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#### column

##### How far should one go?

A healthy environment, obviously, is for the benefit of us all, fauna and flora are limited as they are. However, things may run out of hand, there ought to be some sort of environmental balance when matters are dealt with. This is also the case with lead-free soldering of electronics products. Lead must be left out, but how much lead turns up in the environment eventually? It has not been made clear that assembly plants need a lot more energy to produce their products lead-free. This will bring about a lot more emission of CO<sub>2</sub>. Eventually the product will be more expensive. Where is the environmental balance? When will the time come that every time you fart you will have to catch it in a custom-made environmental friendly bag and you will have to have its contents analysed for hazardous substances in order to be able to hold the supermarket of manufacturer liable for it? How far should one go? You don't have to do anything where the environment is concerned, only leave things.

Ton Plooy  
managing director

#### lead-free soldering

##### the state of the art of lead-free at tbp electronics

For some years now it has been known that no lead may be used in the production process as per June 2006. Many seminars have been organized about this topic. It is known what lead-free soldering is about, but implement it in the production is rather more than just the replacement of a brazing alloy. For this reason tbp electronics has decided to order the undersigned to realize the lead-free plan as per March 2004.

The first thing I did, was to write a project plan with subjects such as:

- the formulation of objectives
- the set-up of the implementation plan
- the selection of materials/machines
- the definition of the various processes
- the development of a robust process
- the implementation in production.

The second action has been a theoretical exercise in order to realize implementation. This had a practical reason. So many data are available on brazing alloys, compounds, machines etc. on the market that often one cannot see the wood for the trees. In addition, each production process with its specific clients and their requirements is different.

Then the implementation plan could be set up in practice. We knew the rough client requirements and we were able to make a temporary choice for alloys and compounds. tbp electronics was able to define the corresponding processes and the accompanying machines. In defining the production processes, we paid attention to the controllability of the process in particular, allowing having a grip on the reliability and the life of the soldered joints and components.

We have opted for a full nitrogen process for flow soldering and equally for the reflow process. In the reflow machine we have paid much attention to the number of zones, the control in the cooling down stage in particular. Cooling down has a large impact on the microstructure of the soldered joint, read: life. All machines and their adaptations have been purchased and installed and are now being tested extensively. The Vapour Phase that was present already is incorporated in the testing program and we are looking for the new generation of Vapour Phase-machines, including the vacuum process. During this test stage and the generation of temperature profiles, delta T throughout the printed-circuit board is playing

an important role. We also are paying attention to the nitrogen consumption.

Tbp electronics has made a temporary choice of the brazing alloy. This choice enables us to meet most client specifications and to guarantee a reliability that is as large as possible. Obviously, the brazing alloy affects the temperature profile and the whole should fit the process definitions that were set up. A choice has been made as well for a finish at the printed-circuit board. In it, special attention has been paid to the visible and partly non-soldered soldering faces at the printed-circuit board. Lead-free runs badly as it is and this is not always accepted.

Currently, verification is taking place on a testing printed-circuit board that has been composed by the 'Fraunhoferinstitut'. Despite the indisputable choice of the finish, some five other finishes and some six soldering compounds are being tested. Parts of this printed-circuit board are tested for reliability and life by temperature-cycle-tests. Obviously we are paying attention to microscopic inspection and inspection with the X-ray machine present. In addition tbp electronics is currently judging a new generation of X-ray machines for applicability.

Simultaneously tbp electronics is polling both all its clients to evaluate their requirements and its components suppliers on the availability of lead-free components. To initiate things we have organized a client's day in cooperation with Technolution in the Novotel in Eindhoven. Furthermore, tbp electronics has made presentations during an FHI-seminar in the Evoluon in Eindhoven and during the conference "Make it in the High-Wage Countries" that was part of the trade fair 'HET Instrument 2004' in Utrecht.

tbp electronics is co-organizing the conference "The environmental challenge in electronics production" that will be held at Wednesday 9 March during the trade fair Electronics & Automation 2005 in Utrecht. All in all we intend to decide in cooperation with our clients around summer when lead-free will be introduced. We are considering to keep on offering the lead-bearing process as well. At least until 2009 ultimately, because then all will be really over. In principle, the lead-free process will be available at tbp electronics after the second quarter of 2005.

In the near-future research will be carried out into soldering with VOC-free fluxes, as law will restrict this as well.

Ton van Galen, TvG Consultancy

## open days 2005: olé!

FRIDAY 1 APRIL AND SATURDAY 2 APRIL

tbp electronics' traditional open days this year will have a Spanish slant and will take place on Friday 1 April and Saturday 2 April. As usual Friday has been reserved for our business relations and Saturday for all those others interested, friends and family. And just like all previous years informative tours will be accompanied with conviviality. And to cap it all we will serve tapas and paella.

There is much to be seen at tbp electronics. Our employees will be available to enlighten you about assembling robots, testing methods and project management. In 2005 again, those interested will be able to build themselves a nice gadget. On Saturday 2 April a mini-fair will be present for the kids, just like last year.

### all about tbp electronics

Obviously, we will pay all our attention to you -our guests- during the open days. All questions you always wanted to ask, but you did not have the chance to do so, will be answered by us. During the tour of our company we will show you how the Mydata assembling machines do their fast precision work, how we test the produced boards in various ways, and how we translate a CAD-draft aided with sophisticated software into a complete production program in a quarter of an hour. This way you will see with your own eyes how tbp manages to realize a yield of 99,9 per cent combined with the shortest possible time-to-market.

make a note in your diary: Friday 1 or Saturday 2 April either day from 10.00 a.m. We will taste gladly the Spanish atmosphere with you this year and we are looking forward to your visit.

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### summer closure tbp

FROM MONDAY 18 JULY UP TO AND INCLUDING FRIDAY 5 AUGUST. WEEK 29, 30 EN 31.

tbp electronics will close its doors this year as well for a well-earned holiday. Please, make sure to send your orders in time and to pay attention to the required supply date, so as to enable us to plan delivery still in week 28 or from week 32.

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### high-tech for product & process Electronics & Automation 2005

The trade fair Electronics & Automation (E&A to insiders) has been developed by and for the technology sectors to enable companies to show their products and services to the visitors. The organizers' motto - including the FHI's (Dutch Federation of Technology Branches)- is that the event is organised to earn money with technology, not to spend it! The concept of Electronics & Automation, as it was set up renewed in 2003, has proved to be a success for exhibitors and visitors alike: a short, three-day show and a broad range of stands, concentrated in one big hall with euro-cafés.

Obviously tbp electronics will be present at the E&A-fair in the Jaarbeurshallen in Utrecht. You are welcome to visit us at our stand: stand no D168. Our colleagues are ready for you with information and coffee and something to go with it, of course.

Free admittance to the fair via [www.tbp.nl](http://www.tbp.nl). Register via our homepage and we will take care of your free admittance to the trade fair Electronics & Automation.

--- hot from the press ---

On 9, 10 and 11 March the Netherlands and Flanders will score their 'technology-shot'. A vitamin-shot for innovation: the trade fair Electronics & Automation in the Jaarbeurs, Utrecht. Over two hundred companies will present their 'high-tech for products and processes' in as many stands. On the opening day the winner of the by now well-known Mechatronics Trophy will be revealed festively. Moreover, on all three days there will be a conference program with sheer highlights.

The range of technology on E&A 2005 will be from microtechnology and nanotechnology, via electronics design and its production, testing technology and embedded systems to 'measuring, adjusting and controlling', be it 'remote' or directly aided by advanced communication technology.

You can find further information and the conference program in full at [www.eabeurs.nl](http://www.eabeurs.nl)

## informative & user friendly order tracking system renewed

Via our website clients are able to follow the state of their orders. In addition they are enabled to affect the production process of their various orders by e.g. establishing priorities. Obviously the system is secured. You can apply for a user name and login code at Dana Wolters (dwolters@tbp.nl).

The tbp electronics *Order Tracking System* is a secured application that is being controlled by the ISAH 7 ERP-system that is used at tbp for the entire production process. This makes that all production data and component data are up-to-date and the data is refreshed constantly as well. The state of an order is immediately visible and offers a possible opportunity to the client to adjust the priority of his own planning.

### informative and user friendly

The Order-Tracking-program is user friendly and immediate in use. Due to tbp's international clients, the application's language is English, but the dialogue boxes are self-evident. It is just a question of clicking the right button with the mouse to use the system. A manual is present, but actually it is redundant. Here we summarize the operation of the Order-Tracking-System.

Click the language flag of your choice at our homepage, and then click the button 'Order Tracking'. Insert your login-name in the login-screen and your password. Click OK. This is followed by the screen in which you can ask for the state of your order(s) or stock with an order number or an article number. Based on the reference number the Order-Tracking-System shows in a well-organized table the number of ordered products, the planned delivery date and possibly the number of products already delivered. The system indicates with a colour-code what the state of your order or stock is. This way the client is kept informed of the progress from day to day.

**Fig. 1** example of the order searched for and indication of date of delivery

**Fig. 2** example of the article searched for, stock and indication of the next production process

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## the challenge Royonic SMD-Tower

The right components at the right place: that is the challenge that all production and assembling companies are dealing with. At the SMT-department of tbp electronics for instance well-trying paternosters for storage of components and component reels are used. Now tbp electronics has started a pilot project with a new system: the Royonic SMD-Tower.

The Royonic SMD-Tower offers a number of pros with respect to a paternoster. Storage and order picking are much faster and simpler thanks to the barcode-controlled storage of components. To find the right components for a particular production course, the user only needs to type the article number, after which the Royonic SMD-Tower picks the right reel in 5 seconds at the most. Thanks to the automated identification via barcodes it is no longer possible to pick the wrong components or the wrong reels. In addition it is possible to call for one single reel or to enter a complete mounting list. The connected pc registers all operations and keeps track of the stock as well. The storage of components takes up less space as well, due to the fact that the Royonic SMD-Tower stores the reels at random. Empty places or storage bins are history. Moreover, the SMD-Tower is taking up only one square meter of floor space in order to be able to store about as much as 550 reels.

### lean manufacturing

Actually, manual order picking has been made redundant with the Royonic SMD-Tower. The whole process is faster, due to which changeover times of the assembling machines are shortened considerably as well. In addition, the Tower starts from the principle of FIFO: First In - First Out. The reels with their specific components that are stored first, are used first too. The next step is to link the SMD-Tower to the pick & place automatons and the ERP-system at tbp electronics in order to enable the industrial process to elapse more quickly. tbp electronics is helping the supplier of the SMD-Tower in the further development of the system. "That is to the benefit of both of us", says Ton Plooy. "That

way we are able to affect the features of the apparatus and the supplier is able to improve the system based on our experiences and proposals.”

The use of the Royonic SMD-Tower fits in tbp’s policy of ‘lean and mean manufacturing’. Clients do not want to pay for production options they do not need for their order. That is why tbp invests in automation in order to be able to produce faster and better, but cheaper as well. Ton Plooy: “The Royonic SMD-Tower helps us to produce even more specifically and therefore even more cost-effectively.”

tbp electronics will present the Royonic SMD-Tower at the trade fair Electronics & Automation that will be held from 9 up to and including 11 March in Utrecht.

#### [Medical Measurement Systems b.v.](#)

## everything in order

Medical Measurement Systems, with its HQ in Enschede, is one of the world’s leading companies for the development of medical diagnostic systems for urology and gastroenterology. The company develops, produces and brings systems to the market with which urologists, gastroenterologists and neurologists may make functional diagnoses. The important parts of those systems are the boards that are mounted at tbp electronics.

The products designed by Medical Measurement Systems (MMS) have been available on the market since 1988 and are extremely successful. Distribution takes place via a worldwide network of distributors who sell the systems to many hospitals and universities. It is company policy that engineers and sales and marketing employees are contacting basis with doctors all over the world on a daily basis. These and other factors enable MMS to develop diagnostic systems - and constantly improve them - that meet exactly the latest wishes and requirements of the medical profession. The company has acquired an excellent reputation with it.

At the establishment in Enschede all products are designed and tested so they meet all medical safety requirements such as those of the CE, TÜV and FDA, and all international standards such as ISO 9002. The suppliers as well must meet high demands. “All processes that are no part of our key tasks we have outsourced”, says Paul Salomons, who is working as an electronics engineer at Medical Measurement Systems. “The housing of our systems and the mounting of our boards for instance. We have outsourced the production of all our boards, from the simple ones to the very complicated ones, to tbp electronics. Given the character of our products and the fact that people’s health is involved, all our systems need to be safe, clean and absolutely reliable. Therefore, the boards need to be of the highest quality as well.”

MMS has made a review of companies that qualify for the mounting of print-boards. The company has had a number of strict demands that the supplier had to meet. One of which was that the size of the organisation should be similar to that of MMS in order to guarantee a sound mutual business relation. Logistics had to be organized well too. “Those are excellent at tbp electronics”, says Salomons, “and the settlement of possible problems is supervised well too. Moreover, we are applying their order tracking system, which enables us to see what state our stock is in and the progress in production. It is a beautiful tool.”

In our review possible suppliers have completed an eight-page document, in which they for instance had to answer questions such as: how do you handle quality?; how is the workflow controlled?; how is your documentation? Paul Salomons: “Based on this review, their good name on the market and some orienting visits to tbp’s production facilities, we have chosen them.” After a year of cooperation an evaluation took place and MMS decided to continue its cooperation with tbp electronics. “We are very content about the cooperation and the quality of the boards they supply”, Salomons concludes.

[Medical Measurement Systems b.v.](#)  
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