

# PRINTEX<sup>®</sup> kappa 100 and PRINTEX<sup>®</sup> kappa 10

## Conductive carbon blacks for LFP-based lithium-ion batteries

Technical Information 1488



Orion Engineered Carbons is a global leading supplier of carbon black. Orion offers the broadest portfolio of carbon black products for standard and high-performance applications like rubber, polymers, coatings, printing inks and batteries. With 1,425 employees worldwide, Orion Engineered Carbons runs 14 global production sites and 4 applied technology centers, aiming on quality supply and collaborative partnerships with customers.

Focusing on the current and future energy demands, Orion has developed especially designed carbon black (CB) grades for energy storage applications.

**PRINTEX® kappa 100** and **PRINTEX® kappa 10** are conductive carbon blacks for lithium-ion batteries. With properties like high electrical conductivity, high structure and purity, the PRINTEX® kappa products improve the performance of the LFP-cathode in terms of electrode processability, mechanical stability and electrochemical performance.

The good dispersibility of **PRINTEX® kappa 100** and **PRINTEX® kappa 10** during the electrode preparation, allows the formation of a conductive carbon black percolation network on the LFP electrode. The high conductivity of both carbons and the homogeneously distributed percolation network improve the direct current resistance (DCR) at low state of charge (SOC) and exhibit a capacity retention of 78 % at 5C, Figure 1 and 2 respectively.

**Table 1**

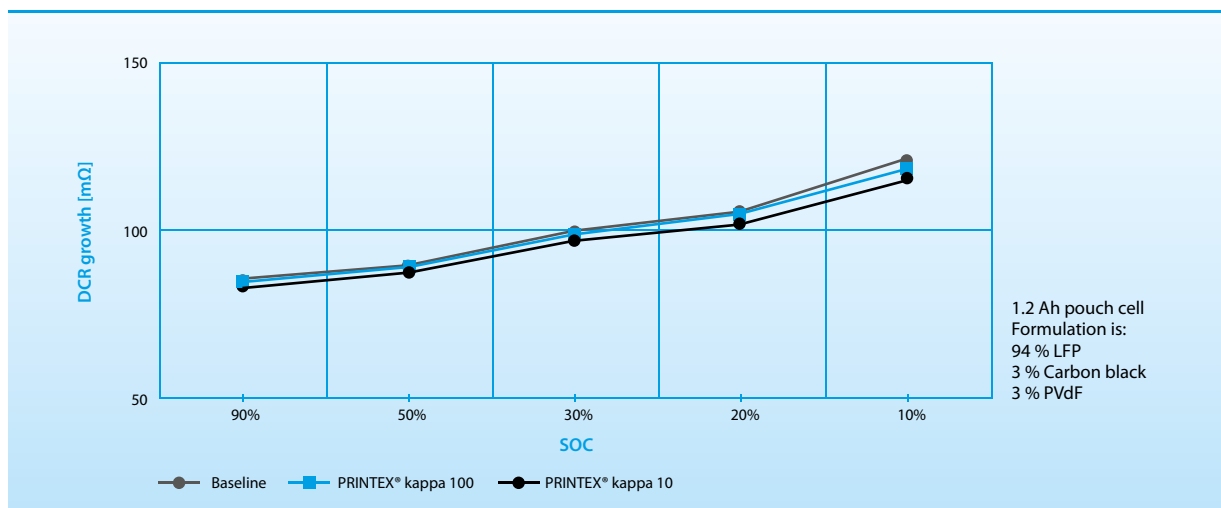
**Colloidal properties of PRINTEX® kappa 100 and PRINTEX® kappa 10**

Properties	PRINTEX® kappa 100	PRINTEX® kappa 10
BET surface area (m <sup>2</sup> /g)	65	74
OAN (ml/100g)	310	145
Sieve residues 45µm (ppm)	5	5
Fe content (ppm)	5	10
Co, Cr, Cu, Ni, Zn content (ppm)	Below detection	Sum 10



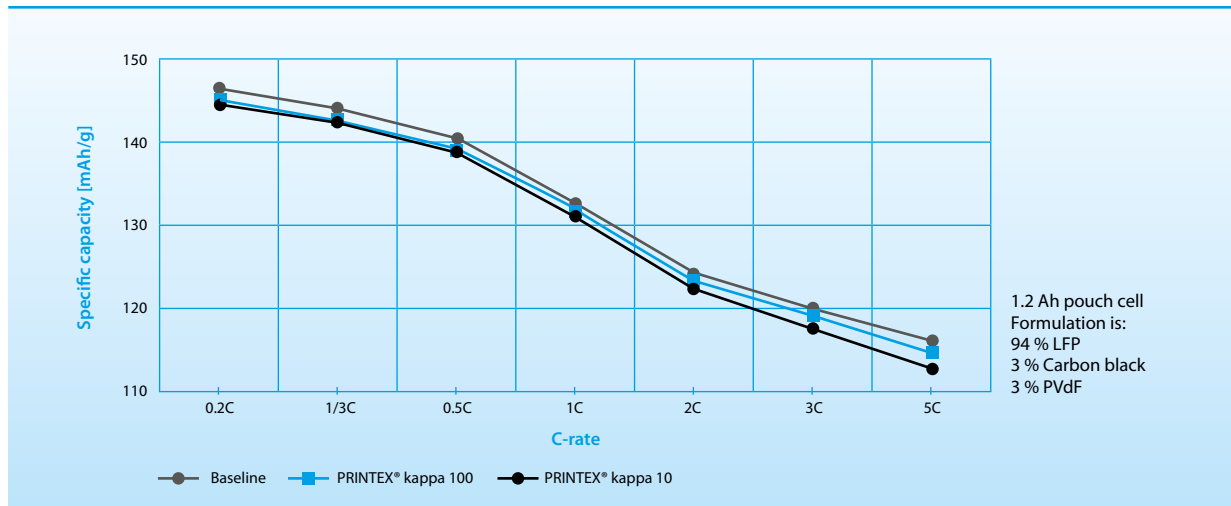
**Figure 1**

**DCR vs SOC**



**Figure 2**

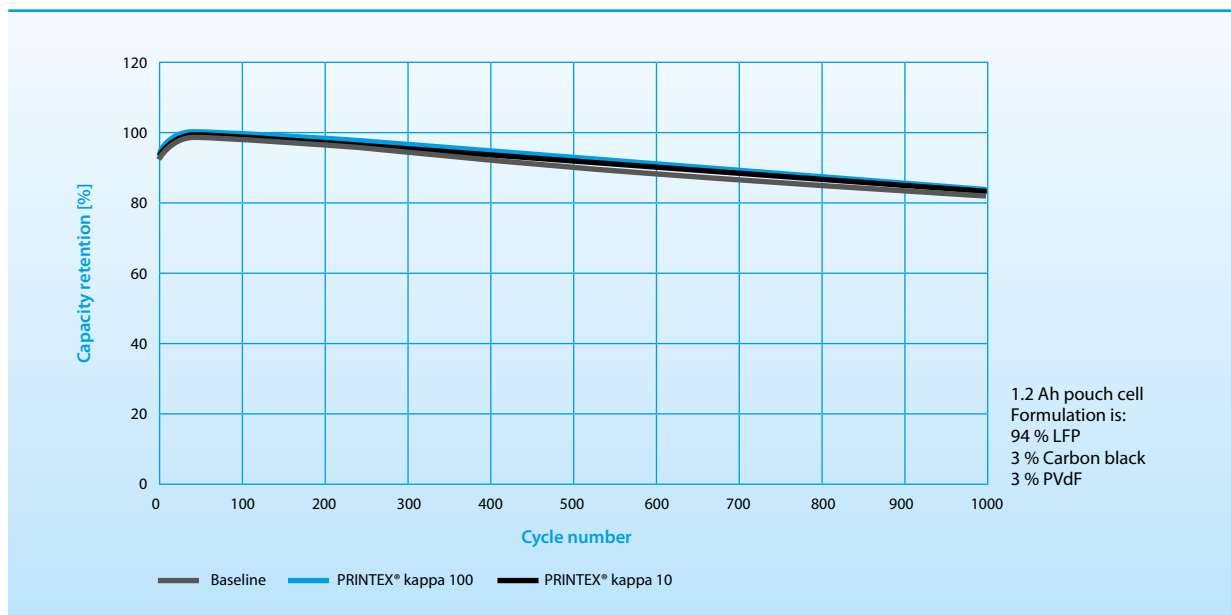
**C-rate discharge test**



The low metal content and low impurity levels of **PRINTEX® kappa 100** and **PRINTEX® kappa 10** contributes to the long-term cycling of the battery, Figure 3.

**Figure 3**

**Long-term cycling, 1C/1C at 25°C**



High-performance conductive carbon blacks play a fundamental role in the development of lithium-ion batteries. By improving the conductivity of the electrodes, the battery enhances its performance in applications like electric vehicles, power tools and energy storage systems. In this context, the wide range of products and the strong know-how of Orion enables current and future lithium-ion batteries.



### The Americas

Orion Engineered Carbons LLC  
1700 City Plaza Drive, Suite 300  
Spring, TX 77389  
USA  
Phone +1 832 445 3300

AMERICAS@orioncarbons.com

### Europe/ Middle East/ Africa

Orion Engineered Carbons GmbH  
Frankfurter Straße 60 - 68  
65760 Eschborn  
Germany  
Phone +49 6196 771 929 100

EMEA@orioncarbons.com

### Asia Pacific

Orion Engineered Carbons (China) Investment Co., Ltd.  
Room 2301, 2302, 2307, BM InterContinental Business Center  
100 Yutong Road, Jing'an District, Shanghai 20007  
P. R. China  
Phone +86 21 6107 0966

APAC@orioncarbons.com

### Incorporated in Luxemburg

Orion Engineered Carbons S.A., 6, Route de Trèves, 2633 Senningerberg, Luxembourg, Phone +352 270 48 06 0

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

All statements given by Orion Engineered Carbons GmbH as well as its affiliates, including for example Orion Engineered Carbons S.A. ("Orion") herein are provided for information purposes only and are given as of the date of this document and are based on the knowledge on the date of the document. ORION DOES NOT GIVE ANY REPRESENTATION OR WARRANTY THAT THE CONTENTS OF THE GIVEN STATEMENTS AND INFORMATION ARE CORRECT OR ACCURATE. ANY LIABILITY OF ORION WITH REGARD TO THE CONTENTS PROVIDED ARE HEREBY EXPRESSLY EXCLUDED. Orion does not give a warranty with respect to any results to be obtained from such information, any uses of such information or with regard to the non-infringement of any proprietary right. Nothing stated herein shall be construed as a license of or recommendation for use, especially with concern to the potential infringement of any proprietary right. Use or application of such information or statements or the material or systems described herein are at user's sole discretion and risk. The user acknowledges that Orion shall bear no responsibility or liability for any use or application of such information or statements or the material or systems described herein. All sales are subject to the respective standard terms and conditions of Sale issued by Orion including but not limited to the limitation of liability contained therein. The Orion standard terms and conditions of Sale can be reviewed, downloaded and printed under [https://orioncarbons.com/en/general\\_conditions\\_of\\_sale\\_and\\_delivery\\_orion\\_engineered\\_carbons\\_europe\\_africa.pdf](https://orioncarbons.com/en/general_conditions_of_sale_and_delivery_orion_engineered_carbons_europe_africa.pdf). Any and all information disclosed by Orion herein shall remain the property of Orion.

© 2022 Orion Engineered Carbons GmbH

OEC-TI 1488-06/2022