

# Electrospinning & Electropray

## FibeRoller Machine



Doxa Microfluidics offers a wide variety of Coaxial Electrospinning and Electropray Lab Equipment for the design and production of Core-Shell and hollow, and plain nanofibers and particles. All the Lab Equipment supplied by Doxa allows clean operation with both Coaxial electrospinning and electropray technique and are built under each customer requirements and needs.

For those scientists and engineers who devotes to perform mass-scale production of nanofibers and nanoparticles using Electrospinning and Electropray Doxa has designed the FibeRoller Electrospinning Machine.



### FibeRoller Machine. | FEATURES

- ✦ **Aluminium, white coated Iron, Stainless Steel and Laminated Glass:** the unit has been designed to work in a laboratory/ research environment as well as factories environment, having an excellent flexibility, ease of use and minimum setup time and maintenance. The transparent doors located at the front allow the visualization of the process and ease the access to the cabinet. The only input required to operate the equipment is electricity and compressed air. The unit is equipped with all security measures, ensuring a safe operation to the user. The machine has two operation modes: safe and normal. In safe mode, the high voltage will turn off and the movable parts will stop at the time the doors are opened to ensure the security of the user. In normal mode, although the doors are opened all the parts will keep in operation. However, the user will be warned about the risk by a flashing red beacon. It also has an emergency stop button and a smoke detector that automatically shut down the equipment in case of hazard.

- ✦ **Roll to roll collector:** designed for rolls up to 1,7 m length. It is isolated by DELRIN® tower to avoid electric power losses and arc discharges. The height of the collector is controlled using the touch screen located at the front.

- ✦ **Control digital panel:** a touch screen, located at the front panel, allows the user controlling all the features provided by the equipment: platform movement, pumping system, roll speed, ... The software includes a user-friendly interface with the option of programming sleep-off mode (timer).



- ✦ **Two High Voltage Power Supplies:** reaching up to 60.000 V of voltage drop from the 2D array of injectors to the roll to roll collector. The device is equipped with two power supplies: one positive (up to +30kV) and one negative polarity (up to -30 kV). Which reduces losses of material. The voltages are fully controlled from two knobs located at the front panel, which provide the user a more accurate control of the process.



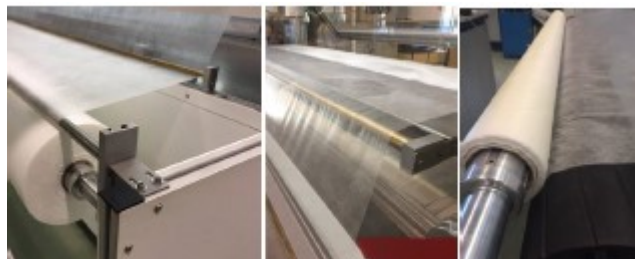
- **Pumping system:** a pressure variation driven pump the solution from a 2 litres tank (can work up to 6 bar air pressure) to the array of injectors through a liquid distributor and PTFE flexible tubes ensuring the correct flow rate distribution. Flow rate is adjusted by setting in the touch panel the length and diameter of tubes and needles and the solution properties.



- **Multinozzle Injector Platform:** a 2D array of 8 multinozzle injectors with 10 needles each is equipped in the machine. The functioning range and operating conditions of the multi-nozzle injectors strongly depends on the liquid solution to be processed.



- **Motion Platform:** in order to get a homogeneous thickness membrane, a transversal movement driven by automated platform system can be controlled (speed and position) easily from the touch panel. The maximum displacement for the injector is 225 mm, which is enough to ensure the overlapping of the injectors footprint. The max velocity of the injector platform is 300 mm/s. The roll to roll collector can be also controlled from the touch panel to adjust the velocity of rotation (up to 150 mm/s).



- **Integrated extractor hood:** the equipment includes a fume hood exhaust fan that allows an efficient ventilation of the cabinet.
- **Warranty and after sales service:** one year from the delivery date. Doxa commits to replay in 48 working hours following the reception of notice (by email or phone) of requirement for repair or technical assistance from the user.

# Electrospinning & Electrospray

## FibeRoller Machine

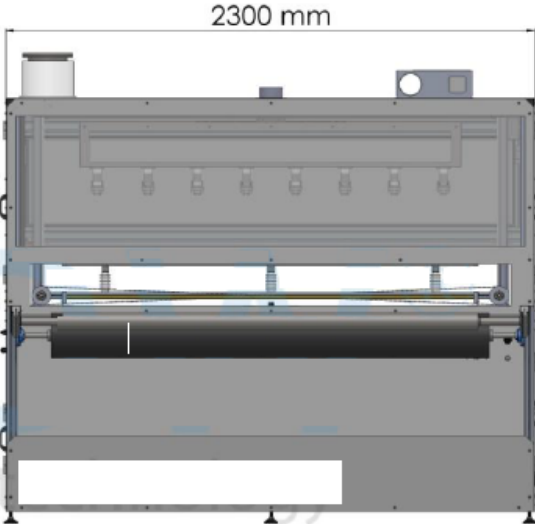
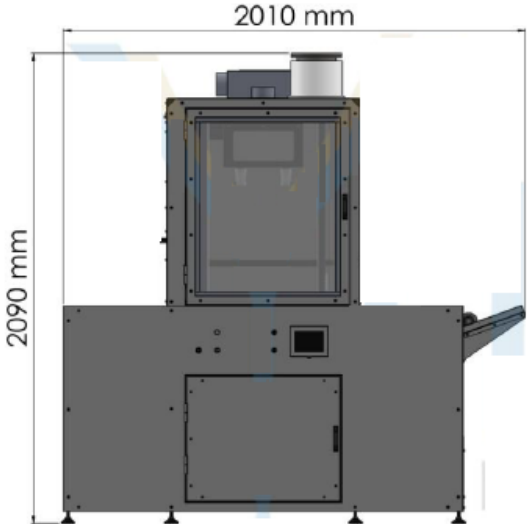


- ✿ **Installation and training course:** if the customer needs it, Doxa's personnel may travel to customer's facilities to complete the equipment installation and give a training course to show the end-user how the equipment works, during the training some electrospinning experiments would be performed. In addition, Doxa also offers a full training course (2-3 days long) where the fundamentals basics of electrospinning and electrospray techniques and the application of the Coaxial technique to microencapsulate will be performed.
- ✿ **User manual:** the equipment is supplied with a complete user guide that can be looked up by the final user in case of need.

# Electrospinning & Electropray FibeRoller Machine



## FibeRoller Machine. | DIMENSIONS



## FibeRoller Machine. | PICTURES GALLERY



# Electrospinning & Electropray FibeRoller Machine



## FibeRoller Machine. | GENERAL INFORMATION

ENCLOSURE MATERIAL	Aluminium, painted Iron, Stainless Steel and laminated glass.
Total weight	750 kg
Dimensions (LxWxH)	2010 x 2300 x 2090 mm
Power supply	210-230 V; 50-60 Hz
Power consumption (max)	< 2000 W
Operation interface	PROFACE Touch screen 5,7"
Warranty	1 year
HIGH VOLTAGE	
Polarization	Double polarization (+ and -)
Voltage range	-30 kV to + 30 kV
Maximum power	15 W
Adjustment voltage	Potentiometers 1,5 kV/ rev
FEEDING TANK PUMP	
Volume	2 L
Dead volume	200 mL
Flow rate Air Pressure	0,01 to 6 bar
INJECTORS	
Type	8 Multinozzle injector with 10 needles each with 1D movement axis.
Diameter of the outer needle (OD/ID)	1,7/ 1,4 mm
Diameter of the inner needle (OD/ID)	0,9/ 0,6 mm
Material of needle	Stainless Steel (AISI 304)
Material of body	PEEK
Distance injector – collector	Up to 200 mm
Distance injector- collector adjustment method	Automated via touch screen
COLLECTOR	
Type	Roll to roll
Max speed	150 mm/s
Dimensions	1,7 m length

# Electrospinning & Electropray FibeRoller Machine



ILLUMINATION	
Type	LED
SAFE AND SECURITY	
<ul style="list-style-type: none"><li>▪ Integrated extractor hood: fume hood exhaust fan allows an efficient ventilation of the cabinet. Extraction flow rate: up to 150 m<sup>3</sup>/h</li><li>▪ Normal and SAFE operation modes.</li></ul>	<ul style="list-style-type: none"><li>▪ Red beacon to warn that high voltages are ON</li><li>▪ Protection to peaks of voltage and current.</li><li>▪ Smoke detector.</li><li>▪ Emergency stop button.</li></ul>

*Note: pictures along the document may differ from reality.*

### Production yield estimation:

Material: PLA

Deposition objective: 0,5 g/m<sup>2</sup>

Substrate width: 1,2 m

Production yield: 20 m<sup>2</sup>/h