

The Orion logo consists of the word "orion" in a lowercase, sans-serif font. The letter "o" is a solid blue circle, while the other letters are white. The background of the entire page is a dark blue gradient with a pattern of glowing white lightning bolts and blue dots of varying sizes.

*Delivering sustainable solutions*

A close-up photograph of four tires with a complex tread pattern, arranged in a row. Bright blue lightning bolts are striking across the tires, creating a dramatic and high-tech visual effect.

**PRINTEX® kappa 70:  
FURNACE BLACK FOR  
CONDUCTIVE RUBBER COMPOUNDS**

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Product Application PA R516-GL





## WHO WE ARE - ORION S.A.

Orion S.A. (Orion) is one of the world's leading suppliers of carbon black. With more than 160 years of experience in carbon black production we offer our customers a broad range of carbon black that includes high-performance furnace black, thermal black, lamp black and specialty black to improve for instance the durability of rubber goods, the rolling resistance of tires or the electrical conductivity in rubber applications while maintaining rheological and mechanical properties of rubber on a high level.

Our products are used in hoses, tires, belts and conductive product applications. With more than 1,600 employees worldwide, Orion runs 15 global production sites and a central Innovation Center, focusing on quality supply and collaborative partnerships with customers. Common shares of Orion S.A. are traded on the New York Stock Exchange under the symbol OEC.

## PRINTEX® kappa 70 - PRODUCT DESCRIPTION

Historically the ASTM grade N472 is regarded as a highly electrically conductive furnace black within the rubber industry. PRINTEX® kappa 70 as a representative of such a conductive furnace black (N472) grade provides superior conductivity already at lower concentration than standard high specific surface area furnace carbon blacks regularly used in the field of conductive blacks. This improved conductive filler is now closing the gap between Orion's extra conductive black PRINTEX® XE2 B and other standard conductive blacks like HIBLACK® 40B2.

At the same time PRINTEX® kappa 70 keeps the rheological properties of rubber compounds and the mechanical properties of rubber goods on an excellent level. This was achieved by putting already in the development phase of PRINTEX® kappa 70 a particular focus on a robust rubber processability, smooth compound surfaces and an overall superior in-rubber performance. Furthermore, the robust processability is demonstrated by lower Mooney viscosities of compounds with equal Shore A hardness.

## RUBBER APPLICATIONS FOR PRINTEX® kappa 70

PRINTEX® kappa 70 is a wet-beaded universal conductive furnace black which can be utilized in demanding applications like ESD (Electrostatic Discharge) and ATEX (Atmospheric Explosion) protection, wire and cable, and parts where elevated and permanent conductivity is required. Typical samples are fuel hoses, power transmission belts, printing rolls or chimney compounds in passenger car tires.



**Table 1**

**Typical data of PRINTEX® kappa 70 and other conductive carbon blacks**

PROPERTY	UNIT	PRINTEX® XE2 B	PRINTEX® kappa 70	N472 REFERENCE
Surface area (BET)	m <sup>2</sup> /g	1000	245	270
Oil absorption number (OAN)	ml/100g	420	170	180
Specific surface area (STSA)	m <sup>2</sup> /g	890	130	140
Ash content	%	< 2.0	< 0.15	< 1.0
Sieve residue (325 Mesh)	ppm	< 50	< 25	< 50

## IN-RUBBER PERFORMANCE OF PRINTEX® kappa 70

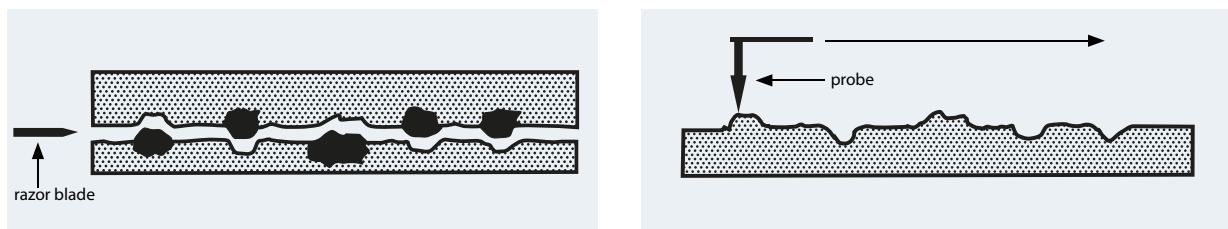
To evaluate the in-rubber performance of PRINTEX® kappa 70 an emulsion SBR formulation was prepared with a variable carbon black loading of 0 – 50 phr, 3 phr zinc oxide, 1 phr stearic acid, 2 phr ground sulfur and 1 phr CBS. Mixing was performed in 1.5 liter internal mixer with intermeshing rotors, final mixing followed on an open mill.

An excellent processability of PRINTEX® kappa 70 is demonstrated by a very smooth surface and confirmed by a very good macro dispersion of PRINTEX® kappa 70 compared to the reference N472 grade.



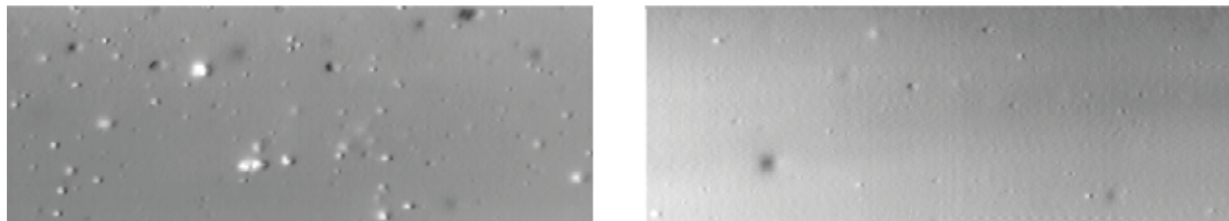
**Figure 1**

**Principal test method - topography**



**Figure 2**

**Topography images of N472 reference (left) and PRINTEX® kappa 70 (right) at equal loading**

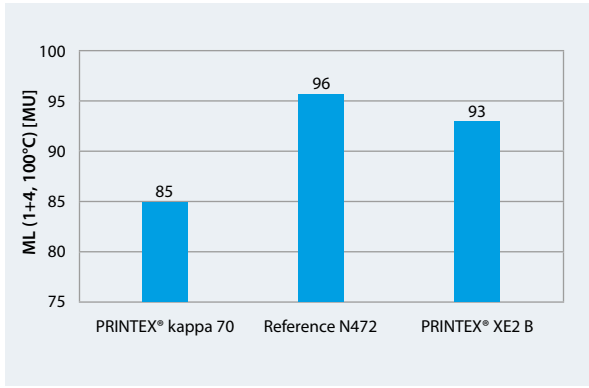


Furthermore, the robust processability is demonstrated by lower Mooney viscosities of compounds with equal Shore A hardness. The carbon black concentration at hardness, 65 Shore A, is 28 wt% both for PRINTEX® kappa 70 and the reference N472 respectively 19 wt% for PRINTEX® XE2 B.

The very good mechanical properties of the vulcanizates of PRINTEX® kappa 70 are reflected in higher tensile strength and higher elongation at break.

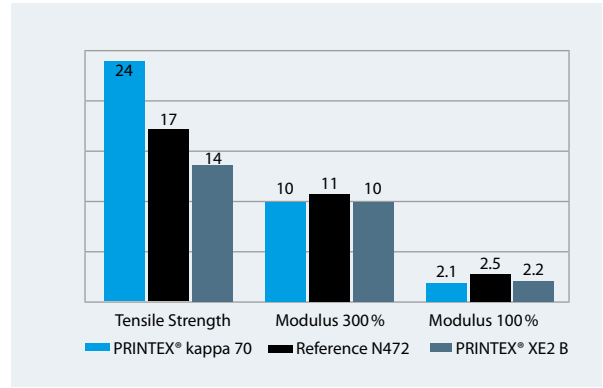
**Figure 3**

**Mooney viscosity at equal hardness, 65 Shore A**



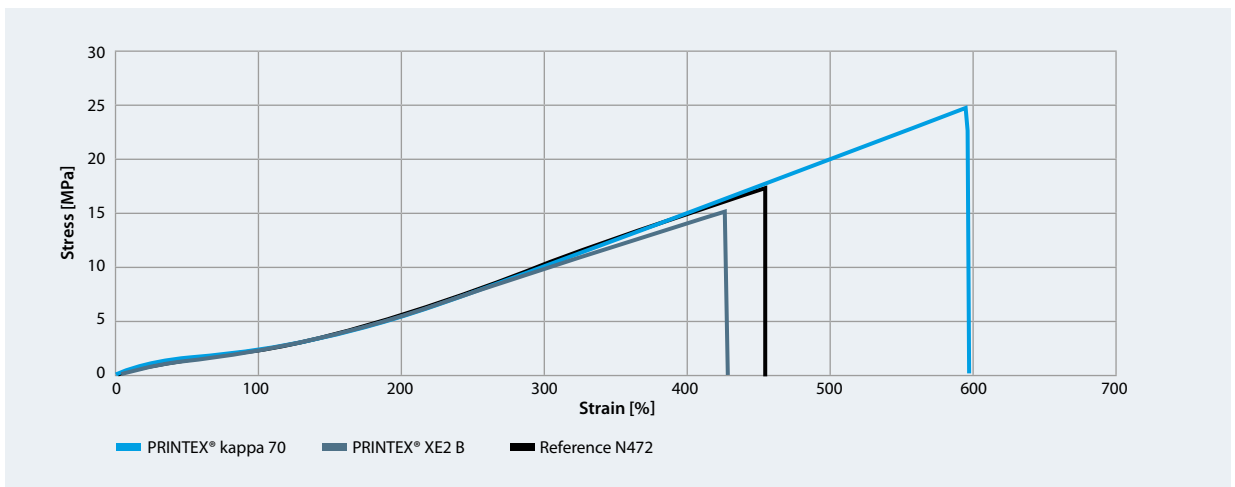
**Figure 4**

**Tensile properties at equal hardness, 65 Shore A**



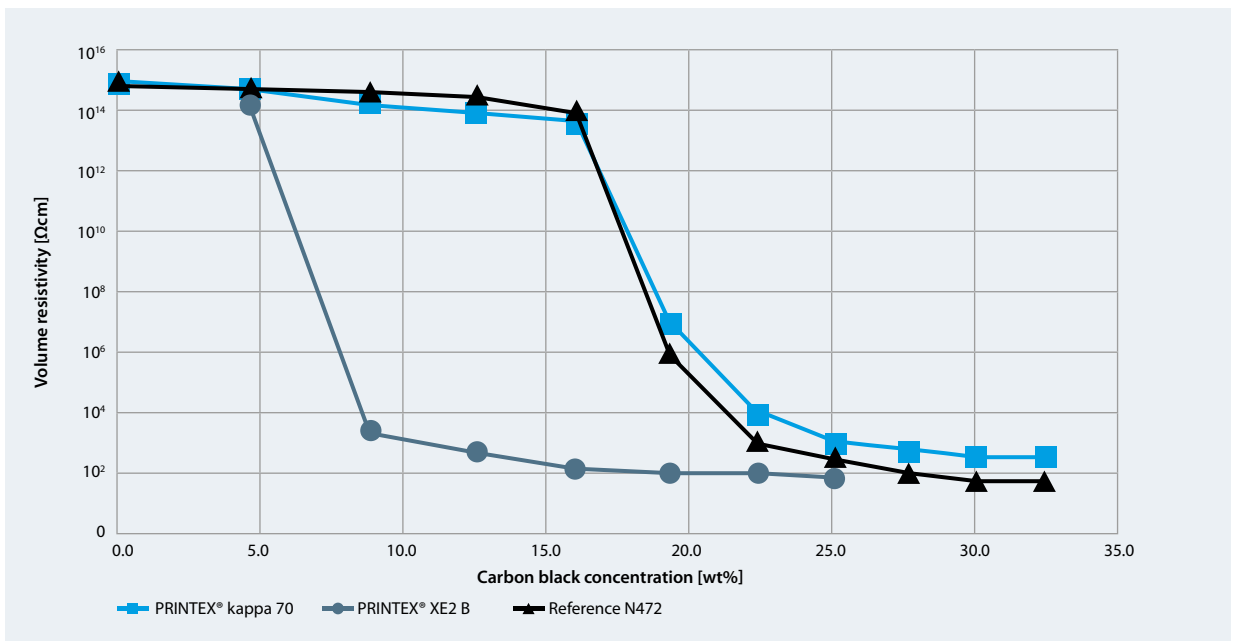
**Figure 5**

**Tensile properties at equal hardness, 65 Shore A**



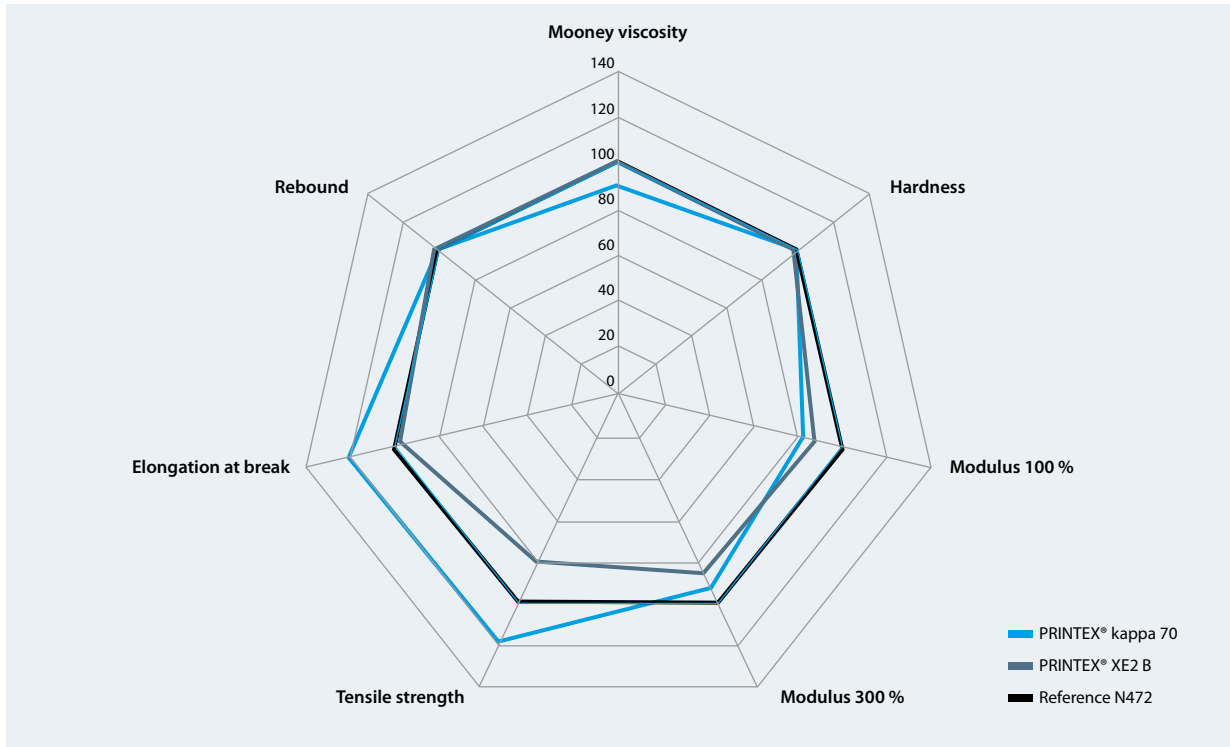
**Figure 6**

**Percolation threshold of PRINTEX® kappa 70 - comparison in an ESR formulation**



**Figure 7**

**PRINTEX® kappa 70 at a glance - comparison of key characteristics in an ESRB formulation at equal hardness, [%] relative to reference**



### Summary

PRINTEX® kappa 70 is a new wet-beaded conductive furnace black with well balanced properties between electrical conductivity and in-rubber behavior to address the needs across a wide range of conductive applications. PRINTEX® kappa 70 has several outstanding performance characteristics like excellent processability (superior dispersion and lower Mooney viscosities) and advantageous mechanical properties (high tensile strength and elongation at break) to enhance surface smoothness and to maintain mechanical properties on a high level.





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