Pilot Fiber Nano Machine

PFNM 501

Pilot-scale **F**iber **N**ano **M**achine (PFNM 501) which is a polymeric/ceramic nanofiber producer machine in pilot (semi-industrial) scale for various applications. In the electrospinning parameters and conditions such as spinneret and collector parameters, working, distance, linear movement speed of the used substrate, working temperature, operation time, and the value of appied high voltages (positive and negative) could be controlled using an HMI control panel.

The machine offers excellent safety for users with respect to the handling of high voltage power supplies and chemical solvents. The pilot electrospinning machine has been designed and built to coat various substrates. Applying high voltage to the solution forms hundreds of polymer jets to the collector that is located on top of the spinneret. Finally, a layer of nanofibers forms on the collector.

Using this machine, nanofibers could be deposited on different substrates in pilot scale. Nanofiber coating rate on different substrates is about 1-100 m/h using this machine.

● Various polymers and composites have the potential to be electro spun.
● Different product specifications such as porosity, morphology, diameter, and ability to load beads 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 could be fully controlled through a user-friendly HMI control panel.
Nanofiber diameters:
● 60 to 500 nm Systems, control systems and panels:
● PLC system for controlling operating conditions
● Touch Screen interface (HMI)
● Using both positive and negative high voltage power supplies to obtain optimum electrospinning conditions

● Control the air pressure
● Control the scan speed
● Control the start and end position of the spinnerets
● Control the temperature of the electrospinning Chamber Indicating the humidity of the chamber (control is optional)
● Advanced high voltage control systems
● Emergency stop button
● easy-to-use Input power
● 220 volts, single phase, 50-60 Hz
Power consumption:
● Heater System: maximum 3 kW
● Control and HVPS: maximum 0.7 kW High voltage:
● Totally 80 kV DC
● 0-40 kV DC, positive polarity, precisely adjustable
● 0-40 kV DC, negative polarity, precisely adjustable
● Digital voltage monitoring and control (accuracy: 0.1 kV)
● HMI control system
● HV current limit to minimize the risks Collector:
● Stainless steel plate (static collection of fibers) or rotating drum (coating a desired substrate)

● Working distance: 5 - 17 cm
● Rotating speed: 0 - 50 RPM (Synced by substrate speed)
● Diameter: 17 cm Ventilation and heating
● Removing solvent from the chamber by a ventilation fan with a scheduled operation time
● Room temperature up to 45 °C Substrate winder
● Servo motor control system
● Substrate speed: 1 to 100 m/h
● Maximum substrate width: 60 cm
● Analogue Tension control (Digital control is optional)
Case
● 7 doors for easy access to all parts of the system
Dimensions
● Length: 342 cm ● Width: 174 cm ● Height: 234 cm
Weight
● About 1000 kg

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