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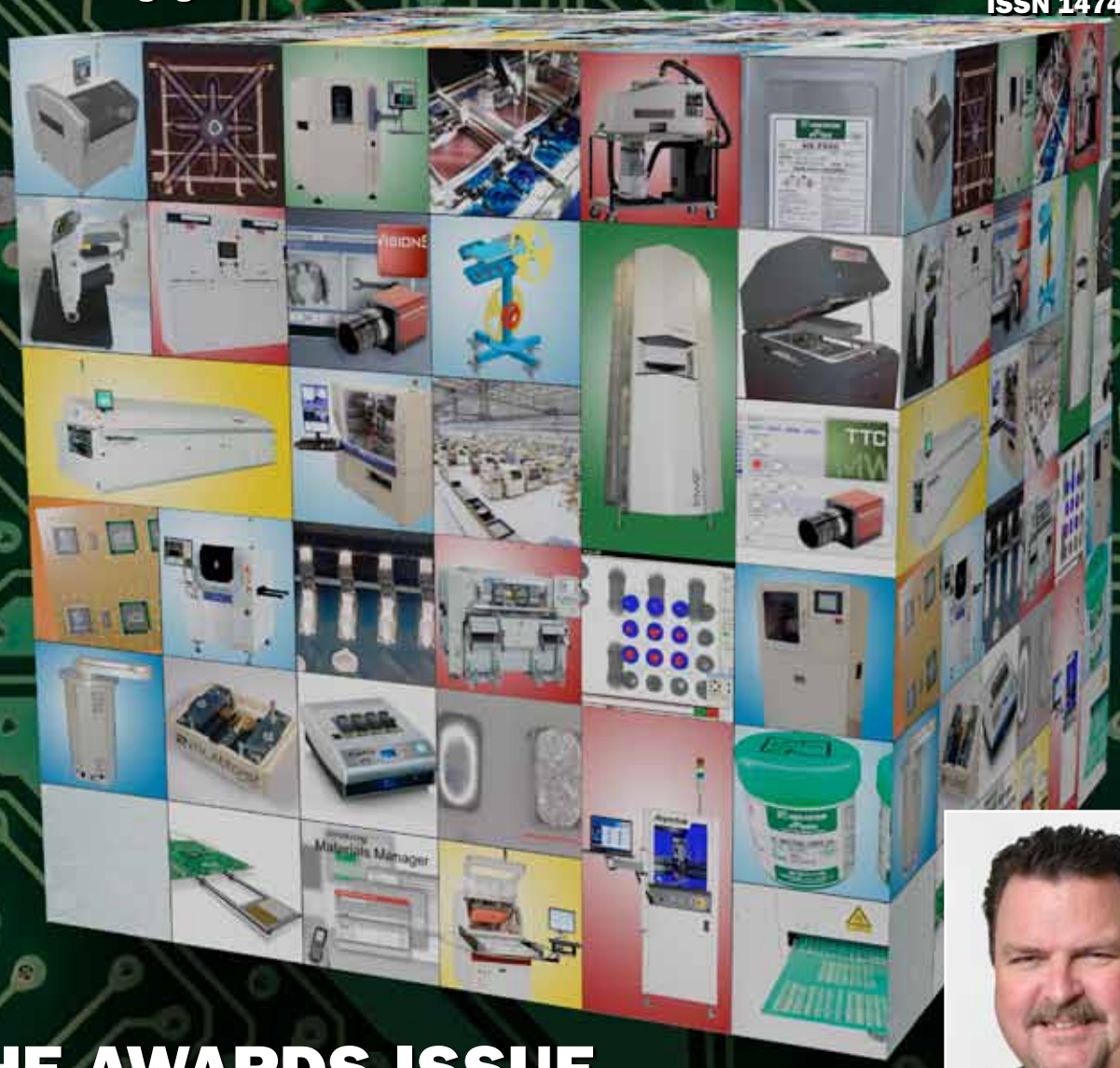


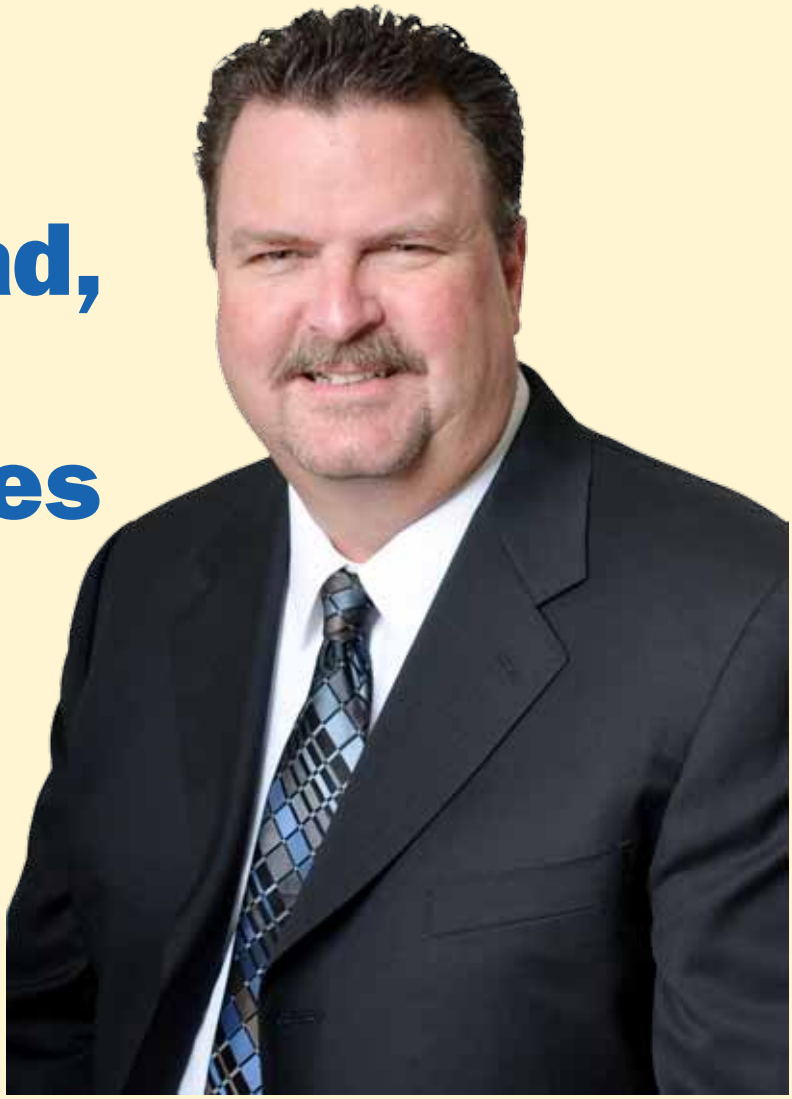
THE AWARDS ISSUE— FIND OUT WHO WON!

5D SOLDER PASTE INSPECTION • PROCESS VALIDATION AND STANDARDS COMPLIANCE • FACTORS INFLUENCING QFN PROCESS

Mike Konrad Interview Inside

Interview—

Mike Konrad, Aqueous Technologies



Mike Konrad is probably one of the best-known faces in the cleaning industry. As president and CEO of Aqueous Technologies, he has steered the company through years of double-digit growth and pioneered a range of batch washers that have become the "industry standard" in many facilities around the world. Trevor Galbraith spoke to Mike about the next milestones for Aqueous Tech.

Cleaning is going through a remarkable resurgence. What principal factors are driving that growth?

Its important to realize that cleaning did not go away after the Montreal Protocol in 1989 that banned the use of all CFCs. Prior to that, cleaning was mainstream, and most products were cleaned. After 1989, cleaning remained strong in military and other high reliability sectors, but the rest of the industry turned to "no-clean." Small amounts of flux and residues left on the board were deemed to be relatively safe.

However, three main drivers changed all that. The first is miniaturization: cathodes and anodes are right next to each other. Second, lead-free increased the melting point of solder by 50-60˚C, which baked the flux residues onto the board and made them harder to clean. The third driver is the increased requirement for greater reliability.

Many customers affectionately refer to batch cleaners as dishwashers. You call them "defluxing machines." What is the difference?

We would love everyone to call them defluxing machines, because unless you put dishes in them, they aren't dishwashers. There are only so many ways you can design a box to clean circuit boards, but that is where the resemblance ends. There are some companies that buy dishwashers to clean boards, but the pumps that we use would break dishes. Our systems have completely different nozzle designs that produce smaller water particles and spray patterns. They are also equipped with sophisticated SPC data and quality control tools in a variety of languages, unlike dishwashers.

With the rising volumes in cleaning, is there a rising requirement for inline cleaning machines?

The good thing about inline cleaners is that they were designed for cleaning circuit boards from the start and are very efficient at doing this in volume applications. The problem with inline cleaners is that they are hugely inefficient to operate: the water consumption, the drain volumes, the energy consumption and the operator requirements are excessive. In today's environmentally aware world, manufacturers are more cautious about the quantity and quality of waste they pump out into the drains or up the stack into the air and have turned to batch processes to manage this more efficiently.

Cleaning, historically, was always a batch process. Inline cleaners only were introduced after the Montreal Protocol in 1989. However, with today's high mix, high reliability product mixes in Europe and the United States, the volumes lend themselves environmentally and economically to a batch process.

You have had many years of experience selling and supporting machines in the Asian market. What makes the Trident so well suited to these environments?

There are many foreign markets where Trident does well. It is designed to be multilingual, and it has a 16" interface that allows us to present a lot more data. This means the operators do not have to rely on a limited knowledge of English to understand the machine. Tridents are electrically configured for operation in almost any country around the world.

The plumbing is also stainless steel throughout, which makes the machine compatible with a much wider range of chemistries with no adverse effects to the pipes, joints and couplings in the machine.

How much is chemistry, and how much does the machine contribute to effectively cleaning boards?

The chemical guys will probably tell you that it's 99 percent chemistry, while the machine builders will tell you the opposite. The reality is somewhere in the middle, at 50-50. We believe we make the best machine on the planet, but if you don't run the right chemistry in it, it will not clean effectively.

My friend and colleague at Kyzen, Dr Mike Bixenman, refers to "the static rate" and "the dynamic rate". The static rate is the ability of the cleaning chemistry to solubilize the soils on the board, and the dynamic rate is the ability of the machine to deliver the chemistries where they need to go on the board, and the impingement force to remove that contamination.

Fortunately, all the major chemical companies in our industry are familiar with the mechanical capabilities and requirements of our machines to clean boards, and design their chemistries accordingly.

What steps have you taken to treat and dispose of waste in an environmentally friendly manner?

Back in 1989, the concern was "What's going up the stack?" in terms of VOCs, etc. Today, the concern is "What are you pouring down the drain"? Every one of our cleaners can run with or without a drain. From an environmental standpoint, you can discharge waste down any drain with the proper filtration.

The issue is not being driven by legislation but rather by management's desire to operate a "greener" and more "environmentally safe" factory, particularly with large companies with potentially large liability exposures. So, hypothetically, if a local factory releases lead into a local waterway, and the electronics manufacturer is operating a zero-discharge system, then they are likely to be overlooked in the investigation by the environmental agencies.

You have been a prolific winner of awards. Why are awards so important to you? Do you have anything left to prove?

When we won our tenth award, we thought we would never win another one again—we are currently on number 39. Awards are very important to us. We are fortunate to be in the leading manufacturer of leading edge cleaning equipment. What the awards programs do is challenge us to build better, faster and more efficient products, and when the industry rewards us by recognizing these technological achievements, it is a great honor and a great motivator.

What challenges do you face with new chemistries, and how do you qualify them for use in your machines?

Most companies in North America and Europe are familiar with our cleaning equipment, and many have them installed in their own laboratories. The bigger concern is that in certain parts of the world there are homegrown chemistry solutions that may have low flash points, that may attack certain polymers or remove labels or component markings. These companies are not always familiar with our equipment.

Fortunately, companies make a large investment in the equipment, relative to the cost of the chemistry, and consequently many of the manufacturers will defer to our recommendation of what chemistries to use.

Why should an operator consider using a stencil cleaner as opposed to hand cleaning?

There is an irony here. The number one competitor we have is hand cleaning, which surprises me. Either management does not recognize the value of an automatic stencil cleaner, or they think they can do it cheaper by hand with a rag and spray. This brings up a number of issues. The first is safety—many operators do not wear gloves when cleaning these stencils with undiluted chemistries. They're handling materials that contain lead and other substances harmful to the human skin. Second is the safety of the stencil itself—there are a lot of stencils ruined because apertures are torn open when the rag gets caught in the corner of one. Sometimes operators clean the back of stencils without proper support, affecting the coplanarity of the stencil. I have also seen poorly cleaned stencils, where dried-on solder paste builds up in the corners of the apertures, affecting the quality of the print.

It is a lot more expensive to fix a B-side misprint than to invest in an automatic stencil cleaning solution. Our ultrasonic cleaners start at $10,000, which is closed loop with zero discharge and employing a non-pressure type technology that cannot damage a stencil. And there are other companies that use spray-in-air systems and other solutions that can avoid the damage caused by hand cleaning.

Where do you see the growth coming from over the next 12 months?

First, from a corporate standpoint, there are more people buying cleaners today, plus we are growing our market share. The industry will continue to see cleaning grow for the next few years, at least, as more companies realize that no-clean is not viable with the increased miniaturization of boards.

What is next for Aqueous Technologies?

Just this year we have added SPC and a whole new level of data reporting to our machines. This year at APEX, we will introduce new technologies for zero discharge using recycling technology that do not rely on evaporation and that convert the water back into high quality DI water. So, for example, the new Tridents will be able to run a machine for an entire month using only ten gallons of water, with not a drop of it going down the drain.

Mike, thank you for talking to us today.

Trevor Galbraith.

Listen to the full interview online in the electronic edition of Global SMT & Packaging Vol. 11 Number 2, available at http://magazine.globalsmt.net.