

PRODUCT MARKING NEWS

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MARKEM TO BE NAMED SONY® GREEN PARTNER

We are delighted to announce that MARKEM has received initial approval to become a Sony Green Partner; final approval is pending an on-site audit by SONY scheduled for this spring. Companies around the world are becoming increasingly aware of the global impact they have on the environment and are working together to reduce any environmentally harmful processes. Sony Corporation, a recognized leader in the “green” movement, is driving one of the most aggressive programs toward this global goal and is encouraging their key suppliers to embrace the standard they have implemented. Once a company demonstrates that its products and processes are environmentally friendly, they can be designated a Sony Green Partner.

Sony has published a technical standard SS-00259, which identifies four categories of chemicals and provides acceptable limits of these chemical based on the effect they have on the environment. The goal of these regulations is to:

- Clarify substances to be banned, phased out, reduced and controlled.
- Prevent, reduce or limit the quantities and usage of these substances in Sony products.

- Reduce chemical effects on the ecosystem and preserve the global environment.

MARKEM has eliminated all known sources of the eight chemical categories listed as the SS-00259 class one compounds and has put measures into place to confirm that our ink and chemical products meet the requirements of our customers. The entire manufacturing process, from new product development to shipment of the final product, is documented with our ISO 9001:2000 system and subjected to regular audits. SONY verifies compliance to the requirements of being a Green Partner through an on-going audit process. Being ISO 9001:2000 certified helps demonstrate that MARKEM has an Upstream Management program in place—another requirement of the Sony regulation. MARKEM ensures that clean, environmentally friendly products are produced the first, and every, time.

MARKEM is proud to be a top-rated supplier to SONY and other companies in the Electronics Industry. We are equally proud to be environmentally friendly in our business and are committed to working to continually improve our environmental position.

LEADING EUROPEAN PCB FABRICATOR USING MODEL 4000 PRINTER

Plantin S.A., located in France, is a manufacturer of small series multi-layer rigid printed circuit boards. They are a subsidiary of CIRE Group (www.cire.fr), the tenth largest printed circuit board (PCB) fabricator in Europe and in the top 85 globally. Plantin produces 2,000 square meters of PCB material per month with a standard three-week turn-around. Like many low to medium volume PCB fabricators, Plantin is focused on reducing costs and increasing turn-around times in order to remain competitive in their industry.

PCB legend marking (a.k.a. nomenclatures) at Plantin was accomplished with traditional silk-screen

technology using white ink. This process has long set-up times and high set-up costs. It takes up to a half a day and over eight process steps just to produce a silk-screen. There are also numerous consumables involved in developing images on screens, printing images from screens, and then breaking-down screens for next lot set-up. Plantin identified an opportunity to reduce costs and increase turn-around times by converting this legend printing process to a digital technology.

First EIE (www.firsteie.com), located in Geneva,



The Model 4000 is leading the digital printing revolution in the printed circuit board fabrication industry.

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LEADING EUROPEAN PCB FABRICATOR continued

introduced Plantin to their CP-400 Legend Printing System. The First EIE system integrates the MARKEM Model 4000 Drop on Demand ink jet printer and uses the MARKEM 4600 Series white-colored UV curable jetting ink. As one of the PCB industry's top five global suppliers of photoplotters, First EIE was already a preferred supplier to the CIRE Group with an excellent rating in product quality, reliability and support. Their precision motion controls and proven image technology combined with the MARKEM experience in Drop on Demand ink jet printing and white-pigmented ink technology provided Plantin the confidence in making the transition to this new digital printing technology.

The Model 4000 integrated printing system was installed at Plantin in February 2003. It has replaced the two manual silk-screen printers at Plantin. It is utilizing their existing UV curing system and meeting performance requirements on their existing Probimer 77 solder mask coating. The system is being fully utilized in their production printing a minimum of 5,000 boards per month. The cost savings and turn-around time reductions at Plantin were immediate.

Please refer to www.MARKEM.com for additional information on how your company can save time and money using the Model 4000 Drop on Demand ink jet printer.

MODEL 4000 PRINTING ON ORGANIC CHIP CARRIERS

Identifying semiconductor components for external reasons such as product warranty, recall or theft issues has been a requirement in this industry for sometime. A growing trend has been to identify these components at the individual or lot level for more efficient product tracking systems. These tracking systems allow companies to better manage inventory, product yields, production throughput and process cost. This is also driving the use of machine-readable codes for automating this internal tracking process.

The internal tracking information will sometimes appear on the individual component, but more often appears on the carrier of the components as it is not necessary to remain with the component at the end of production. More often, for advanced semiconductor components packaged in BGA and CSP format, these carriers will be made of similar organic materials as those used in the fabrication of printed circuit boards. Besides being a carrier to these components, these organic chip carriers also serve as a critical building block for advanced semiconductor components.

There are a number of requirements to provide tracking information on organic chip carriers. They include the following:

- A digital printing process is necessary in order to efficiently and economically produce dynamic (i.e. serialized, date stamped) images.
- An additive, non-intrusive (i.e. non-substrate removing) printing process is necessary in order to avoid potential product damage related to exposure of the under layer of the protective solder mask coating.
- If direct printing a 1-D machine-readable code, a high contrasting print technology is necessary.

- With limited available space, a high resolution printing technology is necessary.
- The print must be able to withstand the permanency requirements as defined by the manufacturer or the industry.

The MARKEM Model 4000 Drop on Demand ink jet printer meets the requirements for providing tracking information on organic chip carriers. It is a digital process capable of producing images at 600 dots per inch print resolution. The MARKEM 4600 Series White-colored UV curable jetting inks produce a high contrast print image on the dark-colored, solder mask coated, organic chip carriers. The ink is specifically formulated to meet the permanence requirements for these substrates with wide acceptance in the printed circuit board industry (see separate article).

Recently a leading semiconductor manufacturer headquartered in Asia purchased fifteen Model 4000 printers for this specific application. They were previously using direct ink printing technology to produce their internal tracking information on these carriers. Their interest in the Model 4000 was to reduce their consumables costs as well as increase their system throughput. Direct ink printers use several consumables versus the single consumable used in the Model 4000 printer. Direct ink printers in this application printed between two to three products at a time versus three to six products at a time in the locally integrated configuration using the Model 4000.

Please refer to www.MARKEM.com for additional information on how your company can save time and money using the Model 4000 Drop on Demand ink jet printer.



The Model 4000 is providing an efficient means for product tracking on organic chip carriers used in the semiconductor industry.

MARKEM INTRODUCES THE MODEL 598 PAD PRINTER

MARKEM is pleased to introduce the Model 598 pad printer, which features a print area of 110 x 300mm combined with proven MARKEM pad printing technology. The 598 pad printing system has an embedded computer control system and a semi-enclosed reservoir inking system that allows for quick and easy setup. All printing process parameters are easily controlled with the touch of a finger and the doctoring system maximizes gravure plate and doctor blade life.

The MARKEM Model 598 pad printer is an enhanced version of the 597E. To accommodate the increased pressure requirements to print an area of 110 x 300mm a new motor was selected to provide more power to the printer. This added power can also provide increased compression needed for larger printing pads. Modifications in the printhead have been made to maximize the performance and to accommodate the larger reservoir size.

The 598 shares the same mounting hole locations as the 597E, minimizing design changes required to mount the 598 on existing handling systems. The reservoirs used on the 597E can be used in the 598 allowing customers to choose a size that optimizes ink usage for their application. The 598 uses the same programmable user interface as found in all

MARKEM 590 series pad printers. This interface allows excellent process control and fast changeover, with preprogrammed data and save sets.

The 598 has clear guarding, is designed to meet applicable CE requirements and Semi S2 requirements and has a maximum noise emission of 70dB. It is capable of printing parts in trays or strips at up to 34 cycles per minute and can be integrated into many handling systems, including the following MARKEM handlers: U-1477 semiautomatic tray marker and the U-1480 fully automated tray marker.



The Model 598 provides print area of 110 x 300mm combined with MARKEM pad print technology.

COST EFFECTIVE SOLUTIONS FOR TRACING PCB ASSEMBLIES

Recently a leading manufacturer for the Aerospace industry contacted MARKEM to discuss a requirement for a new contract they had just received. The contract requires that they produce 1 million electronic

board assemblies and that each be serialized with human readable characters. In anticipation of future business this company also wanted the ability to print machine-readable codes for future applications.

In the past the most common method to accomplish this has been with the use of preprinted labels

and the company evaluated this solution first. First they found that the price of labels is very expensive. Beyond the cost of the labels they then had to support the cost of a machine to apply labels or operators to hand apply a label to each assembly. Next they discovered that often labels come off the boards and the serial number is lost. Further study of the process also revealed that a label adds to the thickness of the board, which in some applications is a real drawback, and the label uses up precious board space. The company decided that labels in their application were not an attractive solution.

Next the company went to one of the leading solvent-based continuous ink jet (CIJ) companies to ask if they had a solution. The solution provided by the CIJ company was tested for the application and found to have inconsistent print quality. Compounding the problem of having a marking system that did not provide a quality mark, the CIJ was messy in the application because of over spraying of ink, dripping and the mess created from the addition of ink and



The MARKEM U-1595 marks high quality human or machine readable codes on PC boards.

Continued on next page

COST EFFECTIVE SOLUTIONS continued

solvents. Again, the company decided that this was not a solution that made sense in their manufacturing process.

MARKEM considered this customer's needs and suggested our U-1595 marking system. This system accepts boards from SMEMA compatible handlers and precisely places high quality human readable or machine-readable codes on each board. The U-1595 system employs the cutting edge model 4000 drop on demand ink jet marker or the 3010CR CO₂ laser marker. For the requirements of this application the model 4000 is the more suitable product. The model

4000 drop on demand ink jet marker is a fundamentally different technology than the traditional technology used in CIJ markers. There is no solvent or solvent make up to contend with. The mark is applied by an array of jets resulting in very high quality, high-resolution printing. And best yet, the prints are white with high contrast and easy readability!

We are pleased to report that this leading Aerospace industry supplier found this to be the perfect answer for their manufacturing problem. They are set to go into full production using the MARKEM U-1595 in May.

MARKING ON JEDEC TRAY FOR TRACKING

More and more semiconductor and component manufacturing companies have a need to track JEDEC trays full of components through the manufacturing process and in some cases through shipment to the end user. This requirement creates a need to have a reliable identification applied to the tray at low cost with a minimum of fuss. The identification may be human readable characters, a barcode, a two dimensional code or a combination of these. While some manufacturers have met this need with the use of labels, this solution has some drawbacks. Labels are

expensive, labor intensive to apply and do not always stay attached to the surface to which they are applied.

At MARKEM we have several methods available to meet this requirement.

Serialized codes, human readable and machine-readable codes can all be applied with a variety of solutions depending upon the actual need of the customer.

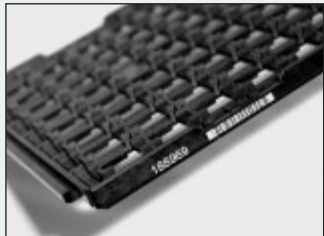
The Model 4000 Drop on Demand ink jet employs white, UV curable ink that provides excellent contrast on JEDEC trays for reliable code readability by scanners and easy human readability. This system, unlike other ink jet technology available today, has excellent print quality, no mess and no nasty make up solvents to deal with. We are proud to say that the

Model 4000 is already being used by some of the worlds leading electronics manufacturers meeting their requirements for permanence, readability and consistency.

The Model 3010CR laser marker is another great alternative where the mark contrast is not as critical for the application. This CO₂ laser system has very user-friendly software, a low capital cost and very high MTBF. The 3010CR has a small footprint and is among the easiest markers to integrate into an existing line.

This application has also been served by the MARKEM Model Q2001. The system employs a combination of laser and ink on a carrier substrate providing extremely good mark quality, contrast and adhesion.

MARKEM would be pleased to evaluate your particular requirements for marking on JEDEC trays and suggesting the appropriate solution as well as presenting alternatives. We have multiple solutions for your marking needs and we are committed to working with you to determine the best way to solve your manufacturing problems.



Model 4000 and 3010CR prints on Jedec trays.



Optimark Q-2001 laser-ink system is the only semiconductor marking technology that provides the process control and legend flexibility of laser marking with the high contrast and quality prints made by a pad printer.

NEW TECHNOLOGIES FOR INDUSTRIAL MARKING



Model 3010CR prints on phenolic electrical housing and epoxy solder mask.

In 2002 MARKEM introduced two new printing technologies, the Model 4000 Drop-on-Demand White UV Curable Ink Jet system and the Model 3010CR - CodeRunner 10-Watt CO₂ laser marking system. When MARKEM released these products to the printed circuit board industry, we did not realize how much of an impact they would have in other markets. Through some crude experimentation, the 4601 White ink, used with the 4000, was tested and found to have excellent adhesion to most engineering plastics with stunning print quality. Additionally, the CodeRunner produces consistent high quality laser marks on these plastics.

Both the 4000 and CodeRunner will print any information required by the user including text, logos, graphical images, symbology and serialized machine-readable codes.

These systems have been successful in producing beautiful tough prints in a variety of marking applications including:

- Automotive parts
- Electrical connectors, switches & housings
- Consumer appliances & electronics
- Promotional products (pens, calculators, knives)
- Compact discs
- Hand tools
- Rubber products.



Model U-1593 semi-automatic tabletop parts marking system.

MARKEM 4601 ink has found to adhere and have solvent, tape-pull and scratch resistance on plastics such as ABS, PVC, Acrylic, PBT, Polycarbonate, Nylon and polystyrene to name a few. The 3010CR marks on most plastics, ceramic, painted metals and anodized aluminum.

To make the marking process even simpler, MARKEM offers several turnkey tabletop part marking systems for the 3010CR and 4000 models.

U-1593 – MARKEM's most versatile semi-automatic handling system for the 3010CR laser marker, the U-1593 provides a fully programmable X-Y worktable and CDRH Class 1 enclosure. It accommodates fixtures and parts up to 12" x 12" x 6 inches and offers a fast, tool-free changeover. The U-1593 has full safety interlocks, laser height adjustment and is supplied with a PC, monitor and handling software.

U-1592 – If a simpler laser marking system is required, the U-1592 fits the bill. This system offers users a safe CDRH Class 1 enclosure with locator pins for fixturing parts in the marking field of the laser. The U-1592 can accommodate the same size parts as the U-1593 and offers laser height adjustment.

U-1596 – While very similar to the U-1593, the U-1596 accommodates the Model 4000 ink jet system. The U-1596 offers all the same features as the U-1593 including the ability to store hundreds of job files, each with hundreds of move sequences and high reliability.

If you are looking for the highest quality mark or simply need to permanently identify your product, look no further than MARKEM. The Model 4000 and Model 3010CR along with a handling solution will delight the end user and make the marking process easy to manage and maintain.



Model 4000 prints on a variety of plastic parts.

AVAILABLE DEMO MACHINES

FOR MORE INFORMATION on any of the products discussed in this issue, please contact bhebert@MARKEM.com.

A variety of machines previously used for demonstration purposes have been identified throughout MARKEM. We are pleased to be able to offer these to our customers at discounted prices on a "first come, first served" basis. Please contact your area sales representative for pricing and availability.

| MODEL | DESCRIPTION |
|----------------|--|
| U-1477 | Semiautomatic tray marker with a 597E pad printer |
| 590CE | Compact pad printer |
| U-1489 | Fully automated stick handler with a 590 pad printer |
| U-1489L | Fully automated stick handler with a direct laser marker |
| U-1481 | Fully automated tray marker with a direct laser marker |
| 3001 | 9 Watt near infrared direct laser marking system |
| 3002 | 15 Watt near infrared direct laser marking system |
| Q-2001 | Optimark™ digital printing system |

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