

FLUIDNATEK™

**CUTTING EDGE ELECTROSPINNING
& ELECTROSPRAYING DEVICES**

by  **BioIncia**
Innovative Polymer
Applications

THE FLUIDNATEK™ TOOLS

we create the future

USE CASES

FLUIDNATEK™ Lab Tools are research instruments designed for the fabrication of small spherical and fibrous particles (with diameters ranging from the micro to the nanoscale) as well as for the creation of thin film coatings. The particle manufacturing process of FLUIDNATEK™ tools relies on **eStretching (electrospray and electrospinning)**.

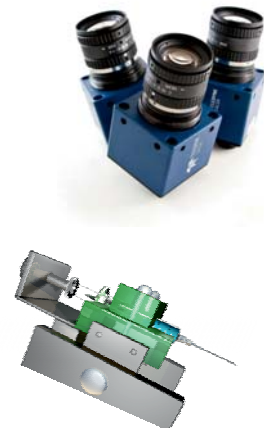
Using physical forces, instead of chemical, **micro & nano particles** of many different materials can be obtained: biopolymers, proteins, carbohydrates, macromolecules, synthetic and natural polymers, sol-gel materials, ceramics and glasses.



HIGH THROUGHPUT

FLUIDNATEK™ Tools for Industry are designed to scale any of the eStretching processing techniques (eSpinning, eSpraying, co-eStretching and multiaxial eStretching) from lab through pilot line to industrial volume production.

The high flexibility of FLUIDNATEK™ equipment designs and its experienced team with long track in the manufacturing of nanosize-controlled materials allow us to offer the best solution to the particular specifications and requirements of your application.



ACCESSORIES

FLUIDNATEK lab tools can be customized with an **extensive range of accessories:**

- Multi-axial arrangements
- Custom nozzles
- Rotating collectors
- Automated linear motion
- Fluid heating
- Parallel injection heads (to increase productivity)
- Continuous particle collection
- :

The working conditions inside the chamber can be controlled to meet the requirements of the different applications through our proprietary systems: **relative humidity, temperature, gas composition (i.e O2 absence, inert conditions), cleanliness and sterility.**

FLUIDNATEK also provides its industrial clients with proper systems to increase their productivity (remote control, automated cleaning, solvent recovery systems) and to obey the required standards (i.e. abatement exhaust systems).

THE FLUIDNATEK™ TOOLS

quality, knowledge and confidence

KEY BENEFITS

▶ FLEXIBILITY

Adaptable to any scale: from **laboratory**, through **pre-series** to **pilot** and **industrial** production.
Applicable for an **exceptionally wide range of materials and solvents**.

▶ FUNCTIONALITY

Able to up-scale all the eStretching processes (including **coaxial** and **multi-axial**).
Touch screen controlled.
The tools can be **remotely operated**.

▶ VERSATILE

Work with many types of materials and solvents.
Field upgradable with optional accessories.

▶ QUALITY

Needle based configurations ensure a **very good control** on the process, enabling a **tight particle size distribution** and high product **homogeneity**. Ideal for very high value added products.

▶ ROBUSTNESS and SAFETY

Extensively **peer tested** by our worldwide customers.
FLUIDNATEK™ is **compliant** with the required **regional and industrial standards**.
Proper solvent exhaust system removes the risk of fire and explosion.

▶ CUSTOMER-DRIVEN

FLUIDNATEK™ has a long track record in providing customized solutions that **meet your special needs** and **fit your budget**.

▶ THROUGHPUT

Modularity enables the scaling to volume production at both **pilot and industrial scales**.
The production scales with the number of emission heads.

FLUIDNATEK™ TECHNOLOGY

e-Stretching

Over the past decade the electro-stretching or eStretching of liquids has been gathering increasing interest from academia and industry. This technology, through its two main approaches (electrospinning and electrospraying) offers **simplicity and flexibility** for the development and production of novel micro, submicro and nanomaterials for many different applications.

The eStretching technology relies on the application of strong electric forces to liquids. When a high enough voltage (tens of kV) is applied to a liquid flowing through a capillary tube, a micro-jet is obtained. The diameter of the emitted liquid jet depends mainly on the electrical conductivity of the liquid, ranging from the microscale (for non-conducting liquids) to the submicron and the nanometer range when highly conducting liquids or solutions are used. Downstream, depending on the rheology of the liquid, the jet breaks up into droplets (electrospraying or eSpraying) or undergoes a whip-like motion (electrospinning or eSpinning).

eSpraying

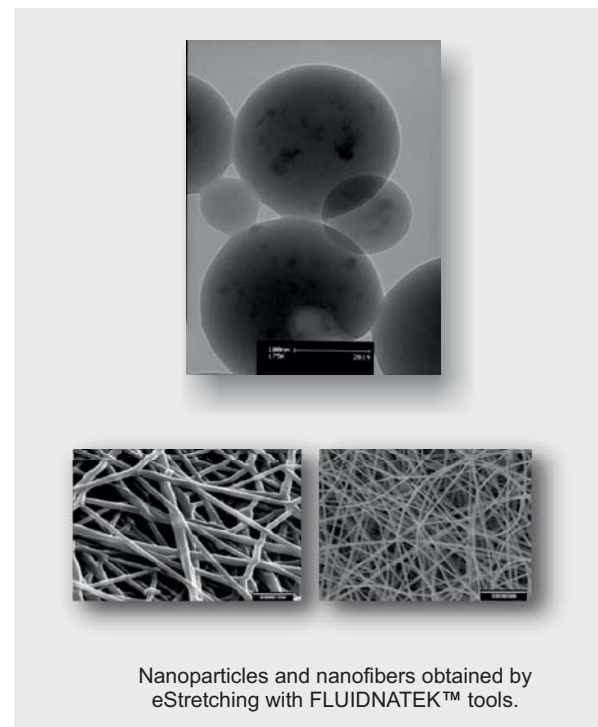
If the liquid viscosity is low, the liquid jet breakup forms a spray of highly charged liquid droplets. These droplets will be evaporated and solid spherical particles may be collected on the collection substrate.

Similarly to eSpinning, eSpraying is suitable for controlled particle generation, ideal for encapsulation purposes. Besides, this eStretching approach is also particularly suitable for the production of very homogeneous functional micro- and nano-metric coatings of adjustable morphology (plain and porous).

eSpinning

eSpinning is a very good and competitive technique for the generation of nanofibers of many different materials and non-woven mats of nanofibers. These non-wovens exhibit great potential for their high active specific surface and porosity (up to 95%).

A very relevant benefit is that the evaporation of the solvent occurs at room conditions and no heating is needed, which makes this technique applicable for dealing with labile materials, such as live cells, enzymes, microorganisms and other substances that are commonly used in the areas of **Biotechnology, Food and Pharmacy**.



MARKETS AND APPLICATIONS



Due to its flexibility, FLUIDNATEK™ equipment are ideal to both research and mass produce e-Stretched nanomaterials that can be applied in diverse areas such as:

- ▶ ACTIVE PHARMACEUTICAL INGREDIENTS
- ▶ BIOTECHNOLOGY
- ▶ FUNCTIONAL FOODS
- ▶ FOOD PACKAGING
- ▶ NUTRACEUTICALS
- ▶ BIOMEDICAL & TISSUE ENGINEERING
- ▶ CHEMICAL ENGINEERING
- ▶ CATALYSIS
- ▶ SENSORS
- ▶ DRUG DELIVERY
- ▶ TEXTILES
- ▶ HEAT MANAGEMENT
- ▶ FILTRATION
- ▶ COMPOSITES
- ▶ AFFINITY MEMBRANES
- ▶ MICRO & NANO ENCPASULATION
IMMOBILIZATION OF
LIVE CELLS, ENZYMES AND
OTHER SUBSTANCES



ABOUT BIOINICIA

comitted to excellency

As the engineering division of BioInicia, FLUIDNATEK™ is focused on providing research groups and the companies involved in the field of micro-submicro-nano particle and fibers technology with suitable equipment to develop their products at their target scale by eStretching techniques.

The FLUIDNATEK™ team consists of technologists and application scientists recognized in the field of materials science, especially in the production of micro and nano particles/fibers by eSpraying and eSpinning. FLUIDNATEK™ is also being developed by a team of engineers with long track record in the design, automation and manufacturing of scientific instruments and industrial equipment.

Together they constitute a group of enthusiastic experts that will provide FLUIDNATEK™ clients with a wide variety of robust and functional tools specially conceived for either R&D or volume production.

The parent company, BIOINICIA, is focused on the development of high value-added products for the food and pharma industries. The existing pilot plant that BioInicia owns allows to toll manufacture any product by eSpinning or eSpraying. BioInicia also helps FLUIDNATEK™ clients in the areas of micro-encapsulation and nano-materials processing through product development and consultancy services.



BIOINICIA WORLDWIDE

BIOINICIA's headquartes are located in Valencia (SPAIN).

In order to offer the best technical and commercial assistance to our customers, FLUIDNATEK™ has established a worldwide network of distributors, representatives and agents.

CONTACT DETAILS:



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