EliteC™ The Power of Carbon

Powdered Activated Carbon for Energy Storage Applications

About Calgon Carbon

Calgon Carbon is the global leader in the manufacturing and supply of activated carbon and has advanced research and development capabilities that provide value added solutions to the challenging problems and applications faced by customers around the world.

Description of EliteC

EliteC is a Powdered Activated Carbon (PAC) specifically designed for use in energy storage devices. This carbon was developed with high activity and high purity to deliver maximum electrochemical performance in applications such as electric double layer capacitors or ultracapacitors and advanced batteries. EliteC's immense surface area and high purity enables customers to design energy storage devices for high power output and greater longevity.

In these energy storage devices, a high quality, high performance carbon is critical to delivering maximum power density. Calgon Carbon Corporation has optimized its manufacturing process to deliver a robust carbon capable of boundless charge and discharge cycles. Life performance testing proves EliteC to have superior durability compared to industry standard carbons. Because designing for end of life performance is essential, better durability translates to immediate cost savings to device manufacturers as less carbon is required.

EliteC was designed to be used as electrode material for energy storage devices. As a result, the quality of the carbon is extremely consistent and tailored to offer optimal electrochemical performance. Calgon Carbon Corporation's expertise in carbon application technology is a valuable resource for designing and optimizing the most critical component of these devices.

Features

- High Volumetric Capacitance – Results in a high power density electrode.
- Low DC Resistance (DCR) – Resistance to charge movement within the electrode. This property results in a faster charge and discharge rate and reduces the total device cost as less conductivity enhancer is required.
- Low Self-Discharge – Confirms low impurity level of the carbon. This property shows the loss in voltage due to current leakage is low.

Figure 1: Self-Discharge

- High Cycle Life – Illustrates the long term durability of the final product. Large cell constant current cycle testing shows superior performance in both capacitance fade and resistance rise. When designing for end of life performance, these properties allow customers to use less carbon and non-carbon components, yielding immediate cost benefits.

Figure 2: Capacitance Fade – Constant Current Cycle

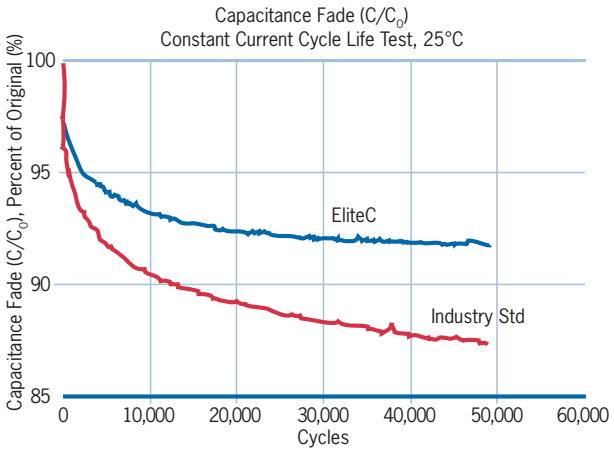
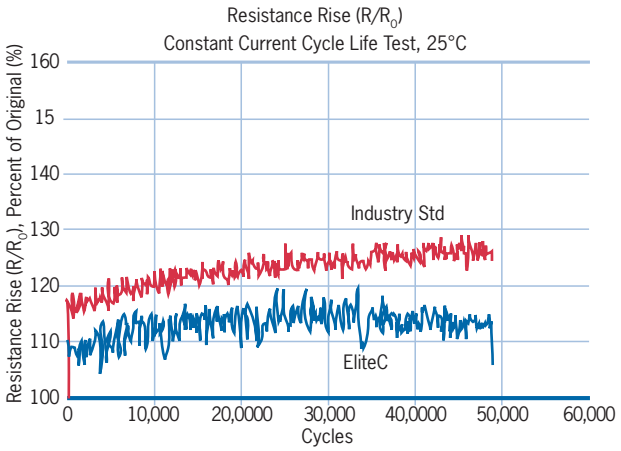


Figure 3: Resistance Rise – Constant Current Cycle



- Temperature Stability – Demonstrates the carbon performance under very aggressive, high temperature conditions. Large cell DC life (constant voltage-high temperature) testing shows superior performance in both capacitance fade and resistance rise.

Figure 4: Capacitance Fade - DC Life

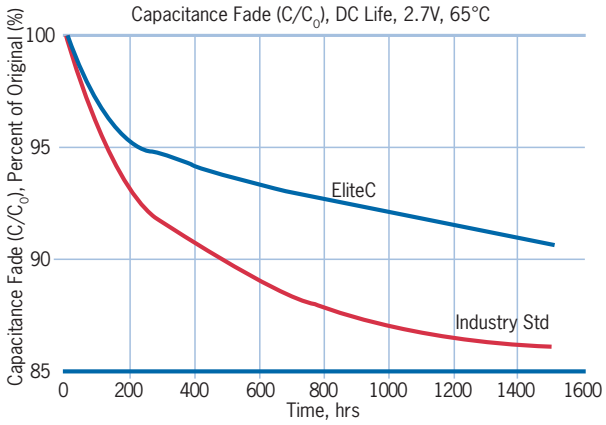
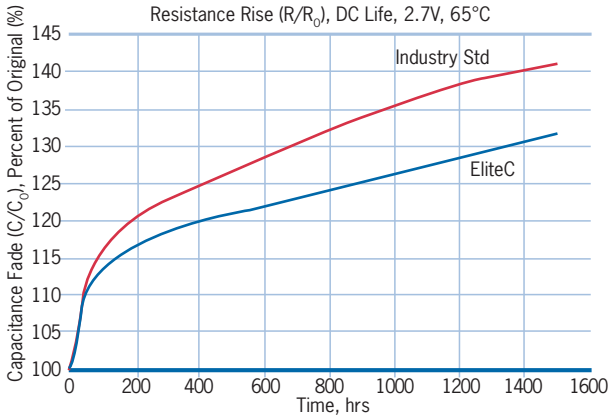


Figure 5: Resistance Rise - DC Life



- State-of-the-Art Quality Assurance – Delivers carbons with consistent, high performance. Calgon Carbon is ISO 9001-2008 certified.

- Technical Resources with Expertise in Electrochemical Applications – Calgon Carbon has always been a leader in activated carbon R&D investments, the effective development, evaluation, and the optimization of new products, and the effective introduction of new applications that add significant value for the organizations and industries that we serve. Calgon Carbon's technical staff is available to discuss your carbon needs for energy storage devices.

Typical Properties	EliteC
BET Surface Area	>1600 m^2/g
Particle Diameter (d50)	5.5 µm
Moisture by Weight	< 3.0 %
Single Electrode Capacitance*	132 F/g
DC Resistance (DCR)*	0.22 mΩ

* From 3000F device testing with no conductivity enhancers.

Safety Message

Wet activated carbon preferentially removes oxygen from air. In closed or partially closed containers and vessels, oxygen depletion may reach hazardous levels. If workers are to enter a vessel containing carbon, appropriate sampling and work procedures for potentially low oxygen spaces should be followed, including all applicable federal and state requirements. Please refer to the MSDS for all up to date product safety information.

Making Water and Air Safer and Cleaner

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