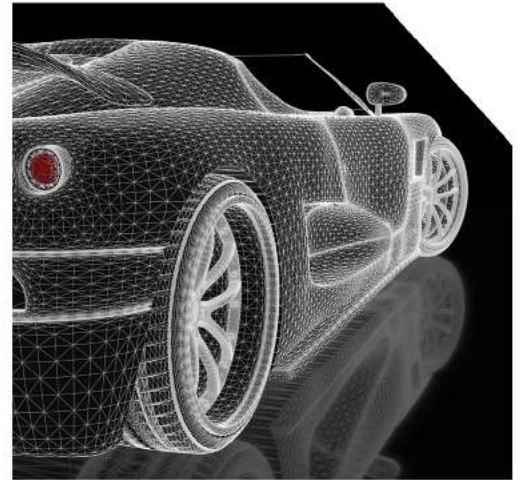
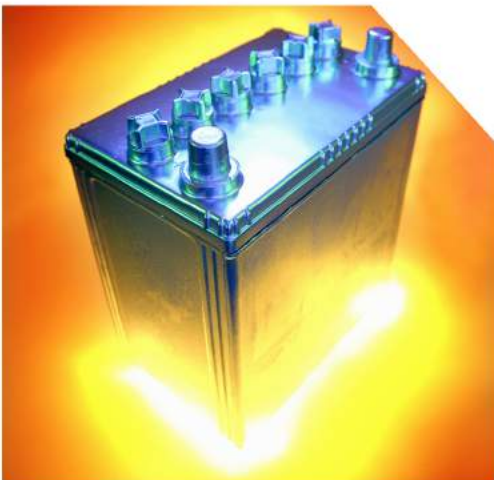


*Formula* **BT**<sup>TM</sup>  
Advanced Lead-Acid Batteries





## FormulaBT™: Superior Performance Graphite/Carbon for Energy Applications

Graphite/Carbon additives in Lead-acid battery electrodes for use in highly demanding operations such as High-Rate Partial State-of-Charge (HRPSoC)

**FormulaBT™** (Battery Technology) are carbon and graphitic powders, developed and manufactured by Superior Graphite, primarily for use in the energy marketplace. **FormulaBT™** takes advantage of our proprietary Electro-Thermal Treatment/Purification Technology. This continuous high-temperature process exposes the raw materials, e.g. natural graphite, synthetic graphite and other carbonaceous products to temperatures approaching 3000°C, so that impurities including inorganic contaminants are evaporated. Combined with a variety of milling and classification techniques and processes, **FormulaBT™** provides the market with superior performance and high purity products.

### FormulaBT™ Advantages:

**Significant Cycle Life Improvement** - Significant reduction of irreversible sulfation due to hindrance of lead sulfate crystal growth and uniform formation of lead sulfate across the negative plate under high-rate partial state-of-charge (HRPSoC) working conditions

**Capacity Improvement** - Improving high-rate capability and the charge efficiency of the negative plates through providing excellent electrical conductivity

**Chemical Stability** - No chemical interference with the electrode components

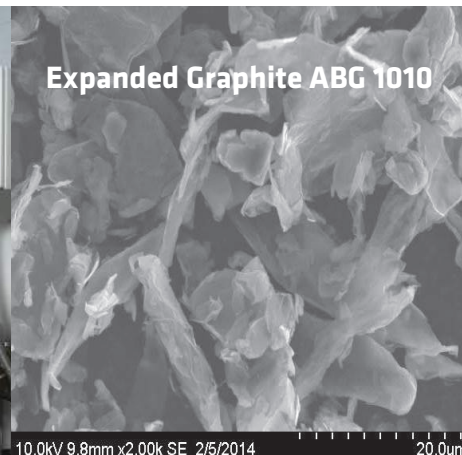
### FormulaBT™ Characteristics:

**High Purity** - High consistent carbon content (>99.9%) with low moisture content, and ultra low metallic and non-metallic impurities

**High Crystallinity** - Near 100% crystallinity leads to excellent electrical conductivity, thermal conductivity and lubrication performance

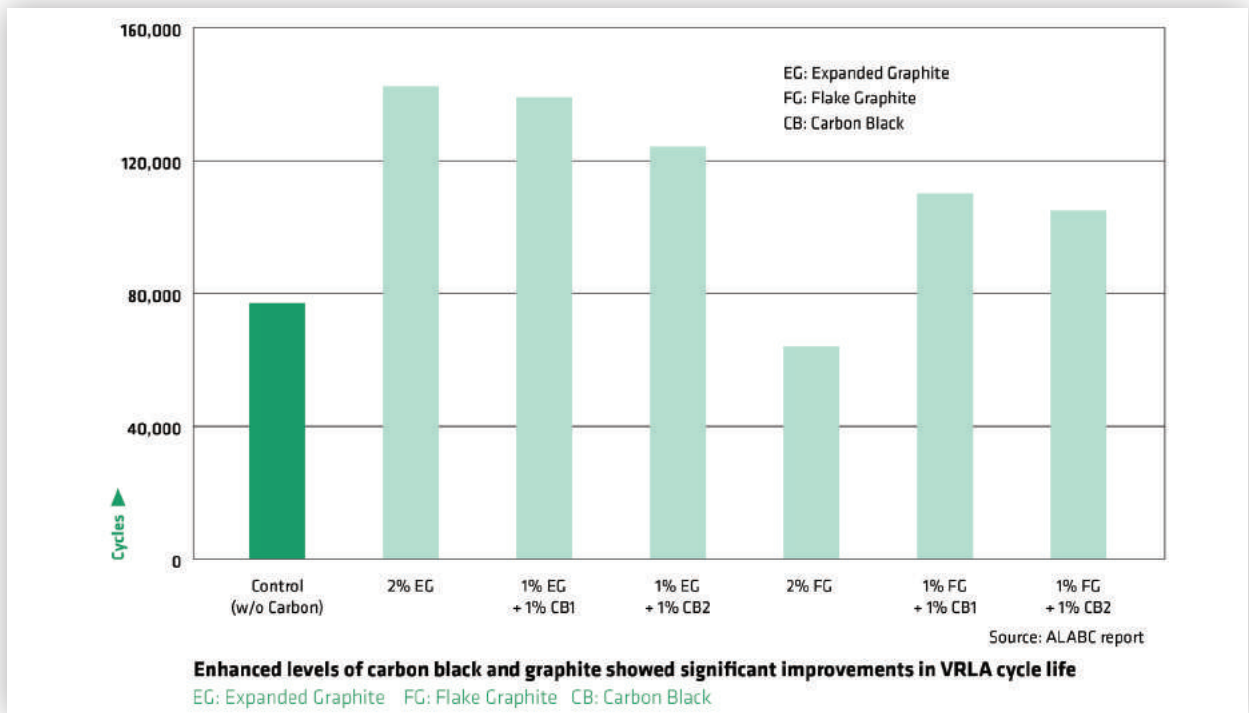
**Defined Texture** - Well-defined particle shape, surface area, as well as bulk density to maximize the nucleating effect for uniform formation of lead sulfate and hinder lead sulfate crystal growth

**Well-Defined Particle Size Distribution** - Predictability in performance and processability



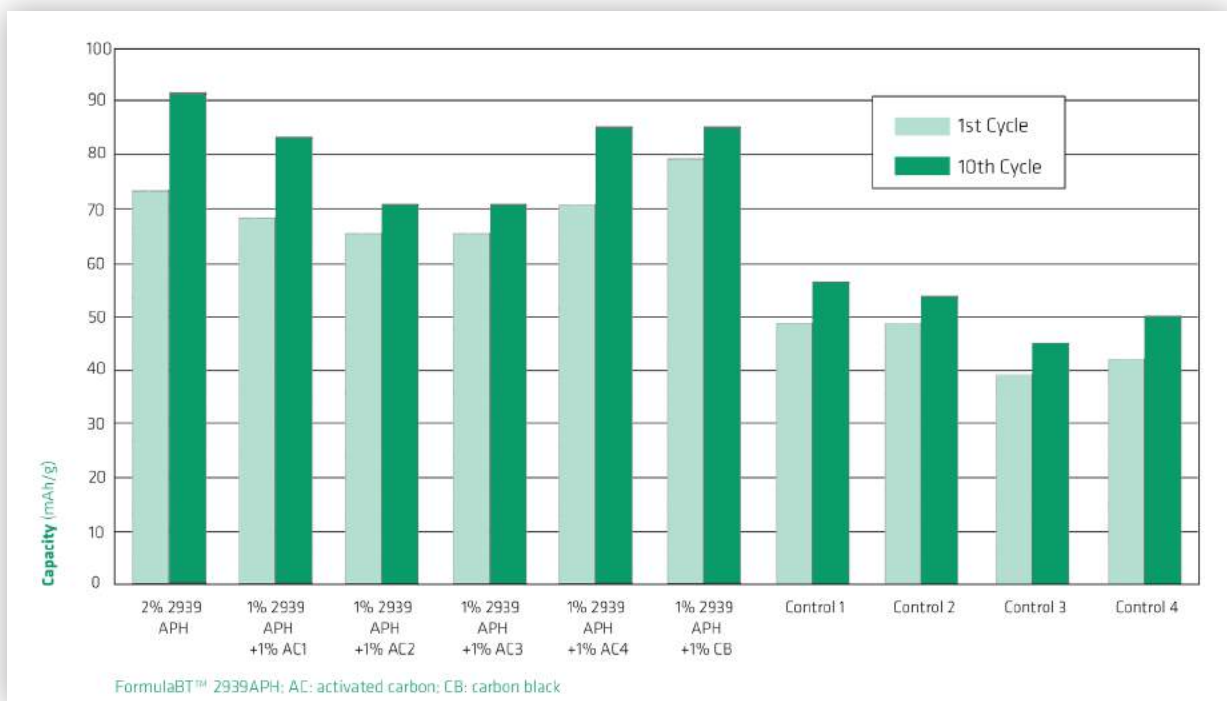
## Enhanced levels of carbon black & graphite showed significant improvements in VRLA cycle life

Number of HRPSoC Micro Cycles Completed to 80% Nominal Capacity or Termination



## FormulaBT™ significantly improves initial capacity under HRPSoC cycling conditions

Average 1st and 10th Cycle Capacity  
(normalized for dry unformed negative active material weight)



## FormulaBT™ Products

Graphite/Carbon additives in Lead-acid battery electrodes for use in highly demanding operations such as High- Rate Partial State-of-Charge (HRPSoC)

**FormulaBT™ ABC series** - Expanded flake graphite powders with high purity. Outstanding thermal and electrical conductivity enhancer for various battery systems (large surface area is in the range of ~20 m<sup>2</sup>/g), various particle sizes, well-defined particle size distribution. Excellent compressibility and lubricating properties.

**FormulaBT™ LBG series** - Natural flake graphite powders with high purity. Excellent electrical and thermal conductivity enhancer, various particle sizes down to 4 micron, well-defined particle size distribution. Especially developed for battery and fuel cell applications. Very high compressibility and lubricating properties.

**FormulaBT™ 29xx series** - Thermally-purified, natural flake graphite powders from 10 micron up to 800 micron. Conductivity additive for batteries and fuel cells.

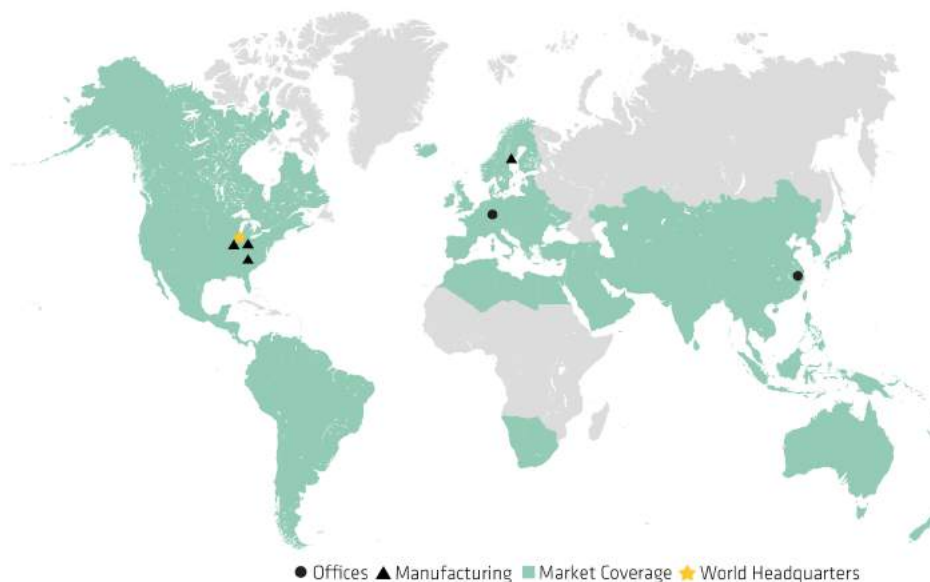
## FormulaBT™ is more than just a high performance energy material. It's a philosophy:

- Our innovative research and development team provides superior solutions with customized products.
- Our dedicated production staff, combined with ISO 9001:2015 certified quality management systems ensure high quality products which meet agreed-upon specifications.
- Our extensive worldwide distribution network ensures supply chain efficiency.
- Our materials management experts secure the supply of high quality raw materials, and continuously evaluate new sources globally.



### Our Mission:

We create value for our customers by providing SUPERIOR SOLUTIONS - utilizing our unique technologies, processes and talents - while contributing to the company's long-term success.



● Offices ▲ Manufacturing ■ Market Coverage ★ World Headquarters

### North & South America

Superior Graphite  
 10 S Riverside Plaza, Suite 1470  
 Chicago, Illinois 60606  
 Phone + 1 312 559 2999,  
 Toll Free + 1 800 325 0337  
 CustomerServiceUSA@SuperiorGraphite.com

### Europe/Africa/Asia/Australia

Superior Graphite Europe Ltd.  
 Box 13000 SE-850 13, Sundsvall, Sweden  
 Phone + 46 60 134188  
 CustomerServiceEU@SuperiorGraphite.com

### China

Superior Graphite Import & Export (Shanghai)  
 Co. Ltd.  
 Room 821, No. 4229 Bao'an Road  
 Jiading District, Shanghai 201814  
 Phone + 86 21 595 800 78, Ext 103  
 CustomerServiceChina@SuperiorGraphite.com



[www.superiorgraphite.com](http://www.superiorgraphite.com)

