

A new battery generation
for the next car generation

EXIDE[®]
INTELLIGENT POWER

MICRO-HYBRID



ECM ENHANCED CYCLING MAT TECHNOLOGY



AGM ABSORBENT GLASS MAT TECHNOLOGY

THE POWER TO INNOVATE



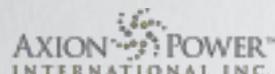
SUPPORTING RESEARCH TO CREATE THE MOST INNOVATIVE PRODUCT TECHNOLOGIES

A recognized leader in the production and recycling of lead acid batteries in over 80 countries, EXIDE Technologies has always made innovation a central element of its business. Now EXIDE Technologies is boosting its efforts to drive the development of new and future generations of hybrid vehicles.

In 2009, the Research & Development department has been expanding, as reflected by a 45% budget increase and the recruitment of 60 new engineers and Ph.D. graduates. The acquisition of cutting-edge laboratory equipment provides researchers with world class conditions for achieving technological breakthroughs.

But progress also comes through collaboration with outside experts, which is why EXIDE Technologies has strong R&D partnerships with the US Department of Energy (SRNL), Axion Power International and Nano-Terra, among others. Their combined expertise opens the way for advancements in the most innovative technologies:

- Conductive glass micro-sphere additives.
- Carbon-graphite additives.
- Nanotechnologies.



Exide's new batteries now bear the «Exide Intelligent Power» logo, in recognition of the fact that these new energy solutions will be perfectly adapted to the needs of tomorrow's hybrid vehicles.

The automotive industry must rise to a major challenge and Exide Technologies, as a supplier of energy solutions, will play a key role.

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INTELLIGENT POWER

**A new battery generation
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A FULL LINE OF PRODUCTS DEDICATED TO MICRO-HYBRID VEHICLES

Set to expand their market penetration considerably, micro-hybrid vehicles currently represent the most operationally feasible and reliable technological solution. This is why most car manufacturers have launched new micro-hybrid vehicles featuring the following equipment:

MICRO-HYBRID EQUIPMENT



REGENERATIVE BRAKING



Once the driver lifts his foot off the accelerator, the starter-alternator immediately converts the vehicle's kinetic energy (rotational speed of the alternator) into electrical energy, which in turn recharges the battery. The battery charge acceptance and cycle resistance are key to this system's operations.

FUEL REDUCTION EQUIPMENT

Examples of dedicated micro-hybrid equipment capable of generating fuel/emissions savings:

- Intelligent alternator.
- Gear switch indicator.
- Predictive energy and electronic fluid temperature management.
- Thermo generator.
- Steering by wire and Braking by wire.

Any additional equipment will act as an additional energy load on the battery.

STOP & START



This system allows the engine to be switched off in order to save fuel when the vehicle is temporarily idling at traffic signals or during traffic jams. Whenever the vehicle is standing still, all electrical devices are receiving energy from the battery and act as an additional battery load. The engine restarts after each automatic stop, which also results in a significantly greater number of high-rate load phases during the battery life cycle.





EXIDE MICRO-HYBRID SOLUTION

THE MORE VEHICLE FUEL/CO2 SAVINGS
THE MORE BATTERY ENDURANCE REQUIREMENTS



AGM ABSORBENT GLASS MAT TECHNOLOGY



Stop/Start System



Regenerative Braking



Superior Equipment



Intensive Urban Use

Jointly developed with Europe's major vehicle manufacturers of premium micro-hybrid applications, Exide AGM (Absorbent Glass Mat) is the most advanced technology able to provide optimal performance in extreme cycling applications, with both high-charge acceptance and partial state-of-charge operations. These factors are absolutely key for micro-hybrid vehicles equipped with Stop & Start and Regenerative Braking systems.

- Original Equipment Technology & Quality.
- Extreme endurance: 3 times the life cycle durability of a standard battery.
- Maximum safety: Hermetically sealed with VRLA pressure control valves and top gas recombination properties. Optimal safety for passenger compartment installation.



ECM ENHANCED CYCLING MAT TECHNOLOGY



Stop/Start System



Superior Equipment



Intensive Urban Use

Jointly developed with Europe's major vehicle manufacturers of micro-hybrid applications, Exide ECM (Enhanced Cycle Mat) technology is perfectly adapted to entry-level micro-hybrid vehicles equipped with the Stop & Start system:

- Original Equipment Technology & Quality.
- High endurance: Optimized for micro-hybrid cycling profile.
- Maximum flexibility: High temperature cycling performances makes Exide ECM the recommended solution for batteries installed in engine compartments.

EXIDE CURRENT MICRO-HYBRID OE CONTRACTS

AGM TECHNOLOGY

BMW Efficient Dynamics Series.

Awarded contracts with other European vehicle manufacturers for models that will be launched shortly.

ECM TECHNOLOGY

FIAT: 500 and Punto with Stop & Start system.
ALFA ROMEO: MiTo with Stop & Start system.
LANCIA: Musa with Stop & Start system.
TOYOTA: Yaris, Auris with Stop & Start system.

Awarded contracts with international vehicle manufacturers for the EU market.



TOMORROW'S BATTERY STANDARD AVAILABLE TODAY

			 AGM <small>ABSORBENT GLASS MAT TECHNOLOGY</small>	 ECM <small>ENHANCED CYCLING MAT TECHNOLOGY</small>	 Conventional lead-acid (Exide Premium)
Micro-Hybrid Cars	Regenerative braking	 Regenerative Braking	✓		✗
	Stop & Start	 Stop/Start System	✓	✓	✗
Traditional Cars	Superior equipment	 Superior Equipment	✓✓ extra life	✓✓ extra life	✓
	Intensive & urban use	 Intensive Urban Use	✓✓ extra life	✓✓ extra life	✓
Battery location			Optimal fit for passenger compartment*	Optimal fit for engine compartment*	Optimal fit for engine compartment*

EXIDE EXPERT ADVICE FOR OPTIMAL SERVICE LIFE :

- **Battery replacement on micro-hybrid** vehicles should always respect the technology of the original battery. Please refer to the Exide fitment catalogue for the right fit.
- **Conventional lead-acid battery** should not be used as a replacement on micro-hybrid vehicles.
- ECM and AGM technologies could provide **extra service life duration for traditional cars** with high level of equipment exposed to intensive use.

*For extra life, choose the technology best suited to battery location (passenger vs. engine compartment).

A NEW ERA IN THE AUTOMOTIVE INDUSTRY

With EU legislation limiting vehicle CO₂ emissions to 130 g/km by 2015, the automotive industry appears to be entering a new era. In their efforts to comply, car manufacturers have been developing alternative means of electric propulsion and innovative equipment to reduce fuel consumption. A complete line of new vehicle models is now emerging: Hybrid Electric Vehicles (HEV).

ELECTRIC VEHICLES (EV)

Vehicles featuring a 100% electric driving power source.

Battery technologies: Li-ion, NiMH.

Battery replacement: Not required. Battery should last the entire vehicle service life.

FULL-HYBRID

Vehicles operated by independent alternation of combustion engine and electric motor.

Battery technologies: Li-ion, NiMH, Advanced Lead Acid batteries in development.

Battery replacement: Not required. Battery should last the entire vehicle service life.

MILD-HYBRID

Vehicles equipped with a complementary electric motor to add torque (a boost) to the main combustion engine.

Battery technologies: Li-ion, NiMH, Advanced Lead Acid batteries in development.

Battery replacement: Not required. Battery should last the entire vehicle service life.

MICRO-HYBRID

Vehicles powered by a traditional diesel/petrol engine equipped with additional systems / devices to reduce fuel consumption: Stop & Start, regenerative braking, etc.

Battery technologies: AGM (Absorbent Glass Mat), ECM (Enhanced Cycling Mat). Battery replacement: Required.

TRADITIONAL CARS

Vehicles powered by a traditional diesel/petrol engine.

Battery technologies: Conventional lead-acid.

Battery replacement: Required.

CO₂/fuel savings

Driving power source

100%

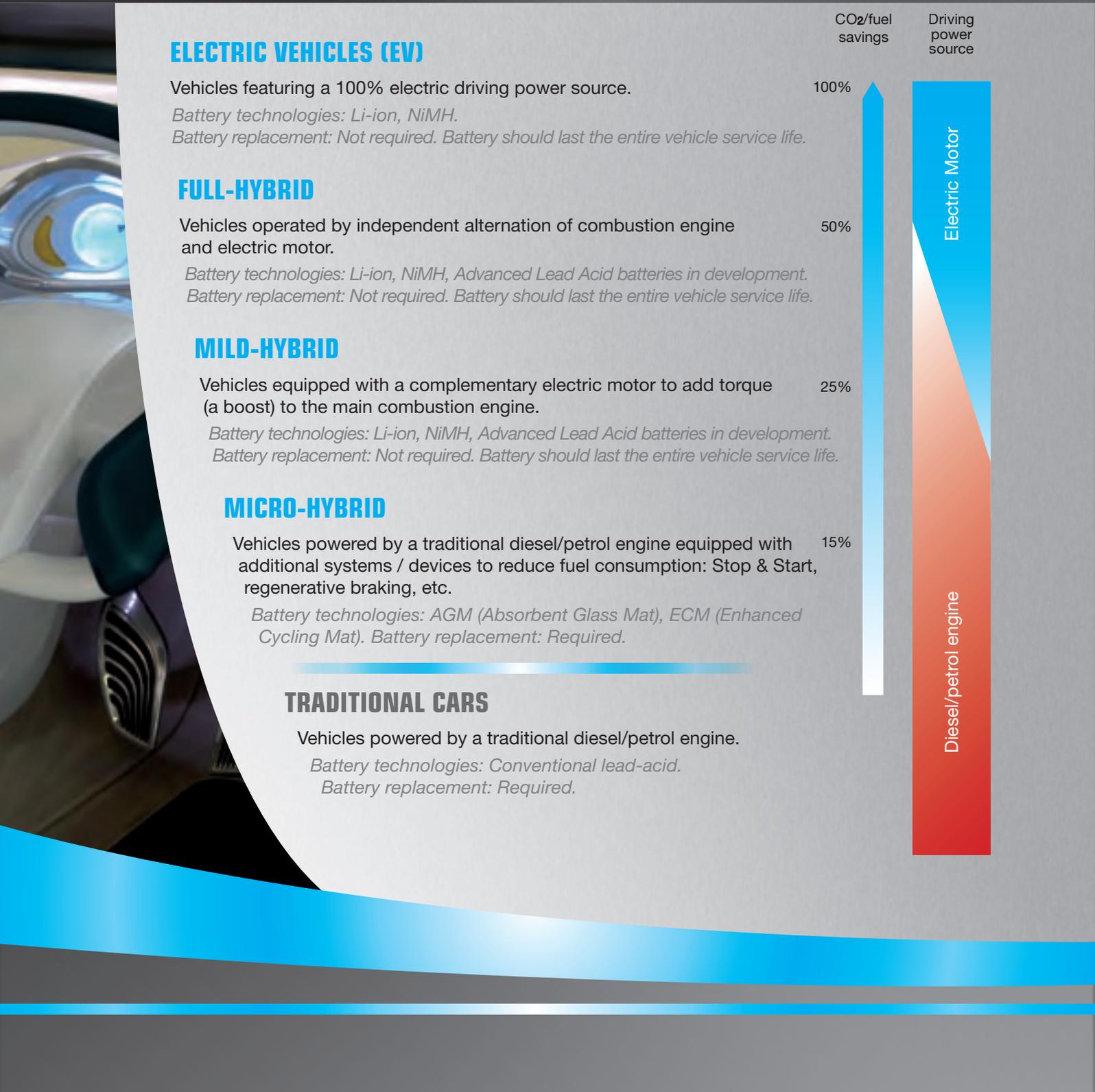
50%

25%

15%

Electric Motor

Diesel/petrol engine



PRODUCT CHARACTERISTICS

	AGM ABSORBENT GLASS MAT TECHNOLOGY	ECM ENHANCED CYCLING MAT TECHNOLOGY	Conventional lead-acid (Exide Premium)
Main Feature	Starter battery + Extreme resistance to cycling + Gas recombinant (VRLA)	Starter battery + High resistance to cycling at high temperature	Starter battery (capacity and cold cranking performances)
Technology	AGM Absorbed Glass Mat	ECM Enhanced Cycling Mat	Exmet
Plate Design	Casted/Expanded metal designed with AGM-specific active materials and curing	Expanded metal improved with a higher-density active material + additives	Standard expanded metal
Separator	Glass Mat	Polyethylene envelope + Poly Mat	Polyethylene envelope
Plate Group Compression	High	Low	None
Charge Acceptance	High	Medium	Low
Lid technology	VRLA-Hermetic sealed lid with valves. Gas recombined to water in the cells	Heat-sealed double lid with Exide-patented labyrinth system. Vapors condensed to water and then returned to the cells	Heat-sealed double lid with Exide-patented labyrinth system. Vapors condensed to water and then returned to the cells
Handling / Maintenance	Leak proof / Maintenance free	Spill proof / Maintenance free	Spill proof / Maintenance free
Key Performances	<p>115% X3 VRLA SEALED LEAK-PROOF</p>	<p>100% X2 SPILL PROOF</p>	<p>100% X1 SPILL PROOF</p>



Power



Endurance



Handling

TECHNICAL SPECIFICATIONS



MICRO-HYBRID

AGM ABSORBENT GLASS MAT TECHNOLOGY

CODE	PERFORMANCES		DIMENSIONS				CHARACTERISTICS		
	CAPACITY AH	CCA A (EN)	BOX	L (mm)	W (mm)	H (mm)	POLARITY	TERMINAL	HOLD DOWN
EK700	70	760	L3	278	175	190	0	1	B13
EK800	80	800	L4	315	175	190	0	1	B13
EK900	90	900	L5	353	175	190	0	1	B13



MICRO-HYBRID

ECM ENHANCED CYCLING MAT TECHNOLOGY

CODE	PERFORMANCES		DIMENSIONS				CHARACTERISTICS		
	CAPACITY AH	CCA A (EN)	BOX	L (mm)	W (mm)	H (mm)	POLARITY	TERMINAL	HOLD DOWN
EL600	60	540	L2	242	175	190	0	1	B13
EL700	70	630	L3	278	175	190	0	1	B13
EL800	80	720	L4	315	175	190	0	1	B13





100%





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By Exide Technologies / www.exide-intelligent-power.com

Exide Technologies (Transportation) Ltd
Unit 2 Pisces, Mosley Road, Trafford Park, Manchester M17 1PF
Tel: 0845 450 2400