
QUALITY PRINTS.
Bayoxide® E for Toners
Iron oxide pigment solutions for printing systems.
Bayoxide®
QUALITY WORKS.
LANXESS
Energizing Chemistry

A PERFECT PRODUCT RANGE

Tailor-made iron oxides for printing systems

LANXESS is the world's largest manufacturer of synthetic iron oxides and offers a full range of pigmentary products developed specifically for the toner industry. Our high-performance Bayoxide® E 8700 grades are produced by the precipitation process in Germany.

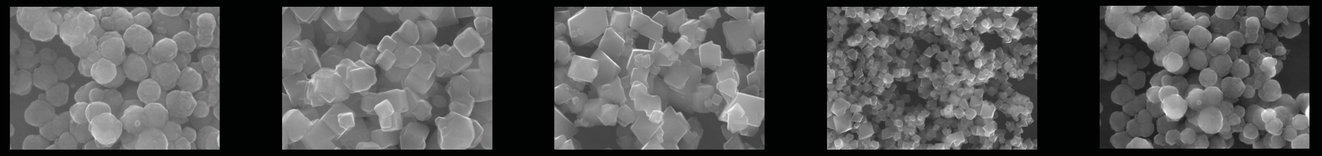
Important properties such as coercivity and remanence of a toner are, to a certain extent, dependent on the type of system used in the copier or printer. To satisfy the requirements of virtually any type of machine, LANXESS offers products in the ranges of 55 Oe, 100 Oe and 125 Oe.

There is also a product with a special coating available to give it water-repellent properties. This significantly reduces moisture adsorption and improves the dispersibility in certain formulations, e.g. polyester based systems.

BAYOXIDE® E
HIGH PERFORMANCE GRADES

	BAYOXIDE® E				
	8706	**8709**	**8710**	**8712**	**8707 H** (surface treated)
Main constituent	Fe_3O_4	Fe_3O_4	Fe_3O_4	Fe_3O_4	Fe_3O_4
Total iron oxide content, determined as Fe_2O_3 [%]	~ 99	~ 99	~ 99	~ 99	~ 96
Specific surface area (BET) [m^2/g]	~ 8.0	~ 6.5	~ 4.5	~ 8.8	~ 7.5
Moisture content [%]	≤ 1.0	≤ 1.0	≤ 1.0	≤ 0.5	≤ 0.5
pH value	~ 6.8	~ 8.5	~ 6.0	~ 7.0	~ 6.0
Coercivity (iHc) [Oe]	~ 55	~ 95	~ 97.5	~ 110	~ 70
Remanence (Br) [G]	~ 350	~ 803	~ 860	~ 920	~ 525
[emu/g]	~ 6.0	~ 13.9	~ 14.9	~ 16.0	~ 9.1
Saturation magnetisation (Bs) [G]	~ 5,150	~ 5,055	~ 5,100	~ 5,150	~ 5,100
[emu/g]	~ 89.2	~ 87.5	~ 88.3	~ 89.2	~ 88.3

TABLE 1 | **The magnetic data** were measured with a Remagraph C magnetometer at a maximum field strength of 5 kOe assuming a density of 4.6 g/cm^3.



E 8706, spherical | E 8709, cubic | E 8710, octahedral | E 8712, octahedral | E 8707 H, spherical

FIGURE 1 | **Electron micrographs** (magnification 30,000:1) of high performance Bayoxide® E grades.

Our Bayoxide® E 8700 grades have outstanding tinting strength and a bluish black color, which is preferred by most end-users. High tinting strength allows the development of toners with high image density.

Due to a low heavy metal content our toner oxides meet the requirements of the Japanese “Eco Mark” and German “Blue Angel”.

The Bayoxide® E 8707 H grade is treated with an organic silicon compound to minimize water adsorption which can occur when the unpacked product comes into contact with humid air. Due to the hydrophobic and lipophilic nature of the surface, the dispersibility is improved in many formulations, particularly in polyester based systems.

Coated toner pigments have improved dispersibility in polyester based formulations:

- no adsorbed water molecules on the surface
- nearly no moisture uptake during handling, storage in silo and blending
- improved wetting behavior because of lipophilic nature of the surface

PRIMARY PARTICLE SIZE DISTRIBUTION OF BAYOXIDE® E HIGH PERFORMANCE GRADES

The Bayoxide® E 8700 types have a particularly narrow particle size distribution between 0.15 and 0.5 µm, defined particle shape and good dispersibility.

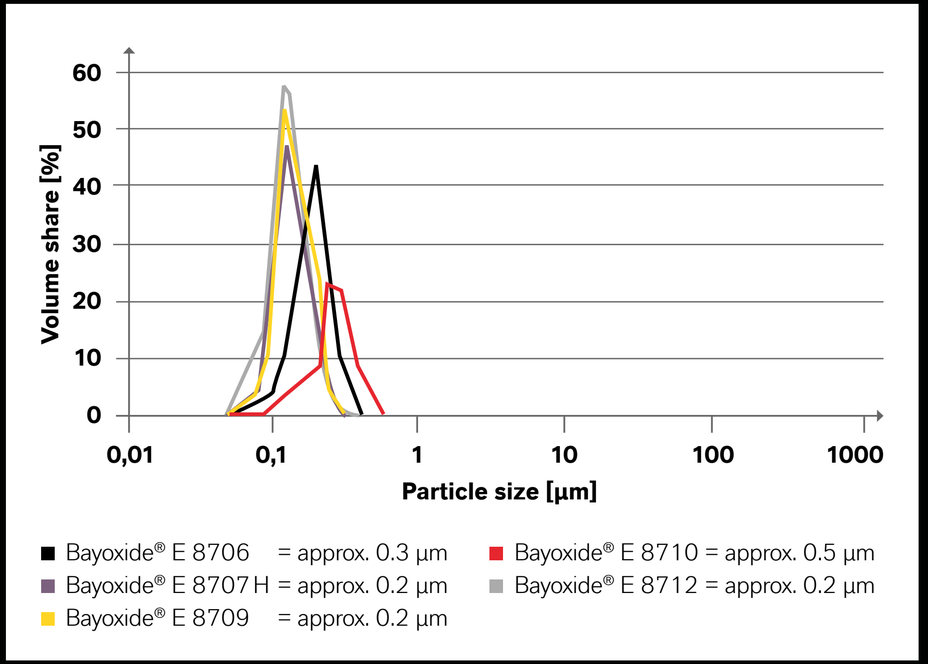


FIGURE 2 | **Primary particle size** of Bayoxide® E high performance grades.

COLOR OF BAYOXIDE® E
HIGH PERFORMANCE GRADES

The end-user requires toners with a high image density at a reasonable yield. While the balance between yield and image density can be influenced by changing the magnetite content of the toner, both yield and image density can be optimized at the same time, when oxides with high tinting strength are used. In this respect, most of the Bayoxide® E 8700 grades have an outstanding tinting strength and a bluish black color, which is preferred by most people.

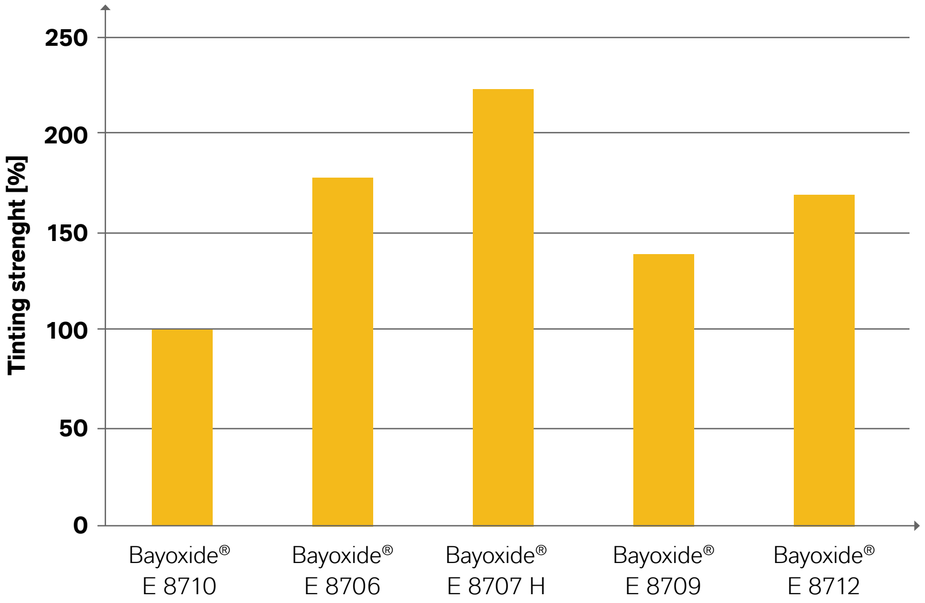


FIGURE 3 | **Tinting strenght** (%) of Bayoxide® E grades.

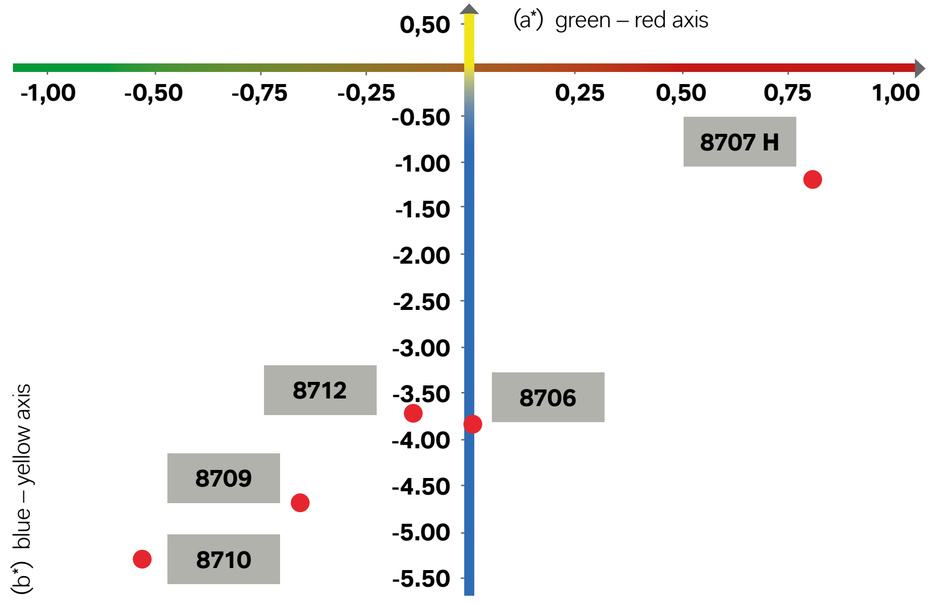
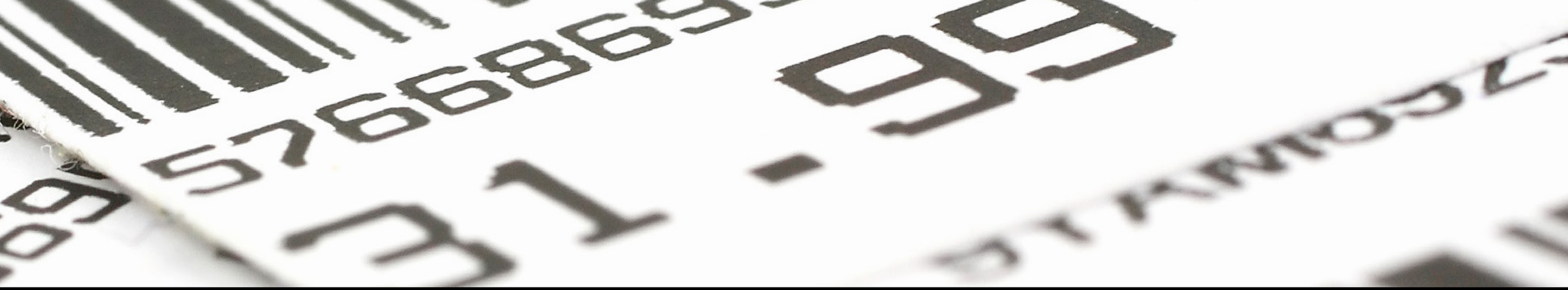
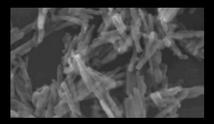


FIGURE 4 | **Chromaticity coordinate** of Bayoxide® E grades in reduction with TiO_2 (1:5).



HIGH COERCIVE NEEDLE SHAPED BAYOXIDE® E FOR THE PRODUCTION OF M.I.C.R. TONERS

High coercive needle shaped magnetites are used for M.I.C.R. (Magnetic Ink Character Recognition) toners for document printing. Bayoxide® E 8840 is an acicular, magnetic iron oxide black pigment. It has a coercivity of 375 Oe and is particularly suited for the production of M.I.C.R. toners which are used for the printing of machine-readable checks and security documents. It exhibits a very high coercivity and remanence.



E 8840, acicular

FIGURE 5 | **Electron micrograph** (magnification 30,000:1) of standard Bayoxide® E grade.

TABLE 2 | **The magnetic data** were measured with a Remagraph C magnetometer at a maximum field strength of 5 kOe assuming a density of 4.6 g/cm^3.

Typical analytical data of Bayoxide® E 8840	
Main constituent	Fe_3O_4
Total iron oxide content, determined as Fe_2O_3 [%]	> 99
Specific surface area (BET) [m²/g]	~ 19
Moisture content [%]	≤ 0.5
pH value	~ 6.5
Coercivity (iHc) [Oe]	~ 375
Remanence (Br) [G]	~ 2,225
[emu/g]	~ 38.5
Saturation magnetisation (Bs) [G]	~ 4,623
[emu/g]	~ 80.0

HOW CAN WE HELP YOUR BUSINESS?

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