

Technical Information

No. 1261

▶ **PRINTEX® XE2** **PRINTEX® XE2-B** **DERUSSOL® NA 9/XE2-B**

Printex® XE2 and Printex® XE2-B are conductive blacks with extraordinary properties which differ significantly from those of conventional carbon blacks.

This difference is essentially attributed to the porous structure of Printex® XE2 and Printex® XE2-B.

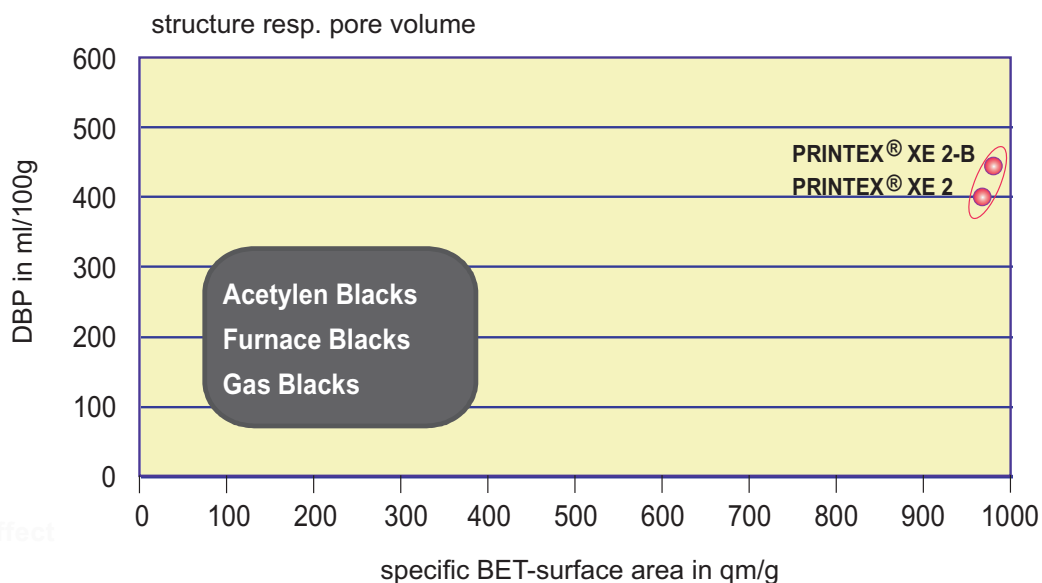
In the case of Printex® XE2 and Printex® XE2-B the major physical properties regarding conductive characteristics of carbon black - such as specific surface area, structure and pore volume - range on an entirely different level than those of conventional carbon blacks. This is shown in the diagram below.

A comparison of the physico-chemical data is shown in **Table 1**.

In general, polymers exhibit a high electrical resistivity. As a result of employing Printex® XE2's and Printex® XE2-B's extraordinary properties, a noticeable drop in the resistivity of polymers is observed at comparatively low concentrations.

The use of Printex® XE2-B results in similar good conductive properties as the use of Printex® XE2, though at increased sulphur and heavy metal contents. A possible influence on the heat ageing properties of plastics has to be taken into consideration.

When producing conductive compounds, only relatively small quantities of Printex® XE2 and Printex® XE2-B are needed.



PRINTEX® XE2 PRINTEX® XE2-B

Iodine absorption mg/g	1075	1125
DBP-absorption ml/100 g	380	420
Sieve residue ppm	≤ 500	≤ 500
Ash content %	≤ 1,0	≤ 2,0
Sulfur content %	≤ 0,4	≤ 0,8
Fleetingness at 105 °C	≤ 1,0	≤ 1,0
pH-value	8	7,8

Vanadium content ppm	approx. 1000	approx. 5000
Nickel content ppm	approx. 500	approx. 2500
Iron content ppm	approx. 300	approx. 1800

Table 1: Physico-chemical data

This is a very important advantage compared to other conductive compounds containing higher concentrations of conventional carbon blacks. This results in the following positive effects:

- decreased influence on the viscosity of liquid systems and polymer melts
- reduced effect on the flow and injection properties of thermoplastic compounds
- less influence on mechanical properties of particular final products
- highly reduced moisture adsorption of the conductive compound when stored under unfavourable weather conditions.

Applications

Printex® XE2 and Printex® XE2-B are mainly used for the manufacture of electrically conductive or antistatic compounds. Low sensitivity to mechanical stress during processing and production is a particular advantage of Printex® XE2 and Printex® XE2-B.

Thermoplastics

Among the leading fields of applications are:

- containers, boxes and trays (not to be used for food)
- tubes and fittings
- flooring compounds (computer rooms, hospitals, etc.)
- plastic films and packaging materials (for explosives and electronic components)
- heating panels and sheets
- cables (for conductor jacketing and shielding)
- shielding elements (EMI-Shielding)

For instance based on PE, EVA, EEA, PP, PA, PS and copolymers, PVC, PC, POM, PUR, SI, UP, EP, etc.

Elastomers

In this case Printex® XE2 and Printex® XE2-B are applied to produce rubber goods such as:

- conveyor belts and transmission belts
- flooring compounds
- cables (for conductor jacketing and shielding)
- technical rubber goods
- tanks for transportation and fuel
- hoses
- special tires and rollers

For instance, based on NR, SBR, EPDM, CPR, BR and nitrile rubber etc.

Other Special Applications

Further applications of Printex® XE2 and Printex® XE2-B are the electrically conductive modification of:

- adhesives and sealants
- papers for use in conductor insulation and cash registers
- paints and coatings
- printing inks
- resin-modified mineral systems such as knifing fillers, floor pavements, concrete, mortar, etc.

Processing Recommendations

Printex® XE2 and Printex® XE2-B provides equivalent conductivity at a mere one-third to one-quarter of volume by weight, compared to that of conventional carbon blacks.

In thermoplastics, for instance, amounts of about 5 -15 % by weight of Printex® XE2 and Printex® XE2-B are sufficient to achieve resistivity values in the range of $< 10^2 \Omega \text{ cm}$.

In rubber compounds, Printex® XE2 and Printex® XE2-B are preferably used in combination with other carbon blacks (2-6 phr). However, it can also be used as the sole component at 20-30 phr.

	PRINTEX® XE2	PRINTEX® XE2-B
Electrical resistivity in PP 8 wt. % carbon black	43 $\Omega \text{ cm}$	42 $\Omega \text{ cm}$
Filter pressure value (15 % carbon black, 85 % PE), 42 μm Sieb	0.077 bar cm^2/g	0.076 bar cm^2/g
Microtome cut (Number of particles: according to 5 cm^2 und 2,5 % carbon black-content)		
20 μm	21	180
30 μm	1	79
40 μm	1	1
50 μm	1	2
60 μm	1	0
> 60 μm	0	0

Table 2

DERUSSOL® NA 9 / XE2-B

Pigment black dispersions have proven successful for many years for the antistatic finishing of aqueous binder/filler systems. A great advantage here must be seen in the possibility of dust-free metered addition of the carbon black. In addition, no intensive dispersing is necessary because the dispersion already contains the carbon black in well distributed form. In order to ensure the stability of carbon black dispersions, they contain carefully matched wetting agent systems.

Designation:	Derussol® NA 9/XE2-B
Carbon black-content:	9 %
Solid matter content:	23 %
Wetting agent :	anionic/non-ionic

The presence of cation-active substances, especially multivalent cations, for example of iron and aluminium, various wetting agent systems, the pH value, etc. can result in a flocculation of the carbon black.

During the testing of the dispersion, it must be considered that the concentration of the carbon black used, lies below the concentration used for conventional conductivity blacks. The amount of water introduced via the dispersion should be considered in the formulation.

An aqueous dispersion based on Printex XE2 is available on request as a special product, too.

Before the processing, the containers must be stirred. Since temperatures below + 1° C and over + 30° C can possibly result in a flocculation, appropriate storage conditions must be maintained. Under normal conditions carbon black dispersions can be stored for at least four months.

Product Forms Supplied

Printex XE2 and Printex XE2-B are supplied as pelletized carbon black in 5 kg PE-LD bags.

Carbon black dispersions are offered in 100 kg open-head drums with PE-liners or in 1000 l containers.

Literature List

Information regarding product safety are published in our Material Safety Data Sheets.

No.	Titel
SR 7	Degussa Pigment Blacks and Pigment Black-Preparations for Plastics
TI 1185	Pigment Blacks for Plastics

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