

# SOLUTIONS FOR FLEXIBLE LUMINAIRES ...

... AND FLEXIBLE ELECTRONICS (FLEX PCB)

## MÜHLBAUER COMPETENCE IN REEL TO REEL ASSEMBLY

### LUMINAIRE ASSEMBLY

- Solder or adhesive connection (ACP, ICP or reflow)
- CSP/Flip chip LED or SMD packages
- Electrical components, current or color controller
- Connector, lenses or other components
- Wide web up to 350mm
- Narrow web up to 100mm
- Glob top unit for encapsulation
- Test Unit

### DISPLAY APPLICATION

- Micro LED bonding
- Multi chip bonding
- High speed wafer to panel application+

### ADDITIONAL MODULES

- Screen printer (vision control & screen cleaning)
- SPI (Solder inspection)
- R2R solder reflow

## APPLICATIONS FOR FLEXIBLE LUMINAIRES AND FLEXIBLE ELECTRONICS (FLEX PCB)

### LOW AND MID POWER LIGHTING APPLICATION

- LED strip (single row)
- LED wide web luminaires (multi row)
- Smart Lighting Multi Component layout, combining LED and other applications such as RFID
- Internet of Light

### MULTI COMPONENT ELECTRONICS

- Get flexible instead of rigid to discover new market applications
- Make use of a super low cost material such as aluminum PET and save more than 30% manufacturing costs
- Other high end materials available such as copper or PI / Kapton can run as well in case of higher performance
- Latest curing technology for interconnection such as ACP or solder materials

## PERFORMANCE AND BOUNDARY CONDITIONS

- Flexible luminaires start from 500lm/m (or less) up to 2900lm/m or even >6000lm/m on wide web applications
- Nominal drive current from 10mA up to 120mA with ACP adhesive, higher current possible with solder connections
- Any CCT can be produced e.g.: 2700K, 3000K, 3500K, 4000K, 5700K
- Target CRI is usually >80; on request even higher
- Efficacy: 120 lm/w
- Operating temperature: 0° to 40°C
- Even outdoor use with special packaging / housing

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## SMART AND FLEXIBLE ELECTRONICS

INNOVATIVE REEL TO REEL MANUFACTURING SOLUTIONS  
FOR MULTICOMPONENT APPLICATIONS

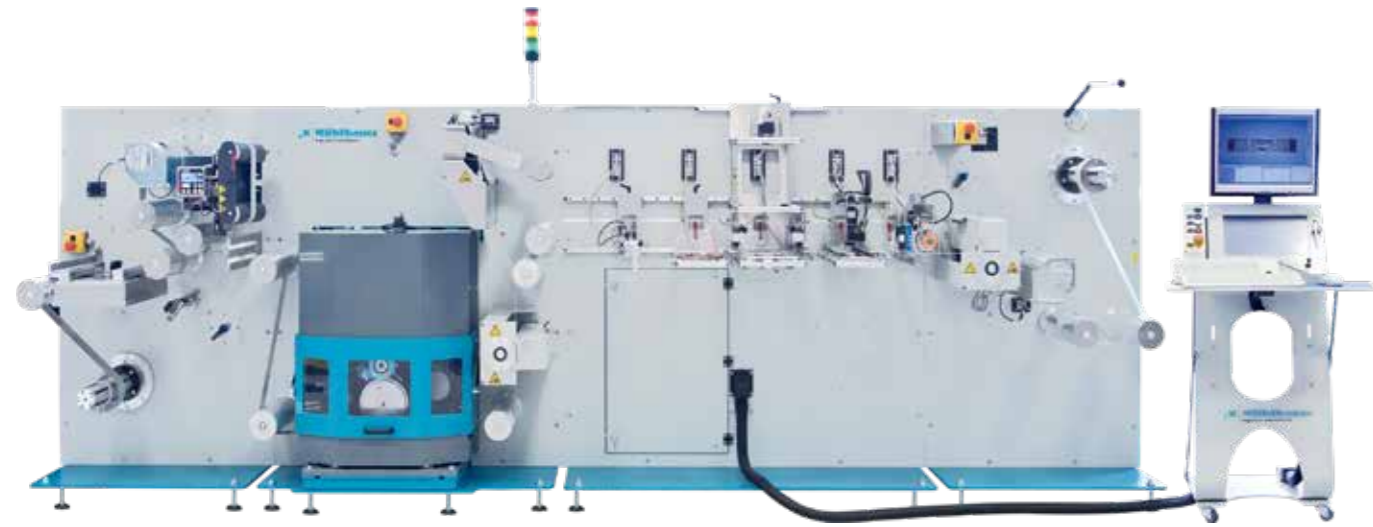


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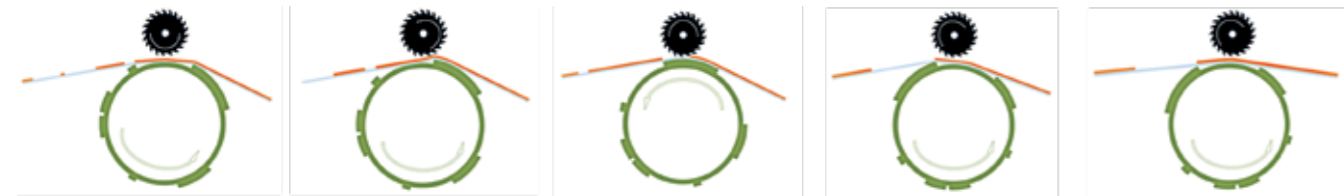
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# ALUMINUM CIRCUIT PRODUCTION

PRODUCE YOUR OWN FLEXIBLE CIRCUIT IN JUST 8 HOURS



EASY AND SIMPLE PROCESS:



## FLEXIBLE CIRCUIT PRODUCTION

### ACS 100 & ACS 350

- Time saving – a new aluminum circuit is created and produced within just half a day
- Design your layout, create a new cliché through laser engraving or etching and start sample production of even high volumes with the ACS - everything within a few hours
- More flexibility – makes you independent of suppliers and their delivery times
- Easy and simple process due to its non-chemical cutting method
- Production yield of 99.5%
- Speed: up to 30m/min.
- Output: aluminum circuit on PET, visually inspected and electrical verified; copper circuit under verification
- Saves up to 50% on cost compared to the conventional etched aluminum circuits



# REEL TO REEL LED PRODUCTION LINE

WIDE AND NARROW WEB SOLUTIONS FOR FLEXIBLE INTELLIGENCE



## FLEXIBLE LED LUMINAIRES

### MULTI COMPONENT LINE "MCL"

- NEW: ALL IN ONE production solution
- Adhesive apply (either jetter via dispenser or printing)
- Conductive glue (such as ACP or ICP) or solder paste
- Flip chip (CSP) LED or SMD package LED attach
- SMD component assembly, i.e. electronics, sensors, connectors, batteries, lenses or RFID
- Placement accuracy of +/- 50µm
- In line curing (thermodes or reflow oven)
- Glop top unit for encapsulation
- Integrated test station
- Output slitting (optional)
- Wind up with support of spacer tape



# WAFER TO WAFER / PANEL LED PRODUCTION

LED DISPLAY / PANEL PRODUCTION WITH DDA W2W/P



## MICRO LED BONDING

### DDA W2W/P FLIP CHIP BONDER FOR WAFER TO WAFER / PANEL

- Release of single LED chips from wafer
- LED chip size down to 250µm
- Under R&D: Micro LED chip down to 30µm (target)
- Only good LED chips will be bonded (Bad ones remain on the wafer)
- Placement accuracy +/- 25µm optional +/- 15µm
- Die picking WITHOUT a bond head (even without a die ejector)
- Die picking WITH inspection wheel for 100% 6-side inspection and full speed
- RGB panel bonding with super high pixel density down to 20µm
- Multi die transfer process possible
- No bad die replacement / repair required
- Optical inspection included
- Panel size 12", optional 18"

