

## TECHNICAL SHEET

### NANOMAG\_water

**Descrizione:** Fe<sub>3</sub>O<sub>4</sub> nanoparticle suspension in water stabilized with phosphates

**Appearance:** dark brown liquid

#### Chemico-Physical Characteristics:

|   | Strumento          | Range       |
|---|--------------------|-------------|
| Fe <sub>3</sub> O <sub>4</sub> concentration [% w/w]                        | ICP-OES            | 0,45 - 0,55 |
| Average hydrodynamic diameter [nm]<br>Z-average                             | pHmetro            | 30 - 45     |
| PdI   | DLS                | 0,11 – 0,13 |
| pH  | pH-meter           | 9,2 – 10,7  |
| <b><i>Magnetic core characteristics<sup>1</sup></i></b>                     |                    |             |
| Crystalline diameter [nm]   | XRD                | 9,0 – 14,0  |
| Average inorganic diameter [nm]   | TEM                | 12,0 – 26,0 |
| Blocking Temperature (T <sub>B</sub> ) [K] <sup>1</sup>                     | SQUID Magnetometer | > 300       |
| Saturation magnetization (M <sub>s</sub> ) at 300K<br>[Am <sup>2</sup> /kg] | SQUID Magnetometer | 66,0 – 72,0 |
| Saturation magnetization (M <sub>s</sub> ) at 5K<br>[Am <sup>2</sup> /kg]   | SQUID Magnetometer | 75,0 – 82,0 |
| Remnant Magnetization (M <sub>r</sub> ) at 300K<br>[Am <sup>2</sup> /kg]    | SQUID Magnetometer | 0           |
| Remnant magnetization (M <sub>r</sub> ) at 5K<br>[Am <sup>2</sup> /kg]      | SQUID Magnetometer | 27,2 – 30,6 |
| Coercive Field (H <sub>c</sub> ) at 300K [kA/m]                             | SQUID Magnetometer | 0           |
| Coercive Field (H <sub>c</sub> ) at 10K [kA/m]                              | SQUID Magnetometer | 23,0 – 31,0 |
| Ratio M <sub>r</sub> /M <sub>s</sub> at 10K                                 | SQUID Magnetometer | 0,35 – 0,45 |

<sup>1</sup> Magnetic properties vary with the properties of the matrix in which nanoparticles are dispersed.

|  |                                     |           |
|--|-------------------------------------|-----------|
| RF mediated Hyperthermia ( $H_0= 22$<br>(kA/m); $f = 356$ (kHz)) [W/g] | RF generator<br><i>pancake coil</i> | 700 - 900 |
|--|-------------------------------------|-----------|

## Applications

The product is used for Magnetic Fluid Hyperthermia applications and for encapsulation in organic matrices for the preparation of biocompatible formulations to be employed in the biomedical field.

**The magnetic and hyperthermic characterization of the magnetic core is provided. Each lot of the product containing the magnetic core indicated above will be analyzed and characterized in terms of the aforementioned quantities at the time of release.**

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