



INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
MATERIALS MANAGEMENT DIVISION
Powai, Mumbai 400076

Purchase Requisition No. 1000011745 (SRM/RFX No. 6100000192)

Technical specification of Roll-to-Roll Set-up for Perovskite Solar Cell Fabrication

Item description

Roll-to-Roll set-up for Perovskite Solar Cell fabrication on Flexible Substrates and LBIC for mapping of solar cells

Processing methods

Slot-die coating with optional Flexographic printing

1. Slot-die head with maximum 100mm width and strip (max. 8 numbers) coating. Options for printing up to 100 meters maximum.
 - Capable of handling water and organic solvent for thin coating layer. Slot-die head should be compatible of handling acidic solutions and organic solvents.
 - Arrangements for transporting the coating material to the die with a respective pump system.
2. Flexographic printing unit with 30-50 mm wide canvas sleeves. Printing resolution below 200 microns.

Roller specification

Width-150 mm, Heated with temperature range ambient to 150 degree C. Un-winder and re-winder for handling maximum 100 mm wide foil. 2-axis control (up/down and side registration). Processing speed of up to 2.75 meters/min.

Ink-delivery system

Holds syringes from 1 ml and up to 50 ml. Pump rate from 0.01 ml - 5 ml per minute. Able to handle different viscosity liquids.

Control System

In-built screen, PLC based system, computer controlled and remote monitoring. All control software should be provided.

Substrate pre/post treatment

UV-ozone cleaner (controllable from 0-200Watt) for substrate cleaning, UV-curing oven (controllable from 0-200 watt) for post processing, IR curing oven (controllable from 0-500 watt), Atmospheric Plasma (100 mm wide, controllable from 0-ca.1000 watt, plasma source from internationally reputed company), Dry Air/inert gas (with pressure control) (gas temperature controllable from ambient to 120 degree C).

Laminator

Roll to Roll laminator with two options (a) Pressure sensitive adhesives and (b) UV curing. The width and the speed should be as per the R2R coater specifications.

Purge box assembly

Purge box should be constructed and the processing should be performed under inert atmosphere.

100 meters of ITO/PET patterned substrates and lamination sheet need to be provided at the time of delivery along with lamination foil for PSA lamination (100mm wide) of length 100 meter and lamination foil for UV lamination (100mm wide) of length 100 meter need to be provided as free for trial.

The machinery can possibly be inspected at the factory/workshop before shipping. Supplier should be able to provide needed support and local hospitality during the course of inspection.

During this inspection the plant should be able to run and demonstrate all its mechanical functions.

(a) Check of completeness according to the order confirmation, (b) Visual inspection with regard to appropriate assembling, (c) Check of the mechanical functionality and safety regulations, (d) Functional demonstration of the installation according to the technical parameters and (e) demonstrate and train the IITB personnel to reproducibly produce perovskite devices with >5% efficiency with the equipment.

Upon satisfactory, the supplier should be responsible for transportation, installation, demonstration and provide adequate training at the receiver end for regular maintenance and operation

Laser Beam Induced Current mapping and tools should be provided for uniformity mapping. Control and analysis software should be provided with laptop for controlling. Preferred working area for such analysis is ca. 25 cm² but essentially not limited to.