



Indian Institute of Technology Kanpur Samtel Centre for Display Technologies

Enquiry No.: SCDT/FlexE/2016-17/18

Opening Date: 07/10/2016

Closing Date: 21/10/2016

Expression of Interest for Supply of Roll to Roll Machine for Printing Flexible Electronic Circuits

National Center for Flexible Electronics has a requirement for Roll-to-Roll machine for printing electronics on flexible substrates. Companies, in India or globally, with demonstrated capabilities are invited to discuss their machine options. Basic requirements and specifications of the machine are included in the attached Annexure.

The interested companies must clearly demonstrate their capability by at least:

- a) providing evidence of commercial use of their machine in flexible electronics; the machine should have multiple printing technologies integrated on the same unit, or
- b) providing evidence of commercial supply of production grade, high speed conventional printing machines along with commercial supply of roll to roll R&D machines specifically for use in flexible electronics.

The interested companies are expected to send, along with requirement above, company profile, product portfolio, and list of supply of equivalent machines in past by 21 October 2016 at scdt@iitk.ac.in.

The companies showing interest would be required to make a visit to IIT Kanpur within the month of October 2016 for discussion on customization of the machine based on their own expertise and design capability.

Dr. Monica Katiyar

The basic requirements are as under:

The roll to roll machine with flexible web width of 10-30 cm should have following features, appearing in the order of operation:

1. Unwinder with double antistatics
2. Horizontal web alignment & tension control
3. Double side contact cleaning
4. Liner removal
 - rewinder with antistatics
 - antistatics at delamination point
5. Predrying unit 0.8 – 1 m convection dryer with possibility of IR dryer integration,
6. Inkjet Printing of registration marker and possibility of barcode for sample tracking
 - using standard industrial inkjet head e.g. those used in packaging industry;
 - for inks that don't require additional drying step
 - position adjustable to web width (10 – 30 cm)
7. Direct atmospheric plasma pretreatment
 - DBD or SDBD type
 - Gases: N₂, CDA, CO₂; upgradable with Ar
8. Coating station with
 - Fine alignment cross web and along web
 - To take following coating modules:
 - o rotary screen
 - o flexo printing
 - o direct gravure (max 28 cm),
 - o Inkjet System
 - o Slot Die
 - o doctor blade/comma bar
 - all coating systems including suitable ink feeding system (e.g. syringe pump, pressure vessel, etc.)
9. Optional UV lamp position
10. Drying unit:
 - convection dryer with adjustable nozzles
 - optional integration of IR drying
 - air flow control (manual with reading or integrated in HMI)
 - with min 2 different temperature zones
 - possibility of extension of dryer length in later stage
11. Optional UV lamp position
12. Optional flash sintering unit for 15 cm treatment width
13. Second print station as in point 8, with following exceptions
 - gravure not required
 - should be possible to bypass when not needed
14. Optional UV lamp position
15. Drying unit, same as point 10
16. Optional UV lamp position
17. Rewinder section with lamination unit
 - With unwinder for liner film
 - o Antistatics
 - o Front side contact cleaner for liner before lamination
 - Lamination unit with
 - o Option to disengage nip roller when not needed
 - o Controllable nip pressure

- Heated roller
- Rewinder film
 - With antistatics
 - Alignment
 - Tension control
 - Backside contact cleaner

Additional specifications are:

- Possibility of allowing rearranging of modules and extension of the line at a later stage
- HMI with at least 3 operator levels (standard, expert, service)
- Remote control for trouble shooting
- Compatible with Class 10000 clean room
- Max foot print including working area required around machine: 24 m x 3 m
- Max floor load: 1000 N/m², preferred < 750 N/m²
- Max height less than 3 m
- Web handling:
 - Speed 0.1 - 30 m/min
 - Option of stop and reverse mode by few meters at least,
 - Precision printing mode: 0.1 m/min - 10 m/min with speed accuracy +/- 1 % over whole speed range
 - Rollers should be dual mounted rollers , cantilevered only acceptable at re/unwinder
 - Non- contact front side turns
 - Web path variable/adjustable with adjustable positioning of idle rollers
 - Alignment accuracy across and along web 100 µm or better
 - Web tension control 0.1 - 20 kg
- Compatibility with following substrates
 - Polymer films (e.g. PEN, PET, PI), 50-200 µm thick
 - Paper
 - Metal foils
 - Fabric
- Compatible with following inks
 - Solution
 - Nano/micro particle dispersion
 - Emulsion
 - Latex like
 - Resin / Resist
 - UV curable
 - water based
 - organic solvents, including VOC
 - solvent mixtures
- Coating stations
 - should be capable of exchangeable coating modules
 - coat/print width adjustable between 8 and 28 cm
- Slot Die (continuous)
 - 9 o'clock position with vacuum chamber
 - 12 o'clock without vacuum
 - Viscosity range: 0 - 500 mPas

- Heated die,
 - Heated backing roller
 - Gap adjustment with meters, optional automated
- Direct Gravure printing (full drum)
 - Chambered blade, preferable with variable blade angle
 - Lazy drive for wetting of roller during coating break
 - Optional heating of backing roller
 - With pressure force measurement and control
- Rotary screen printing
 - Compatible with Storck screens
- Inkjet printing
 - Compatible with both Fuji SG 1024 and KM 1024 heads,
 - Initially with 2 print heads, extendable to 4-5 heads
 - easy head exchange
 - drop view, recirculation, purging tray
- Knife/blade, comma bar coating
 - Height adjustable in micron range
- Flexo printing,
 - chambered doctorblade
- Ovens
 - Hot air impingement
 - Length extendable at later stage
 - Temp accuracy +/- 1 C
 - Each dryer unit individually controlled for flow, temp and exhaust rate
 - VOC proof,
- UV Curing
 - Flexible placement
- IR drying/curing
 - Optional integration in oven or stand alone
- Provision of standard safety measures such emergency stops, management of hazardous gases, electrostatics etc.
- Provision of protection of machine against power failure using minimal backup power