

PERFORMANCE ADDITIVES FOR ADVANCED LEAD ACID BATTERIES



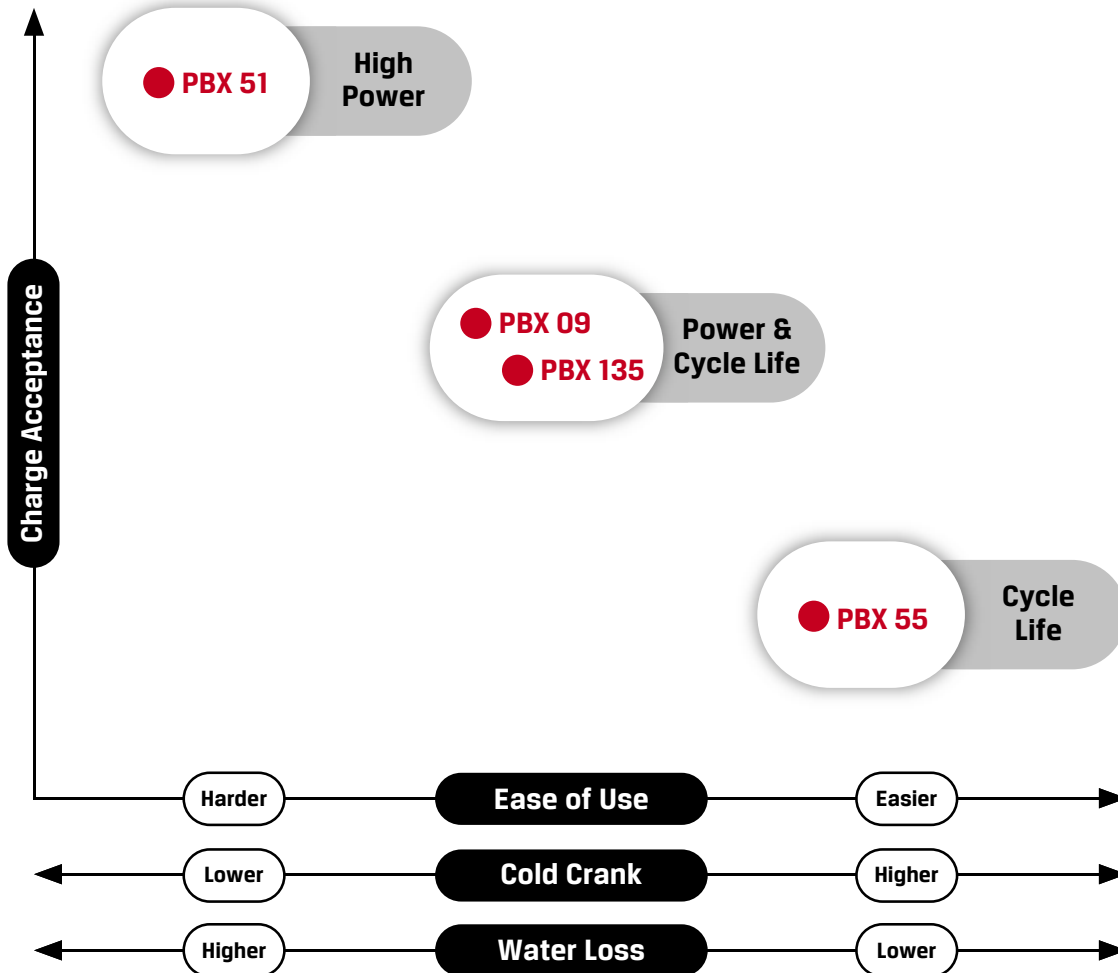
PBX™ PRODUCT SELECTION GUIDE

CATEGORY	PERFORMANCE REQUIREMENTS	APPLICATION	CABOT CARBON ADDITIVE	CHARGE ACCEPTANCE	CYCLE LIFE	CHARACTERISTICS
HIGH POWER ADDITIVES	Dynamic charge acceptance is the primary requirement	<ul style="list-style-type: none"> ◆ Micro hybrid vehicle ◆ Mild hybrid vehicle ◆ Motive ◆ Grid storage 	PBX 51			<ul style="list-style-type: none"> ◆ Excellent dynamic charge acceptance and cycle life ◆ Suggested loading 0.25-1% ◆ Designed primarily for use in valve regulated lead acid (VRLA) batteries
MULTI-PURPOSE ADDITIVES	Charge acceptance and cycle life are equally important	<ul style="list-style-type: none"> ◆ Micro hybrid vehicle ◆ Motive ◆ Telecom ◆ E-bike 	PBX 09			<ul style="list-style-type: none"> ◆ High charge acceptance and cycle life ◆ For use in both VRLA and flooded batteries
			PBX 135			<ul style="list-style-type: none"> ◆ Excellent cycle life and good charge acceptance ◆ For use in flooded batteries
CYCLE LIFE ADDITIVES	Cycle life is the primary requirement	<ul style="list-style-type: none"> ◆ Micro hybrid vehicle ◆ Other 	PBX 55			<ul style="list-style-type: none"> ◆ Excellent cycle life ◆ For flooded batteries with minimal charge acceptance requirements

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Additives for Lead Acid Batteries

The primary function of Cabot additives for lead acid batteries is to improve the morphology of negative plates and enable better charge acceptance and cycle life for partial state of charge cycling applications.

- ◆ For applications that require superior dynamic charge acceptance, consider high surface area products such as PBX 51 carbon additive. This product is most suitable for valve regulated lead acid (VRLA) batteries or in applications where water loss and cold crank performance are less important or can be mitigated by battery design.
- ◆ For applications that primarily require excellent cycle life, with minimal requirements on charge acceptance, consider low surface area products such as PBX 55 carbon additive.
- ◆ For applications where both high charge acceptance and cycle life are important, consider multi-purpose products such as PBX 09 and PBX 135 carbon additives to meet the requirements for a variety of applications.

Balancing Other Requirements

- ◆ Cabot can provide the customer with assistance in selecting and optimizing additives to achieve the appropriate balance between various performance requirements.
- ◆ Cabot can also provide guidance on techniques on how to disperse and incorporate Cabot's additives into the negative plate.

For more information contact: battery.materials@cabotcorp.com or visit: cabotcorp.com/batteries

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