

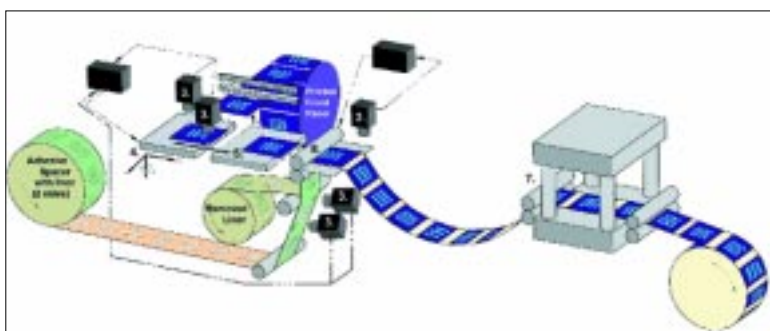
Roll-to-roll processing now adds embedded advantages for biosensors

Roll-to-roll processing is catching on for inline registered lamination for biosensors in screenprinting or diecutting applications. Chris Walker reports.

Inline registered lamination (IRL) is, essentially, the ability to take a coil of material with printed or punched features on it, and match it to a sheet that also contains similar printed or punched information. These references are in the form of fiducials, or camera recognition marks, and are instrumental in producing material that is laminated and matched together to better than $\pm .1$ mm. A typical example is the lamination of a roll of adhesive or spacer material to a sheeted coverlay, as shown in the drawing.

Alternatively, it is possible in some instances to create a system that registers one web to another, provided that the introduced web is die cut, printed, or populated 'just in time' relative to the known camera-detected location of the base web. Using a similar example, with the printed coverlay remaining as a roll, the introduced web spacer material would be die cut after cameras detect the coverlay fiducials, in order to allow the precision alignment of the two designs. Another application besides membrane switch assemblies that have successfully utilised IRL are biosensors.

If this were all that could happen with IRL, the



1. Printed overlay material is either sheeted from a roll or dispensed from a sheet feeder. 2. The ongoing web is indexed to its stopping position using an optical device. 3. CCD cameras find register location elements (fiducials) on the adhesive web (eg punched holes) and the overlay. 4. Sheet support device is moved into x-y-theta alignment with the anticipated adhesive web position point. 5. The overlay is advanced so that the sheet's leading edge is taken into the lamination rollers (6.). 7. Process can either be repeated for other switch layers, or die cut/kiss cut or treated to other finishing processes.

Fig. 2. Inline registered lamination allows web automation to replace time-consuming manual assembly of membrane switches.

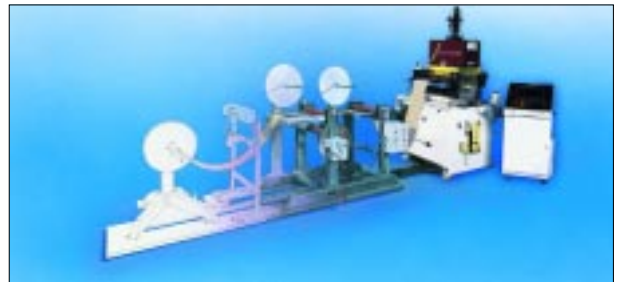


Fig. 1. Lamination solutions can be custom designed.

process would lose some of its dimension. Done properly, advantages allow for example, the inclusion of tactile domes, LEDs, microchips and other discreet components as embedded devices within the lamination. And a 'sandwich' of multiple-laminated layers can be achieved, dependent on layer thickness and rigidity. After that, Preco can die-cut, sheet, punch, slit, strip, rivet, knock-out, weed, inspect, measure, verify or perform a number of other mechanical tasks to take a roll of material and turn it into a quantity of useful parts.

Preco products and Preco custom engineered solutions are already being used by biosensor manufacturers but Preco's Advanced Processing Technology Group will seek process development partnerships with companies and research institutions that are involved in commercial development of new technologies. Its objective is to learn the developing manufacturing 'state-of-the-art' for these new technologies and combine them with existing manufacturing processes.

"In most cases, published material related to processes are limited due to the proprietary nature of development work," says Jim Gramling, Director, APTG. "Most companies walk a tight rope balancing between their need to maintain process secrecy (and competitive advantage) and their need to identify workable processes that are already developed. Many times there are great solutions that have been developed for one application, that, with a little modification, can cut months from the process development cycle for a completely new (and non-competitive) application."

It depends only on what you want to do. ■

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