3000 AH**

**Designed Service Life: 10-20 Years (floating Service Life @ 20°C )**



# INDUSTRIAL POWER SUPPLY

## CFPS & LFPS (OPzS) BATTERY SERIES

### General Features

- \* Tubular Multi-Alloy Positive Plate design to prevent active material from falling off.
- \* Separator design utilizing combined application of porous rubber and porous PVC to deliver superb corrosion resistance.
- \* Acid Proof bolt allowing for acid smog filtration and providing for electrolyte density / temperature measurement.

### Typical Applications

- \* SOLAR Power Supply
- \* WIND Power Supply
- \* Industrial UPS Power Supply
- \* Emergency Lighting
- \* Telecommunications Equipment
- \* Electronic Instruments
- \* Fire Alarm & Security Systems



**Meets DIN 40736 & IEC 60896-21 Standards**

**Voltages: 2V, 6V, 12V**

**Capacity: 60 AH - 3000 AH**

**Designed Service Life: 20 Years (floating Service Life @ 20°C )**



## HIGH POWER TRACTION

# MATERIAL HANDLING & TRACTION SERIES

### General Features

- \* Assembled in high grade containers
- \* Tubular positive plates and pasted negative Plates.
- \* Longer life with more than 1600 cycles upto 80% depth of discharge.
- \* Low energy costs.
- \* Low water costs.
- \* Suitable for ALL weather conditions.

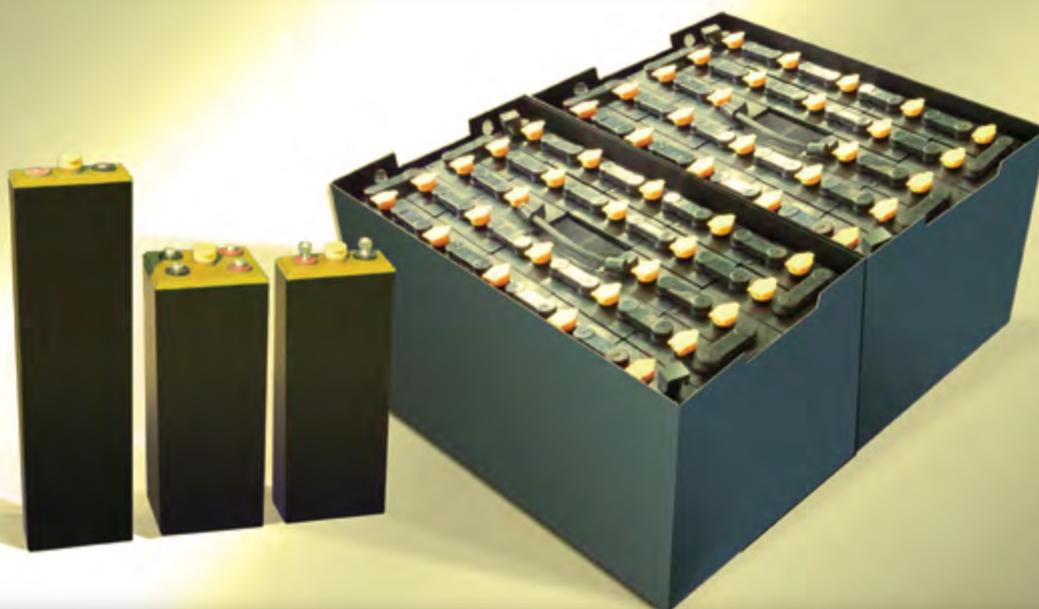
### Typical Applications

- \* Forklift / Lifttruck
- \* Tow truck
- \* Power trolley
- \* Lifting platforms
- \* Other industrial traction applications

**Voltages: 2V**

**Capacity: 46 AH - 630 AH**

**Designed for 1600 Cycle life with upto 80% discharge depth.**



# Marshall

TO SERVE AND PROTECT



DISTRIBUTOR CONTACT DETAILS

[www.marshall-batteries.com](http://www.marshall-batteries.com)