SYNRAD
A Novanta Company

## Digital Cutting Advancements

# The New Frontier for Converting

The digital printing revolution has significantly changed the landscape for packaging and product labels, allowing designs to be customized for special occasions, demographic regions, or even unique individual pieces. Trends like these cut across many industries and are driving a rapid increase in the market for flexible converting systems. As the name implies, these systems are responsible for converting either large sheets or rolls of thin materials into individual parts like product packages and labels. In each case, manufacturers are challenged to meet demands for high design flexibility, shorter time to market, and predicting demand volume.

Mechanical cutting using rotary or flatbed dies is the traditional method. Using traditional cutting methods a manufacturer was committed to one design for a production shift, a few hours would be required to changeover the design or replace a worn die, and warehouse additional dies. While this is a workable trade-off for high volume manufacturing, the increased interest in shorter runs, customizable designs, and fast time to market demands a different solution: digital converting.

Digital cutting replaces the traditional mechanical system with a $CO_2$ laser and fully digital galvanometer scan head. The laser produces a beam of light at a specific wavelength (9.3 µm, 10.2 µm, or 10.6 µm are typical for $CO_2$ lasers), which is focused and directed onto the material by the scan head. For the highest quality and most efficient cutting, the laser's wavelength should be matched with the material's absorption characteristics (see Figure 1) and the laser output and scan head motion must be synchronized to deliver consistent power density to the material.

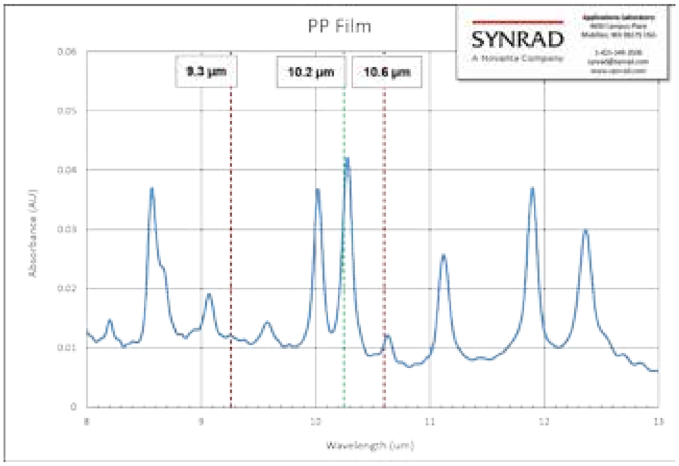
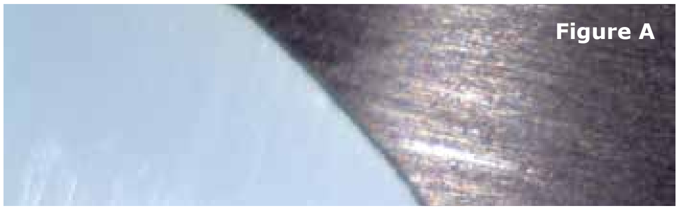



***Figure 1:*** *The absorption characteristics of polypropylene, a material commonly found in food packaging and labels. The absorption at 10.2 µm (marked in green) is approximately double the absorption at 9.3 µm or 10.6 µm. This increased absorption produces cleaner, faster cuts.*

Novanta companies have partnered to combine Synrad's 400 W i401 $CO_2$ laser with Cambridge Technology's high speed, high accuracy Lightning II scan head. Combining the innovation and expertise of these two companies has yielded a high speed laser sub-system engineered to cut both flat and dimensional materials. The laser output power is carefully modulated in synchronization with the real-time cut velocity of the scan head for the most efficient, highest quality cutting. Lightning II is equipped with proprietary control algorithms to ensure uniform laser power density and accurate positioning over the entire workspace. This allows users to create and changeover jobs quickly, secure in the knowledge that the results will be of consistent high quality.

As digital converting continues to gain traction in a market dominated by mechanical processes, high processing throughput and consistent quality are paramount. The non-contact, change-on-the-fly nature of digital converting continues to grow in value, but must be balanced with application-specific technical aptitude. Choosing the appropriate laser wavelength as well as optimizing power density and scan speeds are crucial to success in converting. The Lightning II/i401 cutting system provides the flexibility of a digital process while ensuring consistent, high quality results.





*The above illustrations show the difference in edge cut quality between a Synrad 10.2 µm $CO_2$ laser (Figure A) and a Synrad 10.6 µm $CO_2$ laser (Figure B) when cutting Oriented Polypropylene (OPP) and Biaxially Oriented Polypropylene (BOPP). Note the smaller melt lip on Figure B. Additionally the sample in Figure A was processed at 2.5X the throughput speed. OPP and BOPP are popular materials for labels and food packaging where crisp, clean cuts are required.*

# Contact Us

www.synrad.com
+1 (425) 349.3500
info@synrad.com