Pilot-scale Dip-Electrospinning Unit

Electroris-Dip® is a polymeric/ceramic nanofibers producer machine in large scale. The conventional electrospinning machines often use nozzle to produce nanofibers with a very low production rate and it is usually suitable for research. Despite the enormous application potential, needle electrospun nanofibers meet difficulties in broad applications in practice, due to the lack of an economic and efficient way to scale up the electrospinning process. Dip electrospinning appeared as an alternative electrospinning technology with the aim of producing nanofibers on a large scale from a compact space. Dip-electrospinning is featured as electrospinning of nanofibers directly from an open liquid surface. Numerous jets are formed simultaneously from the needleless fiber generator. Electroris-Dip has a main body with a stainless steel drum dipped in a polymer solution bath, a plate / rotating drum collector, positive and negative high voltage power supplies and a rolling system of substrate.

Electroris-Dip can control the electrospinning parameters and conditions including electro spinner drum and collector rotating speed, working distance, the rolling system including the direction and rate, working temperature (room temperature to 45°C) and operation time. Electroris-Dip has sufficient safety for users with respect to the handling of a high voltage power supply and chemical solvents. Electroris-Dip® has been produced in 3 collector sizes: 20, 50 and 100 cm named NL20, NL50 and NL100.

Model	Collector	Spinner length (cm)	Collector diameter (cm)	Bath Volume (ml)	No of HV	Machine size (cm)	Machine weight (kg)
NL25D	Drum	20	8	350	2	70*70*80	120
NL50D	Drum	50	16	750	2	125*90*95	200
NL100D	Drum	100	32	1500	2	220*120*130	300
NL30R	Roll to Roll	30	Plate	450 * 3	6	150*90*200	350

Features:

Flexibility

- Various polymers and composites have the potential to be electrospun.
- Different product specifications such as porosity, morphology, and diameter can be obtained.
- The process is easy and economical.
- Different polymer types such as synthetic, biodegradable and natural polymers and/or
- polymer/composite may be processed.

Easy operations and convenient functions:

- Electrospinning parameters can be programmed in full controllable ways via user-friendly panel.

Control

- Analog Control (NL20) / PLC with HMI interface (NL50 and NL100)
- easy-to-use

High voltage:

- 0-35 kV DC, Positive Polarity, precise adjustable
- 0-35 kV DC, Negative Polarity, precise adjustable
- Digital Voltages Monitoring

Spinneret:

- Stainless steel drum
- Changeable (Cylinder, disk or wire)
- Length: 20, 50 and 100 cm related to the model
  Diameter: 6 cm
- Rotating speed: 2-20 rpm

Collector:

- Stainless steel
- Movable (up and down)
- electrospinning distance: 5-20 cm
- Rotating speed: 50 RPM (NL20) / 0-100 RPM (NL50 and NL100)
- Diameter: 8, 16 and 32 cm

Heating system:

- Room temperature to 45°C

Rolling system (NL30R model)

- Two speed controllable motors
- Suitable to gather flexible substrates like filter, fabrics or paper
- Speed controlling from 0 to 150 m/h

Nonvolatile Memory

- The system remembers its last configuration settings.

Ventilation

- Controlled by a On / Off Timer

Others

- Metallic Enclosure, with Ventilation fan
- With 3 doors on 3 sides

Power requirements:

- 200-240 V AC; 50/60Hz; single-phase;
- Current: 5, 9 and 12A (NL20, NL50 and NL100)

High voltage safety control

Earth detector

- Turn off HV while lock of proper earth

Safety switches

- Safety switches in 3 doors.