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## Kimberly-Clark Professional Launches Innovative RightCycle Programme to Recycle Single-Use Cleanroom and Laboratory Gloves and Garments



Kimberly-Clark Professional has launched a pioneering initiative across EMEA that enables cleanroom and laboratory operators to recycle a wide range of used protective garments. This follows a successful launch in the United States earlier this year.

The programme, called RightCycle, makes it easy to dispose of previously hard-to-recycle garments such as coveralls, gloves, hoods, boot covers and hairnets in a sustainable manner. The used items are simply placed in a RightCycle collection box or the operator's own box. Full boxes are assembled onto pallets and collected by Kimberly-Clark Professional programme partner TerraCycle.

Launched initially in the UK and Germany as a one-year pilot scheme, RightCycle is the first large-scale recycling solution for this kind of waste, offering companies an opportunity to reduce landfill waste streams and enhance their sustainability efforts. After the used garments are collected, they are turned into raw materials to create eco-friendly consumer products such as plastic chairs.

Ruud Sleumer, Customer Marketing Manager at Kimberly-Clark Professional, commented: "Our cleanroom and laboratory customers have ambitious sustainability goals, yet often struggle with where and how to get started. Our innovative RightCycle programme offers a powerful and easy way for them to exceed their solid waste reduction goals, while helping to make their workplaces healthier, safer and more productive."

The RightCycle programme supports the 'Planet' pillar of the three-pronged Kimberly-Clark Corporation Sustainability 2015 vision, which also encompasses 'People' and 'Products'.

The Sustainability 2015 strategy engages Kimberly-Clark businesses, brands and employees globally.

Under each of the three pillars, the company is working towards meeting a range of demanding targets that will make a major difference to the sustainability of its operations and, potentially, affect millions of people's lives for the better.



Sustainability 2015 builds on the success of previous Kimberly-Clark Professional environmental improvement programmes – such as the Vision 2010 initiative, under which the company implemented a number of successful projects worldwide to improve its performance in key environmental areas. It also widens the focus and scope of the company's sustainability agenda to integrate elements that sustain and nurture healthy working environments and communities.

Ruud Sleumer said: "The disposal of solid >>>

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waste by pharmaceutical and other scientific organisations poses considerable challenges for businesses and society. Landfill options are becoming more limited and waste disposal costs continue to rise. The RightCycle programme takes recycling to a new level – beyond downcycling, upcycling and other approaches – by making it easy to recycle pharmaceutical cleanroom and laboratory garments that used to be very difficult to dispose of sustainably.”

He continued: “This new recycling pro-

gramme, operated with our partner TerraCycle, further extends the Kimberly-Clark Professional commitment to offering our customers sustainability initiatives which save time, materials and ultimately money. This new capacity to recycle cleanroom gloves and coveralls also importantly helps our customers’ employees stay motivated to reach their CSR goals.”

Chris Baker, General Manager for TerraCycle Europe, added: “TerraCycle is delighted to partner with industry leader

Kimberly-Clark Professional to launch this new, first-of-its-kind recycling solution for non-traditional cleanroom waste. Providing end-of-life solutions for previously difficult-to-recycle items from cleanrooms is an exciting new venture and could have massive industry-wide impact.”

Kimberly-Clark Limited

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## Vaisala HUMICAP® Celebrates Its 40 Years

In the early 1970s, humidity was measured using organic materials, such as human or animal hair, in hygrometers. At the time there were few alternatives available and the accuracy and reliability issues of such measurement methods were well known. In an effort to find a solution, Vaisala contracted the semiconductor laboratory of the Technical Research Center of Finland to cooperate on the development of sensors. As a result of this work, Vaisala introduced HUMICAP®, the world’s first thin-film capacitive humidity sensor in 1973.

As the world’s first thin-film capacitive humidity sensor, the HUMICAP® was a radical innovation that completely changed the way humidity is measured. The new ground-breaking technology had no moving parts, and it was amazingly small due to the advanced use of thin-film technology.

The innovation was originally designed for a new radiosonde; however the greatest interest for this revolutionary new sensor came from various industrial customers. Continuous innovation of the sensor has developed INTERCAP®, an interchangeable humidity sensor, as well as HUMICAP® variant which measures moisture in oil. The fourth generation humidity sensor with improved stability and

chemical tolerance was introduced in 2006.

Nowadays, products based on Vaisala HUMICAP® technology range from radiosondes to hand-held meters and industrial transmitters. The sensor is manufactured in-house from start to finish in state-of-the-art cleanroom facilities at Vaisala and it covers applications from HVAC to the most demanding industrial and environmental applications, both indoors and out.

Today, Vaisala is the market leader in relative humidity measurements, and thin-film capacitive humidity sensors have developed from one company’s innovation into a global industry standard.

Vaisala GmbH

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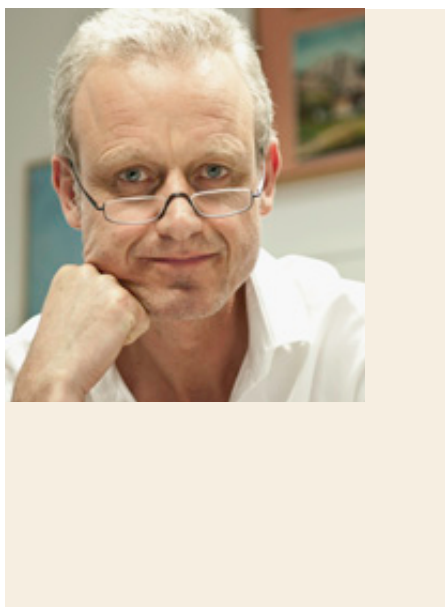
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Dear readers, dear subscribers,

this is the third English issue of our cleanroom newsletter and we are proud to state that we needed only three issues to get important content filling more than twenty pages for this month. We hope that this information can help you in your day-to-day business as well as in planning the future.

The map shows where the readers of the cleanroom online newsletter are coming from: if you want to get in contact with these readers please contact us.

Yours sincerely

  
Yours Reinhold Schuster



# Fungicidal activity of globally acceptable quaternary ammonium disinfectants

## ABSTRACT

Quaternary ammonium compounds (QACs) are excellent active ingredients in disinfectant products because they have low toxicity, good detergency, and bactericidal efficacy. Unfortunately, many currently marketed QAC products are incompatible with some forms of sterilization and provide insufficient fungicidal activity. These drawbacks can prevent the use of QAC disinfectants in ISO-5 cleanrooms. In addition, some QACs have limited regulatory acceptability in certain European countries. The studies described here demonstrate that a product formulated with didecyl dimethyl ammonium chloride, a QAC, has activity against multiple fungal strains, including *Aspergillus brasiliensis*, is irradiation-stable, and meets global standards for environmental acceptability.

## INTRODUCTION

Quaternary ammonium compounds have been used as active ingredients in hard surface disinfectant products since the 1930's, with hundreds of iterations now available. The structure of these compounds includes a positively charged nitrogen atom with four organic groups attached (1). Over the years, various QACs have been developed with different combinations of alkyl and aromatic groups bonded to the nitrogen atom, and these formulations are now used globally (2).

An important factor affecting the selection of a QAC for a disinfectant formulation is whether it is accepted by appropriate regulatory bodies including the United States Environmental Protection Agency (EPA) and the European Biocidal Products Directive (BPD). The number of QACs that are EPA-registered and actively supported for the BPD is relatively small, only including such QAC active ingredients as didecyl dimethyl ammonium chloride and alkyl dimethyl benzyl ammonium chloride (3,4). This can make the selection of a quaternary ammonium disinfectant challenging for international pharmaceutical companies interested in harmonizing global practices. This challenge becomes even greater when selecting a disinfectant for use in a controlled environment.

Disinfectant products must be sterilized before introduction into the cleanroom (5). One method to achieve sterilization of the product and packaging is through exposure to gamma irradiation. QACs with alkyl groups have demonstrated better stability to gamma irradiation than QACs with aromatic

groups. When an aromatic QAC is exposed to gamma irradiation, the bond between the nitrogen atom and the aromatic portion of the molecule can break, resulting in the formation of amines as by-products. Table I compares the stability to gamma irradiation of an aromatic QAC formulation to that of an alkyl QAC formulation. Degradation of the alkyl QAC from exposure to gamma irradiation is minimal, whereas degradation of the aromatic QAC is significant and increases as the irradiation dose increases (6). (See table I)

When combining the regulatory criteria with the desired irradiation stability, the best remaining choice among QACs for a global disinfectant formulation is didecyl dimethyl ammonium chloride. (See figure 1)

Although didecyl dimethyl ammonium chloride meets requirements for international use, some QAC formulations lack true broad-spectrum activity. While demonstrating bactericidal and virucidal activity, some QAC products lack the required efficacy against certain types of fungi due to various mechanisms of intrinsic resistance and the formation of fungal spores that are more resistant to disinfection (7). The consequences of fungal contamination can be significant and lead to long-term problems within a facility. FDA (Food and Drug Administration) warning letters and Form 483 observations often address inadequate control of fungal contamination and lack of assurance that disinfectants used in a facility are effective against fungi (8,9).

One particular fungal strain, *Aspergillus brasiliensis* 16404 (formerly known as *Aspergillus niger* 16404), has proven to be a difficult challenge for pharmaceutical companies, and is not addressed by most QAC-based disinfectants (10). In many cases, sporicides and disinfectants such as bleach (sodium hypochlorite), hydrogen peroxide, peracetic acid, chlorine dioxide, ozone, glutaraldehyde, iodine, and phenols are used in applications that require efficacy against *Aspergillus brasiliensis*. However, use of some of these compounds can have safety, environmental, odor, or staining issues. A QAC-based disinfectant product with recognized *Aspergillus brasiliensis* claims gives users a safer alternative for this type of application.

When formulating a QAC-based disinfectant, ingredients such as an alkalinity source, chelant, co-solvent, or surfactant can be selected to enhance the activity of a formulation based on didecyl dimethyl ammonium chloride. These ingredients are also compliant with the REACH (Registration, Evaluation, Authorization, and Restriction of Chemical substances) regulation (11). Compliance with this regulation is expected to eventually become mandatory for all formulations sold in the European Union.

The testing described in this article was performed on a formulation based on didecyl dimethyl ammonium chloride against various fungal strains using European and United

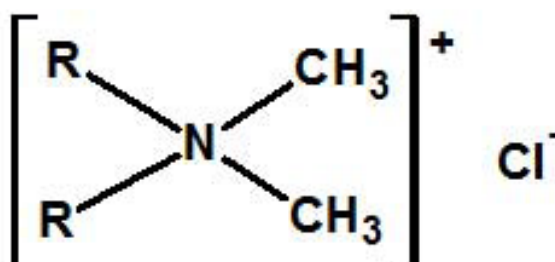


Figure 1: Structure of didecyl Dimethyl Ammonium Chloride (DDAC), where R=n-decyl

Table I. Stability Comparison at Three Gamma Irradiation Doses

Gamma Irradiation Dose	Change in QAC Level, Relative to Non-irradiated Control Sample	
	Aromatic QAC Formula	Alkyl QAC Formula
22-23 kGy	-5%	-1%
32-33 kGy	-7%	-1%
42-43 kGy	-9%	-1%

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States EPA-approved methodologies.

### MATERIALS AND METHODS

Efficacy testing for United States and European disinfectant label claims requires strict adherence to relevant standardized methods recognized by the appropriate regulatory authorities. The procedures are summarized below.

#### BS EN 1650 Method (12)

##### Test organism preparation.

Suspensions of *Candida albicans* ATCC 10231 and *Aspergillus brasiliensis* ATCC 16404 were prepared and adjusted to achieve approximately  $1.5 - 5.0 \times 10^7$  cfu/mL. Serial ten-fold dilutions were performed to verify the number of CFU (colony forming units) per mL in the inoculum suspension.

##### Test Procedure.

An aliquot of the disinfectant diluted in 300 ppm calcium carbonate ( $\text{CaCO}_3$ ) hard water was added to a tube containing the interfering substance and fungal suspension and held at  $20 \pm 1^\circ\text{C}$  for the specified contact time. At the end of the contact time, 1.0 mL the test mixture was transferred to neutralization broth. After a neutralization time of 5 minutes  $\pm$  10 seconds, a 1.0 mL sample of each neutralized mixture was added to a sterile petri dish. Molten Malt Extract Agar (MEA) was added to each petri dish. Following incubation, all plates were counted and the CFU/mL of the test mixture was calculated. Validation testing and appropriate controls were performed concurrently with the test procedure as outlined in BS EN 1650.

#### BS EN 13697 Method (13)

##### Test organism preparation.

Suspensions of *Candida albicans* ATCC 10231 and *Aspergillus brasiliensis* ATCC 16404 were prepared and adjusted to achieve approximately  $1.5 - 5.0 \times 10^7$  cfu/mL. Serial ten-fold dilutions were performed to verify the number of CFU (colony forming units) per mL in the test suspension. The test inoculum was prepared by adding 1 mL of each fungal suspension to 1 mL of the interfering substance (3.0 grams BSA in 1 liter of distilled water) and mixed well.

##### Test procedure.

Clean, dry stainless steel discs two centi-

meters in diameter were placed into shallow individual sterile containers. The test surface was inoculated with 0.05 mL of the prepared test inoculum and dried at  $37^\circ\text{C}$  until visibly dry. An aliquot of the disinfectant solution was placed on each test surface ensuring that the dried inoculum was completely covered. After the specified exposure time (5 min for *C. albicans* and 15 min for *A. brasiliensis*), 10 mL of neutralization broth was added. Each container was covered and mixed for 1 minute to remove any remaining cells/spores from the surfaces. After a neutralization time of 5 min  $\pm$  10 sec, the neutralized mixture was serially diluted and a 1.0 mL sample of each dilution in duplicate was added to separate sterile petri plates followed by molten MEA agar. The test surface was recovered, rinsed with 10 mL of sterile distilled water and, with the test side facing up, transferred to a petri dish containing about 10 mL of solidified MEA. An aliquot of sterile distilled water was placed on the disc and the surface was scraped with a sterile spatula for 1 minute to remove residual desiccated inoculum on the disc surface. An additional 10 mL of molten MEA agar was poured over the disc. Following incubation, all plates were counted and the number of colony forming units was recorded. Validation testing and controls were performed concurrently with the test procedure as specified in BS EN 13697:2001.

#### AOAC Fungicidal Methodology (14)

##### Test organism preparation.

Fungal cultures of *Aspergillus brasiliensis* ATCC 16404, *Aspergillus niger* ATCC 6275 and *Trichophyton mentagrophytes* ATCC 9533 were propagated in Neopeptone Glucose Agar (NGA) at  $25-30^\circ\text{C}$  for 7 to 10 days. The mycelial mats were dislodged from the agar surface and macerated with saline solution in a sterile glass tissue grinder. This was followed by filtration through sterile glass wool. The final inocula were prepared by adding the appropriate amount of Fetal Bovine Serum (FBS) to each culture to achieve a 5% mixture. The density of each conidial suspension was determined using the plate count method. Prior to use, the respective suspensions were standardized using saline solution to yield approximately  $5.0 \times 10^6$  conidia/mL.

##### Test procedure.

For each test organism, two 25 x 150 mm test tubes containing 5 mL representing each lot of the test substances were equilibrated to  $20 \pm 2^\circ\text{C}$ . A volume of 0.5 mL of

standardized filamentous fungal inoculum was added to each tube and swirled. After 10 minutes contact time at  $20 \pm 2^\circ\text{C}$ , a sample from the tube was transferred into 10 mL of appropriate neutralizer using a 4-mm microbiological loop. The process was repeated for all tubes. Appropriate controls were also performed as outlined in the AOAC Official Method 955.17 Fungicidal Activity of Disinfectants. The tubes were thoroughly shaken following each transfer and all tubes were incubated for 7 to 10 days at  $25-30^\circ\text{C}$ . After incubation, the tubes were observed for the presence or absence of growth.

#### Time Kill Method

##### Test organism preparation.

A fungal culture of *Aspergillus brasiliensis* ATCC 16404 was grown on a Sabouraud Dextrose Agar (SDA) slant for 7-10 days at  $25-30^\circ\text{C}$ . The working microbial inoculum was prepared by dislodging the mycelial mats from the agar surface and macerating with saline solution in a sterile glass tissue grinder.

##### Test procedure.

A volume of 0.1mL of the working microbial inoculum was transferred into 9.9 mL of disinfectant. After 1, 5 and 10 minutes contact time, a 0.1mL sample from the tube was transferred into 10 mL of neutralization broth. Ten-fold serial dilutions were then performed, plated and poured with SDA. Plates were incubated at  $30^\circ\text{C}$  for 5-7 days. Controls were performed in the same manner but using buffer in lieu of the disinfectant. Log<sub>10</sub> values of CFU/mL data were calculated for controls and test articles. Log<sub>10</sub> reduction values represent the difference between log<sub>10</sub> average control values and the log<sub>10</sub> of test article values.

### RESULTS AND DISCUSSION

BS EN-1650 is a quantitative suspension test used to evaluate fungicidal activity of disinfectants. Since the test conditions are representative of practical use, this method can be used for generic disinfectant claims in many European countries. The pass criterion for the test is  $\geq 4$  log<sub>10</sub> reduction of viable counts (Log R). Table II shows that the test product diluted to 1:128 in hard water and tested at  $20^\circ \pm 1^\circ\text{C}$  under dirty conditions achieved  $>4.5$  Log R to demonstrate fungicidal activity against *Candida albicans* ATCC 10231 at 5 minutes. Table III shows that the test product diluted to 1:32 in hard water and



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tested at 20° ± 1°C under dirty conditions achieved >4.6 Log R to demonstrate fungicidal activity against *Aspergillus brasiliensis* ATCC 16404 at 15 minutes. (See tables II and III)

BS EN 13697 is a quantitative surface test to establish that products have microbicidal activity against surface-attached microorganisms. The pass criterion for fungicidal efficacy is ≥ 3 log<sub>10</sub> reduction, which is calculated as the microbicidal effect (ME value). Table IV shows that the test product diluted to 1:128 in hard water and tested at 20° ± 1°C under dirty conditions (3 g/L BSA) demonstrates fungicidal activity against *Candida albicans* ATCC 10231 at 15 minutes with a ME value of >5.66.

Table V shows that the test product diluted to 1:32 in hard water and tested at 20° ± 1°C under dirty conditions (3 g/L BSA) demonstrates fungicidal activity against *Aspergillus brasiliensis* ATCC 16404 at 15 minutes with a ME value of >5.66. (See tables IV and V)

In the United States, fungicidal efficacy is determined using AOAC Official Method 955.17 Fungicidal Activity of Disinfectants. Results showed that the test product was effective against *Trichophyton mentagrophytes* ATCC 9533 and *Aspergillus niger* ATCC 6275 after a 10 minute exposure period when diluted 1:128 in 400 ppm hard water and tested in the presence of a 5% fetal bovine serum organic load using AOAC fungicidal activity test with no growth observed in any of the test replicates. The test product also showed efficacy against *Aspergillus brasiliensis* ATCC 16404 when diluted 1:64 in 400 ppm hard water and tested in the presence of a 5% fetal bovine serum organic load after 10 minute exposure period. Experiments have shown that *Trichophyton mentagrophytes* was more susceptible to the disinfectant than *Aspergillus brasiliensis* ATCC 16404 (15).

Basic activity of products containing QACs against *Aspergillus brasiliensis* ATCC16404 can be determined using a time kill suspension test as shown in Figure II. Products A and B are household ready-to-use QAC cleaner/disinfectants and products C, D, E, F are pharmaceutical grade QAC disinfectants. Product C also contains a biguanide.

The results in Figure II demonstrate the importance of proper formulation in the development of QAC disinfectants. A significant difference can be observed in effectiveness against *Aspergillus brasiliensis* that

Table II. BS EN-1650 *Candida albicans* Results

Test Strain	Fungal Suspension		Results at Concentration % (V/V)					
			75%		100% (1:128)		125%	
<i>Candida albicans</i> ATCC 10231	V <sub>c</sub>	46, 43	V <sub>c</sub>	0,0	V <sub>c</sub>	0,0	V <sub>c</sub>	0,0
	N	4.5 x 10 <sup>7</sup>	N <sub>a</sub>	<1.4 x 10 <sup>2</sup>	N <sub>a</sub>	<1.4 x 10 <sup>2</sup>	N <sub>a</sub>	<1.4 x 10 <sup>2</sup>
	N <sub>a</sub>	4.5 x 10 <sup>6</sup>	Log N <sub>a</sub>	<2.15	Log N <sub>a</sub>	<2.15	Log N <sub>a</sub>	<2.15
	Log N <sub>a</sub>	6.65	Log R	>4.5	Log R	>4.5	Log R	>4.5

Where:  
V<sub>c</sub> = viable count  
N = number of cfa/mL of the fungal test suspension  
N<sub>a</sub> = number of cfa/mL in the test mixture  
R = reduction in viability =  $\frac{N \times 10^{-1}}{N_a}$

Table III. BS EN-1650 *Aspergillus brasiliensis* Results

Test Strain	Fungal Suspension		Results at Concentration % (V/V)					
			75%		100% (1:32)		125%	
<i>Aspergillus brasiliensis</i> ATCC 16404	V <sub>c</sub>	52, 66	V <sub>c</sub>	0,0	V <sub>c</sub>	0,0	V <sub>c</sub>	0,0
	N	5.9 x 10 <sup>7</sup>	N <sub>a</sub>	<1.4 x 10 <sup>2</sup>	N <sub>a</sub>	<1.4 x 10 <sup>2</sup>	N <sub>a</sub>	<1.4 x 10 <sup>2</sup>
	N <sub>a</sub>	5.9 x 10 <sup>6</sup>	Log N <sub>a</sub>	<2.15	Log N <sub>a</sub>	<2.15	Log N <sub>a</sub>	<2.15
	Log N <sub>a</sub>	6.77	Log R	>4.6	Log R	>4.6	Log R	>4.6

Where:  
V<sub>c</sub> = viable count  
N = number of cfa/mL of the fungal test suspension  
N<sub>a</sub> = number of cfa/mL in the test mixture  
R = reduction in viability =  $\frac{N \times 10^{-1}}{N_a}$

Table IV. BS EN 13697 *Candida albicans* Results

Test Strain	Fungicidal suspension of assay	Validation assay		Water control	Test Product Concentration
		N	NT		
<i>Candida albicans</i> ATCC 10231	10 <sup>-2</sup> : >300, >300	10 <sup>-2</sup> : 63, 53	10 <sup>-2</sup> : 53, 57	10 <sup>-2</sup> : 62,54	10 <sup>0</sup> : 0,0
	10 <sup>-4</sup> : 53, 63	10 <sup>-4</sup> : 4, 4	10 <sup>-4</sup> : 4, 4	10 <sup>-4</sup> : 4, 4	10 <sup>-1</sup> : 0,0
	N: 6.46	NT: 5.76	NC: 5.76	10 <sup>-2</sup> : 0, 0	10 <sup>-2</sup> : 0,0
				Nc: 5.76 Nts: >300	Nd: <0.1 Nts: 0 ME: >5.66

Where:  
N: log of CFU in 0.05 mL of assay suspension  
NT: log of CFU in the assay surface of the neutralization assay  
NC: log of CFU in the assay surface of the neutralization control  
Nts: number of CFU remaining on the disc surface  
Nc: log of the CFU in the assay surface for the water control  
Nd: log of the CFU in the assay surface for the disinfectant tested  
ME: microbicidal effect = N<sub>c</sub>-N<sub>a</sub>

Table V. BS EN 13697 *Aspergillus brasiliensis* Results

Test Strain	Fungicidal suspension (CFU/0.05 mL)	Validation assay		Water control	Test Product Concentrations
		N	NT		
<i>Aspergillus brasiliensis</i> ATCC 16404	10 <sup>-2</sup> : 163, 141	10 <sup>-2</sup> : 72, 83	10 <sup>-2</sup> : 51, 69	10 <sup>-2</sup> : 53, 61	10 <sup>0</sup> : 0,0
	10 <sup>-4</sup> : 17, 21	10 <sup>-4</sup> : 3, 1	10 <sup>-4</sup> : 6, 7	10 <sup>-4</sup> : 0, 3	10 <sup>-1</sup> : 0,0
	N: 6.88	NT: 6.89	NC: 6.78	10 <sup>-2</sup> : 0, 0	10 <sup>-2</sup> : 0,0
				Nc: 5.76 Nts: >300	Nd: <0.1 Nts: 0 ME: >5.66

Where:  
N: log of CFU in 0.05 mL of assay suspension  
NT: log of CFU in the assay surface of the neutralization assay  
NC: log of CFU in the assay surface of the neutralization control  
Nts: number of CFU remaining on the disc surface  
Nc: log of the CFU in the assay surface for the water control  
Nd: log of the CFU in the assay surface for the disinfectant tested  
ME: microbicidal effect = N<sub>c</sub>-N<sub>a</sub>

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does not directly correlate with active ingredient type, concentration or market application. (See figure II)

### CONCLUSION

The use of a quaternary ammonium compound disinfectant has multiple benefits including excellent cleaning detergency, low toxicity, and bactericidal and virucidal efficacy. However, not all quaternary am-

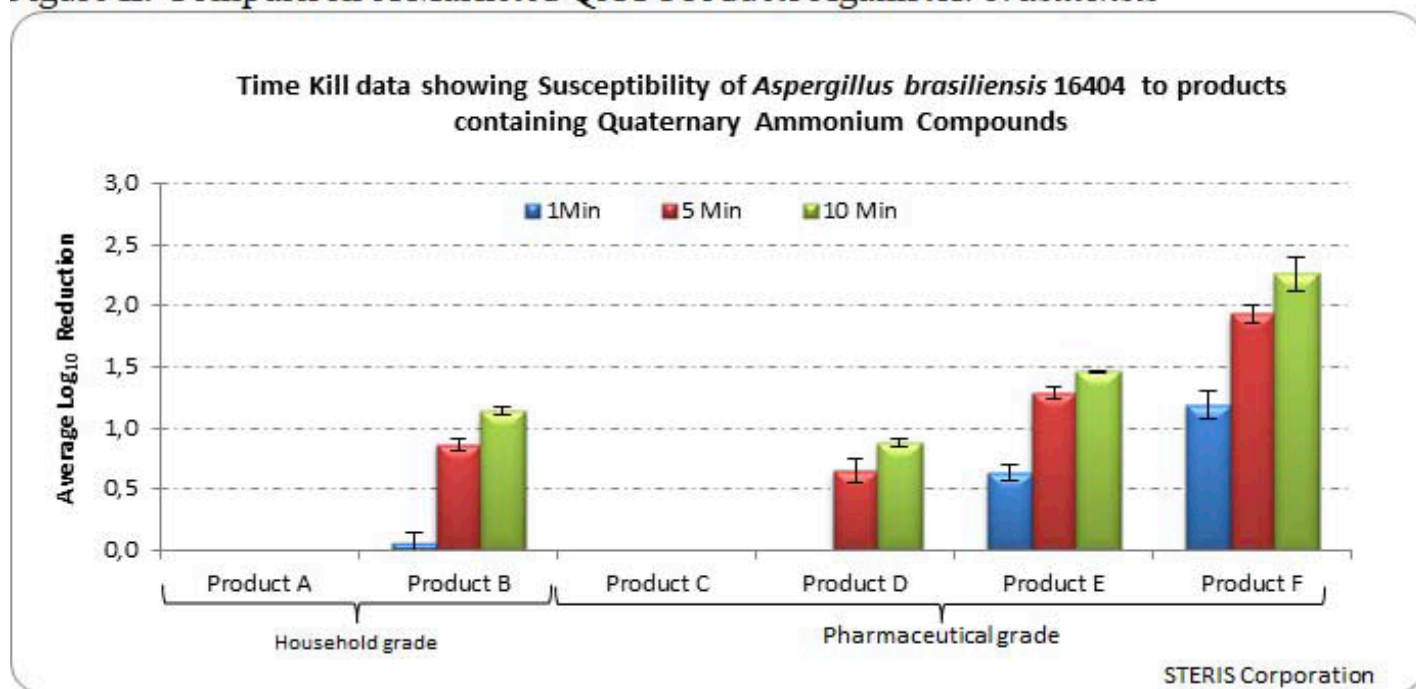
monium compound formulations offer the fungicidal activity of other active ingredients, and marketed QACs can demonstrate widely varied levels of activity against fungal spores. However, a properly formulated QAC-based disinfectant can demonstrate activity against challenging fungal species such as *Aspergillus brasiliensis* without sacrificing other key attributes such as globally acceptable ingredients, environmental acceptability and irradiation stability in a

concentrated form.

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Figure II. Comparison of Marketed QAC Products Against *A. brasiliensis*



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## Interview with Dr. Kai Dirscherl on his presentation at the Cleanzone Congress in Frankfurt

# “The industry requires traceability in quality assurance”

Traceability requires uniform units of measurement and reliable measurement methods. Without these, international comparability of quality assurance in the field of cleanroom technology would not be possible. Metrologist Dr. Kai Dirscherl will be speaking at the Cleanzone Congress (22 – 23 October 2013) about measurement uncertainties, the importance of international standards and what sheep have to do with this field of research. The scientist agreed to talk with us about his presentation on “Traceability of particle size and number concentration”, which he will be giving on the first day of the congress in Frankfurt.

### Dr. Dirscherl, what does “traceability” mean?

In metrology, traceability is a fundamental property for the analysis of measurement results. It refers to an unbroken chain of comparison measurements, so called calibrations, where the individual measurement uncertainty is known at each step. This chain of calibrations is finally related to a recognised standard, i.e. a reference standard, a reference material or a reference instrument.

### You are a researcher and quality manager at the Danish National Metrology Institute (DFM) in Lyngby. What is your field of activity, and where do you come into contact with cleanroom technology?

I have been working in various fields at DFM for some seven years now, and since the middle of this year my main focus has been the coordination of our new department for particle metrology. This field of research was previously a part of the nanometrology department, where we support the micro-, telecommunications and semiconductor industries. However, the field of particle metrology is growing increasingly important. Not only in the pharmaceuticals industry, but also in other high-technological applications there is a growing chorus calling for consistent and reliable international standards for particle measurement and its documentation. In light of these pressing circumstances, we decided the time was right to establish this independent department.

### In what areas is metrology currently being deployed in the field of cleanroom technology?

Lord Kelvin once said: “If you cannot measure it, you cannot improve it.” It is said that anyone who measures a lot will measure a lot wrong, and this really is an area that requires our attention. And as measured quantities get smaller while at the same time a higher



accuracy is demanded, even minimal inaccuracies become significant. For example, every particle counter - like every other instrument - is subject to measurement uncertainty. This means that we have to accept a certain measurement error, and therefore we must know its value. Quality requirements continuously increase, and customers request from the industries to meticulously document the purity of their products and facilities more than ever before. This includes not only the measurement results themselves, but also the calibration of the instruments used - including the traceable documentation of their measurement capabilities. For this purpose, companies urgently need generally recognised calibration certificates. This is the objective of the Mutual Recognition Arrangement (CIPM MRA) concluded in

1999. This international agreement provides for the mutual recognition of calibration and measurement certificates issued by national metrology institutes. It is a response to a growing need for an open, transparent and comprehensive scheme to give users reliable quantitative information on the comparability of national metrology services and to provide the technical basis for wider agreements negotiated for international trade, commerce and regulatory affairs. It is the task of modern metrology to create the conditions in which agreements such as these can be reached, i.e. to define universal standards and to make available verified measurement methods and recognised certificates.

### What is the most difficult part of this task?

The traceability of measured quantities to generally valid and accepted reference standards is the fundamental prerequisite for reliable measurements and the comparability of results, the development of standard procedures and safeguarding product quality - not to mention the mutual recognition of products and services rendered. The provision of a primary standard for particle number concentration is the responsibility of national metrology institutes. This is no minor task, as different types of particles, such as combustion particles and bacteria, require different measurement methods. At DFM we have established a primary standard that allows the calibration of particle counters, which are typically used in cleanroom environments. Methods related to the particulate emissions of modern combustion engines for example are currently being developed in European Metrology Research Projects (EMRP), collaborations of multiple national metrology institutes. As we discussed, measurement uncertainties are unavoidable here - we



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must simply deal with them sensibly and use the technological means at our disposal to minimise them. That is why we believe that developing reliable standards for this purpose is one of our biggest challenges.

### What approaches are you pursuing in order to tackle measurement uncertainty?

When dealing with measurement uncertainties, it is necessary to analyse the measurement methods. Cleanroom particle counters typically work according to the same principle: the air to be tested is sampled and the particles contained therein are measured optically. For this purpose, the particles are exposed to light. The subsequently scattered light allows us to draw conclusions about the number and size of the particles in the air sample. Measurement uncertainties of up to ten percent are still typical. The implementation of the method can be problematic, however, as manufacturers do not have any guidelines regarding the wavelength, i.e. light colour, to be used. Different wavelengths generate different scatter intensities, and therefore different measurement results. While manufacturers do take this into account, the fact that manufacturers generally calibrate their customers' devices themselves – i.e. internally – remains a critical factor for the general comparability of the measurement results. Our approach is to create neutral references in order to achieve improved comparability. An example: For our internationally recognised certificates, we use our own controlled test aerosols and particle counter as the primary standard. We confirm our measurement capability on a regular basis in international comparisons with other metrology institutes, as it is required by the MRA. This ensures that measurement results are transparent and comparable. The thus achieved traceability allows us to create an international degree of equivalence for the calibrated instruments like that called for in the MRA, and quality assurance benefits as a result. Companies that are able to obtain certification in this way from a recognised institute can benefit from their location advantage worldwide.

### From your perspective, what are the biggest challenges facing cleanroom technology for the future?

So far we've been mostly talking about lifeless particles, something that we have a pretty good command of by today's standards. In future, one of the biggest challenges will be the measurement of viable particles. Traditional particle counters are unable to distinguish between dust and bacteria, which means that the current determination of bacterial contamination continues to be based on a count of the particles between 0.5 and 5 micrometres in size – the most common size of bacteria – in combination with cultivation tests. In order to verify that a product has not been contaminated with bacteria, it is therefore necessary to hold it back for up to three days after it has been manufactured in the plant, as this is how long it typically takes to finish the cultivation of a test sample for viables. The next generation of instruments therefore integrates an additional measurement method using UV light, taking advantage of the fluorescence emitted by organic substances. This makes it possible to measure not only the number and size of the particles in the classic sense, but also to register their fluorescence signal. These innovative developments are a positive step towards real-time measurement, yet they still have some weaknesses. For example, UV measurements are still quite slow, meaning that it is usually only possible to examine a fraction of the sampled air with UV light. Taking the typical measurement uncertainty into account, it is very difficult to obtain a representative result in this way. In extremely

sensitive areas such as the pharmaceuticals industry and medical technology, it will therefore remain necessary to rely on cultivation tests – and to accept the loss of time this entails. Yet achieving reliable real-time viable detection continues to be our goal. In metrology we are already working on new calibration systems and applicable standards for this area.

### What factor is primarily responsible for the creation of modern metrology, and what is its role today?

Metrology is actually a very old science, as people have been measuring and counting since time immemorial, be it the width of a field or the size of a flock of sheep. Even so, the units in which people count have changed a great deal over the ages. For example, until the 18th century the human body was typically the basis for measurement units of length, such as the cubit, foot and pace. The problem was that these units were typically related to a living person, such as the length of the ruling pharaoh's forearm or even the circumference of the regent's belly. In France alone there were some 250,000 different units of measurement in the 18th century. The Renaissance heralded the beginning of calls for the standardisation of measurement units. This was the case in the worlds of science, politics and business, as the exchange of goods and knowledge across local and national borders required uniform standards. Even so, it was not until the French Revolution, which gave rise to the metre, that our current standard unit of length came into being. When creating the prototype of the metre in 1799, a great deal of effort was made to find a neutral reference that could be used by everyone. The result: the Earth. A metre was defined as one ten-millionth of the length of the Earth's quarter meridian through Paris. Today we know not only that the scientists made a little error in their measurements, but also that our globe is not a perfect sphere. Yet it is the idea that matters: a uniform, reliable and recognised unit of measurement that serves as the basis for communication across borders. It is a concept that we continue to pursue to this day, as it is the fundamental requirement for the progress we make. Without standards – i.e. without comparability and quality assurance across international borders – this would not be possible.

Dr. Kai Dirscherl's presentation on “Traceability of particle size and number concentration” can be heard at the Cleanzone Congress in Frankfurt am Main on 22 October 2013.

Messe Frankfurt  
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# The Basis for new business

CAT Clean Air Technology GmbH from Stuttgart realized a cleanroom at OWBs (Oberschwäbische Werkstätten gem. GmbH) site in Mengen, Germany. People with disabilities assemble and pack here medical and pharmaceutical products branded with the recently created label ProMediPac.

## **To create working and living for mentally and physically disabled adults:**

With this claim, OWB Oberschwäbische Werkstätten gem. GmbH was founded in 1970 in Ravensburg, Germany. Without the headquarter the company is represented at seven other locations in Germany. The non-profit organisation has taken on the task of opening a new future to people with disabilities through a variety of approaches and qualified support. The aim was not only to make an individual life possible, but also to create a key to social inclusion.

More than 1,400 employees of OWB are active, among other functions, in the metal and wood processing, assembly and delivering, in manufacturing and packaging, in warehouse logistics and in landscape work. This for companies as well as for cities and towns. With great success OWB Sigmaringen sells an extensive range of products around the subject of moderation and presentation,

which realized as in-house production. Most interesting: In Kisslegg OWB is even operating a coffee-roasting-plant.

The site Mengen has now the most innovative equipment of all OWB sites: an around 100-square-meter clean room classified C and D, for which CAT Clean Air Technology GmbH from Stuttgart is responsible. Background: OWB is constantly looking for innovative and attractive jobs for people with disabilities. In the search for new fields, they came across an institution for disabled people in Schaffhausen. For years people with disabilities were packing medical products there.

After a day on site the OWB board and management decided to build a clean room into the workshop. In this context, the brand name ProMediPac was created.

For the clean room project CAT created first the feasibility and concept study. They also took over the design as well as the qualification and validation of the facility. The decision came not accidentally to Steffen Hilds clean room service providing company. „The first contact was initialized by an external consultant of us who took the view that a general contractor for this project would be beneficial“, says Michael Kugler, work-

shop and project manager of ProMediPac. The consultant knew CAT and its extensive reference list for some time and coordinated an initial interview, which took place in November 2012.

One month later the decision was made. „The expertise, experience and reference list of CAT convinced us right at the beginning. We felt very cared for as a newcomer in terms of clean rooms“, Michael Kugler remembers. Especially pleasing was, in addition to the technical perfect execution, that the implementation was very quickly done and without great cost variances.

Since the beginning of July 2013 the cleanroom is operative. The enthusiasm of the chosen employees and specially trained, respectively qualified employees knows no bounds. „For them it is something very special to be allowed working here“, says Kugler. In no time the ProMediPac have already acquired a number of potential customers, an expansion of the cleanroom space is now only a matter of time. And CAT will then certainly be back on board.

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# In the Green Zone

## - controlled ventilation of coma patients



The highest levels of safety and optimum user convenience when administering ventilation to patients is ensured with the new "smart Cuffmanager<sup>®</sup>" by Tracoe medical GmbH. This is particularly important when safeguarding the respiratory function during anaesthesia, emergency medicine and coma care, to be achieved through permanent maintenance and control of the internal pressure of the high volume low pressure cuff of the tracheostomy tube - to be in the "green zone" of between 20 and 30 cm H<sub>2</sub>O. At the same time, very high cuff pressures and subsequent damage to the mucous membrane are thus avoided. A special compensation balloon assures constant cuff pressure within the optimum range. As a result, the high volume low pressure cuff maintains its self-seal effect. Following 18 months' of development and testing, introduction to the market, i.e. to hospitals, followed in mid-August 2013. At COMPAMED, experts are invited to give the Tracoe Smart Cuffmanager<sup>®</sup> a close inspection on the Spang & Brands stand - M33 - in Hall 8a.

"We have given the subject of the compensation balloon our very special attention. This system represents the central functional unit of the Smart Cuffmanager<sup>®</sup>", according to Rd. Ralf Schnell, development manager at Tracoe medical GmbH, "... and because of that we were looking for a plastics processing specialist with medical device competence to whom we could entrust product development and production of this sensitive product range. This task was awarded to our long-term partner Spang & Brands!" That was in the spring of 2012. At present the production process is gradually increasing.

The specialities of Spang & Brands GmbH are design optimisation of plastics components and complete systems for medical device technology and the pharmaceutical industry, the injection-moulded processing of specially formulated raw materials and multi-component injection moulding. With its entire range, from CAD-Design, tool making, to clean-room assembly and packaging of complete products, the company is well positioned to tackle all these challenges.

"For the compensation balloon we have identified a TPE material combination - approved to be used in medical applications - (light blue) with an extremely low Shore A hardness (<5) in the laboratory and empirically. In addition, it is resistant to aggressive agents, excludes osmosis, assures repeat accuracy in long-term pressure constancy, and satisfies the strict FDA and USP requirements", explains Friedrich Echterdiek, managing director at Spang & Brands GmbH. For the other four support components of the module ABS (white) is used, also FDA compliant. The moulds are made in-house by Spang & Brands. Due to the indentations, only collapsing core technology could be considered to achieve a secure snap connection. Thus the highly elastic TPE balloon can be connected to the housing with a snap of the rigid ABS ring. In addition, a most economical assembly process was now possible.

For the compensation balloon Spang & Brands designed and manufactured a multicavity mould in high chromium alloy steel in its in-house mould shop. The company also developed an innovative de-moulding technology in order to de-mould such a soft component automatically.

The required homogeneous wall thickness of the balloon body and its flange - or neck - had to be complied with extremely accurately and consistently. Therefore, the production procedure was crucial: not suitable was the process involving the customary dipping method or the blow moulding technology. Consequently, the precision injection moulding process had to be implemented. The reason: it had to be an exact reproducible component defined totally geometrically. That way the tight functional requirements could also be met.

Quality control with long-term endurance tests provides information about pressure constancy and distortions. Spang & Brands achieves the required repeatability and production safety with all-electric injection moulding machines - clamping force from 350 kN. The company produces the TPE compensation balloons as well as the support components in ABS under clean-room conditions.

Based on the entire value added chain of being a specialist in the provision of medical devices, with its more than 60 injection moulding machines of which over one third are electric, nor forgetting several multi-component injection moulding machines, Spang & Brands is able to offer the entire diversity of products optimized by plastics: "We have the right approach, supported by CAD-3D development and MoldFlow analysis", according to Echterdiek. Medical devices are produced and packed ready to use. With our precision and cleanroom injection moulding technology the most intricate filigree components are moulded. They simply must not exceed the very tight tolerances - in the µm range. They are thus able to withstand the permanent loads to guarantee purity, hygiene and safety on and in patients. Consequently, special plastics compounds, such as TPU, TPE, TPV or Poly-laktit are being used. "With multicomponent injection moulding, our approach is to combine comfort with state-of-the-art functionality. We continue to focus on TPE as an alternative to Polyisoprene. Here, many applications and new form technology are conceivable", emphasises the Spang & Brands managing director.

## Stäubli Robotics at K-Trade Fair Düsseldorf, hall 11 / booth H11

# Robotic solutions for processors of plastics

At the Düsseldorf trade fair, Stäubli Robotics will be showcasing advanced automation solutions for the plastics processing industry. At the Stäubli exhibition stand, trade visitors will have the opportunity to view a customised range of products featuring innovative robots, state-of-the-art programming and highly straightforward integration.

Many of the robots and software tools due to go on display have been developed in close cooperation with plastic processors and machinery manufacturers. With its series of robots specially developed for plastics, the company offers the perfect solution for the automation of injection moulding plants, whether for use in harsh production environments or in cleanroom scenarios. The special robots for plastics in the TX and RX series are the machines of choice for a variety of operations such as unloading of parts, full machining of injection-moulded parts, in-mould decoration, in-mould labelling, or for use inside the moulding machine and for many more applications besides.

**16th to 23th October 2013  
Duesseldorf, Germany**

The speedy six-axis robots are increasingly to be found undertaking downstream tasks such as deburring, testing, cutting, gluing, assembling and packaging. Stäubli robots tick all the boxes when carrying out these roles not only on account of their sleek structure and precision, but even more so with their dynamics: when loading and unloading injection moulding machines, tool-open times can be kept to a bare minimum. The

Plastics series of robots can handle loads up to a maximum of 34 kilos. It extends from the compact TX40 plastics via the middle-weight TX60 and TX90 classes to the RX160 plastics with its reach of up to two metres.

### Three brand new special kinematics

Stäubli now aims to meet the latest, as yet unsatisfied, needs of customers in the plastics processing sector with three additional special kinematic models, namely the new TX340 SH shelf robot, the ultra-fast four-axis TP80 and the RX170 hsm machining robot. The shelf-mounted robot can handle substantial loads of up to 165 kilos with a reach of 3.7 metres.

The Fast Picker TP80 with well over 200 picks per minute is recommended for

all rapid pick-and-place applications in the plastics industry. The RX170 hsm processing robot, however, has been designed for the rapid and straightforward machining of plastic materials. The sixth axis of this special robot has been replaced by a milling spindle and, thanks to its reach, relatively large workpieces can be precisely machined. In combination with a traversing axis, machining of plastic parts that are several metres long is also no problem.

### Programming: Everything is possible

As regards programming, the company utilises a three-stage approach that is tailored to meet the most diverse requirements. Seasoned robotics users program with VAL3. This proprietary Stäubli high-level language is very easy to learn and makes programming of robots a highly efficient process.

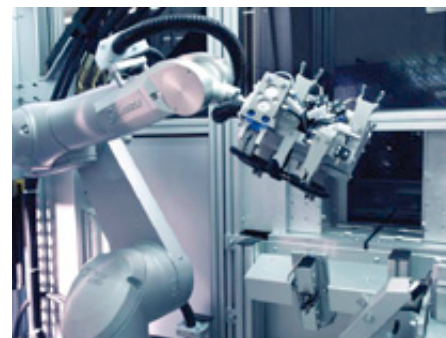
Software developers have developed VALplast application software so that plant operators and system integrators can benefit from the robot's many talents without having any special knowledge. This user-friendly interface facilitates exceptionally fast programming on the basis of predefined building blocks. In addition, Stäubli offers machine manufacturers the option of operating the robots via the control system of the moulding machine. This is made possible by the ready-to-plug uniVal Drive software solution, a real-time interface for the integration of Scara and six-axis kinematic models under external control.

At their trade stand in Düsseldorf, the company will demonstrate how contemporary automation solutions for the plastics processing industry can be both highly productive and cost-effective to run. Across a broad spectrum of sectors – automotive, aviation, aerospace, food, pharmaceutical, medical and the like – wherever the job involves automated applications for plastics processing, Stäubli Robotics will have the right solution in its portfolio.

Stäubli Robotics (Deutschland)  
D 95448 Bayreuth



Reliable production processes are necessary for the manufacture of medical devices under cleanroom conditions. An injection moulding cell produced by Engel with fully integrated Stäubli cleanroom robot readily complies with all the relevant requirements. Photo: Engel



In this fully automated standard injection moulding cell for small parts, a Stäubli TX60 undertakes not only simple handling tasks but also all associated machining processes.



A Stäubli RX160 scores in terms of maximum precision whilst carrying out insertion / removal operations on injection moulds. Yet at the same time, movement sequences must be extremely rapid in order to keep tool-open times as short as possible.



# CPhI Worldwide 2013: Bosch Packaging Technology presents laboratory devices for process technology

- Solidlab 2: drying, granulating and coating in one machine
- Granulating smallest batch sizes with Hüttlin Mycromix
- Worldwide laboratories for product development

From October 22 to 24, 2013, Bosch Packaging Technology, a leading supplier of processing and packaging solutions, presents a selection of laboratory devices for solid dosage forms from its product brands Hüttlin and Manesty at CPhI Worldwide in Frankfurt/Main, Germany. The two process technology specialists for the pharmaceutical industry are part of the Bosch Packaging Technology portfolio since 2011. Hüttlin GmbH based in Schopfheim, Germany, presents its high-shear mixer granulator Hüttlin Mycromix at CPhI. Manesty operates under the name of Bosch Packaging Technology Ltd. with headquarters in Knowsley, Great Britain, and offers customized and highly flexible tablet presses and coaters. Together, Hüttlin and Manesty showcase one of their joint developments, the laboratory device Solidlab 2. The exhibited devices and many more are available for customers to test both equipment and formulations in laboratories at different sites.

## Joint know-how for all process steps

Flexibility, ease of use and cost effectiveness are particularly important when developing products in the laboratory. This is why Hüttlin and Manesty have joined their know-how and developed the laboratory device Solidlab 2. The compact and modular machine combines several process steps in a small space: drying, granulating and coating in the fluid bed, as well as tablet coating in the coater. The modules can be used individually and contain the entire periphery such as inlet and exhaust air handling, sensor technology and control system.

**22. - 24. October 2013  
Frankfurt, Germany**

Hüttlin Mycromix is the smallest high-shear mixer granulator in the laboratory equipment range. It handles batches from 0.05 to 4 kilogram. The bottom drive unit Hüttlin Gentlewing ensures highly homogeneous mixing qualities for granulates. All processes can be easily transferred to pro-



joint development by Hüttlin and Manesty



High-shear mixer granulator Hüttlin Mycromix

duction equipment via scale-up.

With the Manesty Xpress range of tablet presses, Bosch Packaging Technology fulfills the pharmaceutical industry's needs for flexibility and safety, as well as low investment and operation costs. The Manesty Xpress product range consists of both single and double-sided rotary tablet presses as well as a WiP option (Wash in Place) allowing for flexible tablet production of small, medium and large batch sizes. The machines feature an ergonomic design, short product change-over times, high product yield and Overall Equipment Effectiveness (OEE).

## Covering all process steps:

### Bosch laboratories around the world

Bosch Packaging Technology provides laboratories worldwide where customers can test machines and formulations on-site. Bosch experts support customers during the entire development process of pharmaceu-

tical products, right through to the start of production. The laboratory in Schopfheim is equipped with a range of machines that cover all process steps from mixing and granulating, drying and coating through to pressing and coating of tablets and pellets, as well as capsule filling. The laboratory in Knowsley specializes in pressing, coating and testing of tablets. In Waiblingen, Germany, the laboratory focuses on the

development of optimal dosing techniques, for instance in hard gelatine capsules. Further small laboratories are being established at different sites across the globe for testing and feasibility studies.

The technologies from Bosch are on display at booth 41H30 in hall 4.1 in Frankfurt/Main, from October 22 to 24, 2013.

Bosch Packaging Technology  
D 74554 Crailsheim

# ACREX India 2014: heading towards carbon neutral

- **ACREX India 2014 almost booked up**
- **Growing construction sector offers new business perspectives**
- **fensterbau/frontale India again parallel to ACREX India 2014**

South Asia's largest exhibition on Air Conditioning, Refrigeration & Building Services, Acrex India 2014, will take place at Pragati Maidan in New Delhi from February 27 to March 1, 2014. More than 450 companies from Asia, Europe and North America will participate in the exhibition. As a first of its kind, ACREX India has started an initiative that aims at reducing its carbon footprint to set an example for environment-friendly and energy-efficient development in the heating, ventilation, air conditioning and refrigeration (HVAC & R) sector. ACREX India 2014 is organized by the Indian Society of Heating, Refrigeration and Air Conditioning Engineers (ISHRAE) and NürnbergMesse India.

**27th February to 1st March 2014  
New Delhi, India**

The Indian construction industry has progressed with a Compound Annual Growth rate (CAGR) of 15.10 percent between 2008 and 2012. This growth was supported by the country's expanding economy, increased government spending on public infrastructure, high urbanization and a supportive foreign direct investment (FDI) system. For the next five years, the construction industry's growth is expected to remain strong as a result of the government's commitment to improve India's infrastructure. "The positive development of the construction and infrastructure sector offers numerous business opportunities for the HVAC & R industry," says Sonia Prashar, Managing Director of NürnbergMesse India. "With ACREX India we offer the global industry a platform to expand their business and to benefit from these positive developments." Ashish Rakheja, chairman of ACREX India 2014, has set the exhibition's focus on energy efficiency and environmental responsibility. But that is not all: The exhibition will also show the industry new perspectives for future business opportunities, for example with a special architects forum, where future building concepts will be displayed.

## **Towards a carbon neutral exhibition**

The exhibition focuses on energy-efficient technologies and latest innovations. As representative of a future-oriented industry, ISHRAE has decided to set an example for the responsible use of natural resources: To compensate unavoidable emissions caused by the exhibition, the organization is going

to plant 10,000 trees all over India. At the launch of ACREX India 2014, the NGO Sankalp Taru and 200 attendees already started to plant the trees virtually via Internet on behalf of organizers, exhibitors, visitors and ISHRAE members. Every tree can be located through a GPRS system and its growth can be monitored. Another important proposition of ISHRAE is the reusing and recycling of waste material generated during ACREX India 2014. Every exhibitor is invited to contribute to the reduction of the exhibition's carbon footprint by following the principle of three "Rs": Reduce, Recycle and Reuse.

## **Sharing expertise at ACREX India 2014**

ACREX India presents the entire spectrum of the refrigeration and air conditioning industry, ranging from air conditioning systems, refrigeration equipment, temperature control and ventilation to building technologies and services. Industry-leading companies like Carrier, ebm-papst, Daikin Air-conditioning India Pvt. Ltd. (DAIPL), Bry Air Asia Pvt. Ltd., Mitsubishi Electric India Pvt. Ltd., Intertek and Marathon Electric have already booked their booth. The international interest in the show is also high: Germany, Italy, the USA and China have confirmed their participation with country pavilions.

The exhibition not only provides an internationally renowned setting to showcase products and developments; it is also accompanied by a series of informative technical workshops, seminars and panel discussions, offering a platform for international knowledge exchange on a highly qualified level.

## **A powerful duo: ACREX India in parallel to fensterbau/frontale India**

fensterbau/frontale India will again be held concurrent to ACREX India at the Pragati Maidan Exhibition Centre in New Delhi. The international exhibition for windows, doors, façades and related technologies, machinery and services is organized by NürnbergMesse India. "We are very happy to simultaneously present both events," explains Sonia Prashar. "These two exhibitions support cross-sector cooperation and developments in thematically linked segments of building expertise." With their complementary themes they are equally appealing to architects, planners and building experts. In 2013, 70 international exhibitors presented their latest products and technologies to an increased audience of about 5,640.

## **About ISHRAE**

ISHRAE (Indian Society of Heating, Refrigerating and Air Conditioning Engineers), was founded in 1981 at New Delhi by a group of eminent HVAC & R professionals. ISHRAE has more than 12,000 HVAC & R professionals and 3,000 students as members with 40 chapters in India. ISHRAE organizes International and National Exhibition, conducts Seminars and Workshops throughout the country to achieve its primary objective of Advancement of the Sciences of Heating, Ventilation, Air Conditioning, Refrigeration Engineering & Related Services. ISHRAE publications strive to help readers keep up to date with the happenings, learn new techniques, improve old designs and adopt the use of new devices to improve indoor air quality in our buildings.

NürnbergMesse GmbH  
D 90471 Nürnberg

# Only the best and novel Japan Steel Works extrusion and injection moulding technology on display

Actually a world premiere in extrusion: for the first time outside their home region, JSW are presenting their latest development – the TEX 44 Alpha III co-rotating twin screw extruder – for highly economic compounding, masterbatch production, devolatilizing, under water pelletizing, rubber / elastomer dewatering etc. The new extruder manages the entire range of standard polymers as well as the latest engineering and super engineering plastics.

**16th to 23th October 2013  
Düsseldorf, Germany**

„A perfect compounding plant with a comprehensively controlled extruder is the basic prerequisite for economic and trouble-free processing of perfect granulates in plastics processing units. And this is what we can prove to plastics experts who are invited to come to our stand 41 in hall 13 to see our new compounding extruder during K 2013“ says Tadashi Gion, JSW’s Liaison Officer.

Higher torque is the key factor: the design of the new extruder encompasses the main operating structure of the predecessor series TEX Alpha II so that those users of JSW compounding extruders just need to take another step into far more productivity. With the new TEX 44 Alpha III, the processor gets a much higher throughput in a compact machine which safeguards consistent top polymer quality and lower polymer temperature during the process at a reduced screw speed. Performance tests have shown that the productivity could be raised and process temperature reduced. All these results have one extra advantage, i.e. correspondingly lower current consumption and thus considerable energy savings.

The 36% higher torque than the previous model, results from a new gear box, gears and bearings design to increase the performance and operating reliability of TEX Alpha III screw barrel. The wider processing window at higher torque also results in aggressive or rather powerful kneading and mixing. More safety in operation: a mechanical torque limiter (no lead/lag time) cuts the connection to the screw instantaneously when an extremely unlikely event of malfunction or critical process situation is detected, thus protecting the equipment from expensive damage and downtime. The new drive system includes a powerful infinitely variable three-phase motor. It can use



Tadashi Gion, Sales Representative JSW, 08-2013



TEX-Alpha-III-extruder



J-AD Injection Moulding Machine

a water cooling system which is quieter than air cooling. In all aspects of the drive system, JSW engineers have placed great emphasis on designing equipment and components with the least possible energy consumption thus protecting the environment sustainably.

JSW’s twin screw extruder generally uses the latest 64-bit RISC high speed control system – EXANET by JSW – featuring a 15 inch colour LCD touchscreen for optimum process control and surveillance. This control system accommodates all “easy-settings” and process parameters and can integrate auxiliary equipment from the feeding and mixing system downstream to the pelletizing plant’s strand cutter. The comfortable and user-friendly EXANET stores thousands of compounding, masterbatching, devolatilizing, under water pelletizing, elastomer de-

watering etc. recipes for easy repetition and 100% repeatability of the specific process after months or years.

After K 2013, extrusion experts can see and test the new TEX 44 Alpha III extruder in JSW’s Technical Center in Overpelt/Belgium.

Injection Moulding: During K 2013, JSW and their European sales and service partners, WINDSOR Kunststofftechnologie GmbH, Hanau/Germany, present in Halle 13, Stand 41, two machines of the J-AD series – 1400 and 3500kN clamping force – with production-relevant highlights. The J140AD moulds a technical hollow part in PP (injection weight = 80 grams, cycle time = 60 seconds). Thus, two geometrically differing parts are moulded simultaneously in varying cavities of the high-tech mould. The parts are then assembled in the mould proper and finally circum-moulded with PP. These are three operations in one! The J350AD produces a transparent hemispherical container in PP – 400 g injection weight – in no more than 17 seconds. This feature represents a cycle time saving of 30% relative to comparable machines. The total productivity and performance advantage is easily calculated from this value.

Precise and synchronous movements of all relevant axes plus high-reproducibility parallel functions are a guarantee for outstanding mould venting. The machines are gentle on moulds, shorten cycle times and provide optimum quality parts. Up to six mould breathing and compression functions can be integrated into a single clamping operation. Clamping pressure build-up and injection may run exactly synchronized. A clamping pressure build-up profile may be defined for every point along the path of the injection process.

The full control procedures that have so far been available for the J-AD line only are now also available for larger units. Outstanding control equipment, supplied by JSW now also allows registering relevant process parameters every 62 microseconds. These can be evaluated and optimized if necessary. Superior performance by machinery comes with attractive output data, low machine prices and little power connecting load. The energy-optimized 1400 kN exhibit, for instance, just needs 14,7 kVA of power supply.

Japan Steel Works Europe GmbH  
D 40217 Düsseldorf



## Pilz innovations at sps ipc drives 2013

# Complete, safe automation

With its latest innovations at the sps ipc drives 2013 exhibition (26 – 28.11.2013, Nuremberg), Pilz is underlining the benefits of system solutions when meeting the demands of automation technology. In Nuremberg this complete supplier of safe automation will be showing new products from the fields of sensor, control and drive technology, as well as visualisation. The spotlight will also be on machinery safety services.

“Based on our core competency, safety, we offer a complete portfolio of automation solutions to meet every requirement – from the monitoring of individual safety functions on machines through to complete automation solutions for distributed plants. This is confirmed at this year’s sps ipc drives, where we will be showing innovations from all product areas”, says Renate Pilz, Chair of the Board at Pilz GmbH & Co., looking ahead.

**26th to 28th November 2013**  
**Nuremberg, Germany**

### Sensor technology for greater efficiency

Innovations in the field of sensor technology include the light beam devices PSENopt “advanced”, which are multifunctional and can be used for muting, blanking and cascading. Thanks to the new software PSENopt tools, the light beam devices can easily be installed and operated without the need for external tools.

### Control technology: Standardising safety

Where control systems are concerned, the company is committed to openness: It will be demonstrating how safety solutions can be standardised with its configurable control systems PNOZmulti. As the systems are open, they can be connected to a range of different operational control systems. With new link modules for decentralisation in the configurable control systems PNOZmulti, Pilz is increasing flexibility in terms of the size and individual requirements of an application.

Complete automation solutions are based on the control systems PSSuniversal PLC in the automation system PSS 4000. A new feature is support for the communication protocols Ethernet/IP, CANopen and EtherCAT, which enable the user to merge control functions for standard and safety in a single architecture.

### Safe, high-performance motion

In the field of drive technology the company is exhibiting a complete solution for



safety on vertical axes. The company offers various solution approaches, depending on the specific application: these range from a brake test to the control of two high-performance holding and safety brakes with the new safety relay PNOZ s50, plus redundant fall protection with the safe motion solution PMCprotego DS.

With the new RTFL interface for motion control systems, the company will use the exhibition in Nuremberg to introduce a communication mode based on standard Ethernet, which enables extremely short cycle times as well as satisfying safety requirements.

### Simpler diagnostics and visualisation

At sps ipc drives Pilz will be showing the complete 5th generation of operator terminals PMI. These modern devices offer a diagnostic and visualisation concept that is tailored to the requirements of plant and machinery in increasingly complex production processes. New processors provide the necessary computing power.

### Services for greater safety

Services, consisting of consulting, engineering and training on machinery safety, are an important part of the Pilz portfolio. The international training program CMSE® - Certified Machinery Safety Expert - was initiated jointly by Pilz and TÜV Nord and will be starting up in Germany in the Autumn. With this “Driver’s licence for machinery safety”, the company is setting international standards.

In Nuremberg the company will be presenting the new version of the PAScal Safety Calculator. This enables key safety parameters such as Performance Level (PL) and Safety Integrity Level (SIL) to be verified and documented simply and with ease. The new version supports the data format of the VDMA standard sheet 66413. As a result, PAScal is able to convert existing libraries that use other formats into the VDMA format.

Pilz GmbH & Co. KG  
D 73760 Ostfildern

## Wittmann Battenfeld at the K 2013

# “Power for the future” with a 2-component version of the MicroPower

In hall 16, booth D22, Wittmann Battenfeld is presenting the production of a “lab on a chip” as an impressive example from the field of medical technology to demonstrate a 2-component application of clean-room micro injection molding. The product is manufactured in a production cell consisting of 2 MicroPower 15 machines.

The equipment for this application consists of 2 MicroPower 15/10 machines connected with each other by a clean-room tunnel. The injection-molded parts are transported and joined together by the integrated W8VS2 Scara robots.

**16th to 23th October 2013  
Duesseldorf, Germany**

Here, both the special micro-structured surface of the molded part and the coordination of the interacting machines and their robot systems by the control system are regarded as special challenges. The molds are supplied by Microsystems UK (Fig. 1).

In this production process, various components of the “check-card lab” are injection-molded, checked and assembled in the upstream MicroPower. The parts are subsequently deposited on a transfer module and transported to the downstream MicroPower, where the assemblies are picked up and inserted into the mold by a combined insertion/removal handling system. Here, the parts are overmolded with TPE (thermoplastic elastomer), then removed and transferred to a depositing system (Fig. 2).

The objective of this demonstration is to give trade visitors an idea of the MicroPower’s capabilities and its flexible application options. Firstly, it shows the extremely high degree of precision with which micro parts and micro surface structures can be reproduced and manufactured in a stable injection molding process. Secondly, it highlights the outstanding flexibility of the MicroPower and its peripheral appliances. Thanks to these attributes, this specialized machine is able to accomplish even highly complex tasks.

### Lab on a chip

The term “lab on a chip” normally designates a micro fluidic system which scales down certain selected functions of conventional labs (such as the separation of individual ingredients from a mixture) to the dimensions of a microchip, using only minute volumes of fluid (Fig. 3).

With this technology, fluids such as blood can be completely and automatically analyzed on a single chip. Transport of the samples between the various reaction and analysis chambers is effected by capillary forces.

From the engineering point of view, lab-on-a-chip systems can be regarded as a sub-category of micro-electromechanical systems, which combine miniaturized sensor systems with micro fluidics. This involves special challenges in terms of structuring and finishing component surfaces and modifying their electrical attributes.

The MicroPower is the machine model of the PowerSeries from Wittmann Battenfeld specially designed for injection-molding small and micro parts. The specially remarkable feature of the MicroPower is the innovative two-step screw-and-plunger injection unit with a shot volume range from 0.05 to 4 cm<sup>3</sup>. Via this injection unit, ther-



Fig. 1: Schematic image of 2C MicroPower and lab-on-a-chip drawing

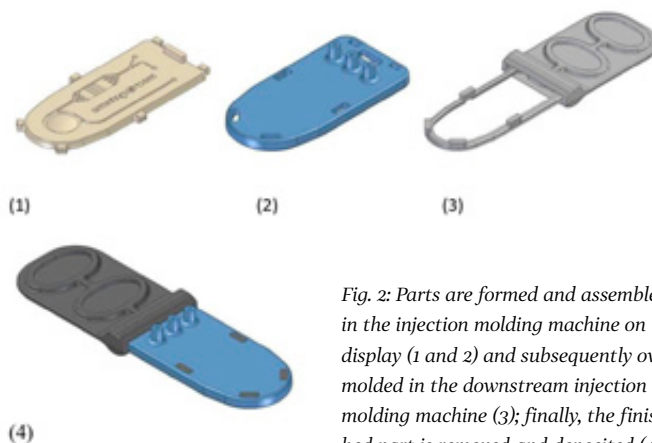
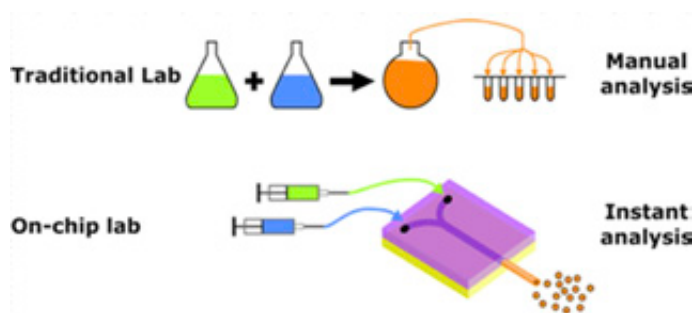


Fig. 2: Parts are formed and assembled in the injection molding machine on display (1 and 2) and subsequently overmolded in the downstream injection molding machine (3); finally, the finished part is removed and deposited (4).



Redrawn from: Brivio, M., Verboom, W., & Reinhoudt, D. N. (2006). Miniaturized continuous flow reaction vessels: influence on chemical reactions. *Lab on a Chip*, 6, p. 329.

Fig. 3: Comparison of a conventional lab with a lab-on-a-chip system

mally homogeneous melt is injected with the result of premium-quality parts from absolutely stable production with short cycle times. Thanks to the all-electric MicroPower’s excellent clean-room compatibility, this machine is particularly predestined for medical technology applications.

WITTMANN BATTENFELD GmbH  
A 2542 Kottlingbrunn

The Royal Society of Chemistry (RSC) is bringing together leading scientists, technical experts and two of science's most famous names, in a special free-to-attend conference at easyFairs LAB INNOVATIONS on 6 & 7 November 2013 at Birmingham's NEC.

## Royal Society of Chemistry Unveils its Conference for Lab Innovations 2013

Details of the two-day conference, carefully devised by the RSC for laboratory managers, researchers and scientists, have just been released. The conference will feature three concurrent strands which explore the latest developments in equipment and best practice for the medicinal, pharmaceutical and chemical industries.

**6th & 7th November 2013  
Birmingham, UK**

The centre-piece of each day will be a keynote address. These are being given by two of the biggest names in science – world-famous fertility expert, Lord Professor Robert Winston plus Professor Andrea Sella, whose chemistry demonstrations have filled theatres around the world.

On the first day of the conference Andrea Sella will explore the names behind well established lab apparatus such as the Büchner funnel or the Liebig condenser. Who were these people and how did they come to invent these pieces of glassware or apparatus? Sella will answer this and consider how apparatus designers in some cases have changed the world, by revealing hidden structures that were previously invisible. Appropriately, for the science-showman, his talk will be illustrated with demonstrations.

While Andrea Sella's talk is showing how equipment advances can transform the way labs operate, Bob Keighley, Product Manager Spectroscopy at Shimadzu will then bring this right up to date by demonstrating how new technology has made advanced spectroscopy more accessible to everyone.

Day one will also feature Steve Wright, Principal Scientist at Microsaic Systems who's talking about 'a flexible and deployable miniature mass spectrometer for the pharmaceutical laboratory'.

Budgets are always under pressure; for lab professionals that means finding ways to minimise operating costs without compro-

promising on safety. Keith Beattie, Head of Life Sciences at the Energy Efficiency Consultancy will outline some new thinking on a practical approach for lab managers to control costs whilst maintaining safety.

The individual presentations on the first day will be rounded off by a session by Anthony Lenk, Director of Romil on accreditation, traceability and the role of certified reference materials in the modern lab.

Lord Professor Robert Winston delivers the keynote address on day two of Lab Innovations. He will consider science's response to 'our uncertain future.' In addition to hearing him speak, 10 show visitors will also win the opportunity to put their questions directly to Lord Winston as part of an intimate, private Q&A roundtable discussion he is hosting during Lab Innovations.

Scientists looking for insights into how to overcome the complexities of bioanalysis will find plenty of food for thought in a session delivered by Dr David Neville, Technical Expert at RSSL Pharma who will outline a multifaceted approach to biomolecule analysis.

Ben Crossley, Research Chemist at Yorkshire Process Technology will share its development of a reusable immobilized iridium catalyst. This has been done to obtain a catalyst with homogenous selectivity/activity and heterogeneous ease of separation. Crossley will outline how the new catalysts when characterized and evaluated against model transfer hydrogenations have shown minimal leaching of catalytic material into the reaction medium and a high precious metal recovery.

Medicinal chemists need to have access to analytical instrumentation, and for convenience and productivity those instruments need to be close to the chemists who use them. Yet high capital and maintenance costs make it unattractive to install and support analytical instruments in every medicinal chemistry lab. Chris Howson, Scientist at

Novartis Pharma UK will explain how it combated this challenge through its LAB2LAB project. This connected remote labs on different floors within a building to instrumentation in a disparate analytical chemistry lab.

Pharmaceutical companies are confronted with challenging R&D timelines and resources. This makes the prediction of product shelf life of solid dosage forms during early formulation design activities increas-

ingly important. Pioneering methods of using stability data generated under accelerated storage conditions to reach the shelf-life calculation will be discussed by Bernard Schneider, Managing Director of RPD Tool. He will outline how his company has built on original concepts to develop a new automated system. This will include an example of an accelerated stability study.

On both days the conference will close with a roundtable panel debate chaired by The Royal Society of Chemistry and giving industry experts and show attendees an opportunity to discuss the critical issues affecting the sector.

In addition to the conference programme, LAB INNOVATIONS will play host to a full exhibition, featuring the latest laboratory technology & consumables, analytical & biotech equipment from over 100 companies. There will be a UKAS Contract Lab Pavilion plus Campden BRI technical workshops.

Lab Innovations is the UK's only event dedicated to laboratory equipment, technology and services. The show is already supported by the Royal Society of Chemistry, Campden BRI and Gambica and its attendees are lab managers and scientists working within the chemical, life sciences, food & beverage industries plus those in research institutions.

easyFairs UK Ltd  
TW1 3QS Twickenham  
Vereinigtes Königreich Großbritannien und Nordirland



## PharmaLab 2013 – 13th/14th November 2013

# GMP Compliance requires informed Staff in the Lab

The increasing attention authorities devote to the quality management and laboratory compliance emphasise the importance of the work in the laboratory for pharmaceutical development and manufacturing. That's why responsible staff has to focus even more on the establishment of GLP and GMP standards in deployed systems and methods. To analyse and process the multitude of accumulated results and data GMP compliantly and to ensure the validity of systems such as LIMS pose additional challenges.

**13th & 14th November 2013  
Duesseldorf, Germany**

For laboratory staff it is difficult to stay on top of these developments. Frequently, courses or conferences are only suitable to a

limited extent to convey knowledge and current trends. The same is true for laboratory equipment fairs. For visitors and exhibitors with a focus on "Pharma" they are too unspecific and too big. For specialised exhibitors, this means many visitors, but little professional exchanges on the other side.

Therefore, PharmaLab will start in 2013. This new laboratory Congress' goal is to provide lab employees in the pharmaceutical industry with current knowledge relative to developments, applications and validation in analytics, bioanalytics and microbiology. It also aims at facilitating the exchange of information and experience with regard to GMP compliance in laboratories.

In six conferences 40 speakers from industry, contract laboratories and from authorities will report about regulatory changes, hands-on experience in the lab as

well as about the implementation and validation of methods.

The Congress' parallel large exhibition which will be located centrally between the conference rooms will also contribute to the information exchange. There, nearly 40 specialised providers will present latest systems and methods as well as services and therefore allow the comparison of available equipment.

**PharmaLab 2013  
13th/14th November 2013  
Swissôtel Düsseldorf  
www.pharmalab-Congress.com**

CONCEPT HEIDELBERG GmbH  
DE 69123 Heidelberg

**The second World Medtech Forum Lucerne (WMTF), held from September 17 - 19, has been a complete success. The mix of international suppliers, latest developments in Swiss medtech research and inputs from the medical technology sector was enthusiastically received.**

## Medtech expert platform establishes itself

3.200 medtech specialists from science, the supplier industry and manufacturers, plus doctors and hospital specialists came together at the World Medtech Forum in Lucerne. 100 top speakers, 250 exhibitors and a wide variety of special exhibits, workshops, expert and cluster meetings brought a unique breadth and depth of subject matter that met with unanimous approval according to the visitor survey.

**17th to 19th September 2013  
Lucerne, Switzerland**

### **Top infrastructure - tailored to the needs of the World Medtech Forum**

Ensnconced in the new infrastructure of the Messe Luzern exhibition centre, with its new halls and integrated congress center, 300 management participants met at the congress held simultaneously with the WMTF to learn about the latest developments in the markets of Europe and North and South America.

„The WMTF is the ideal platform for sharing ideas, developing new strategies and forging partnerships at international level“, says Dr Rubino Mordasini, President of the sector organization Medical Cluster.

### **Highlights of the second WMTF**

The supplier industry surprised the international audience with innovative new products. For example, there was the world premiere of VoiSee. Developed in Switzerland, VoiSee is a device that helps patients with age-related macular degeneration regain their mobility in everyday life. Once again, the Center of Attention attracted the interest of industry, academia and hospitals as they made the most of the opportunity to listen to presentations by selected specialists and discuss them with the speakers. The afternoon talks hosted by the Medical Cluster and IHE Suisse on the subject of „Bridging the domains of medical technologies and informatics“ in the Center of Attention were well attended.

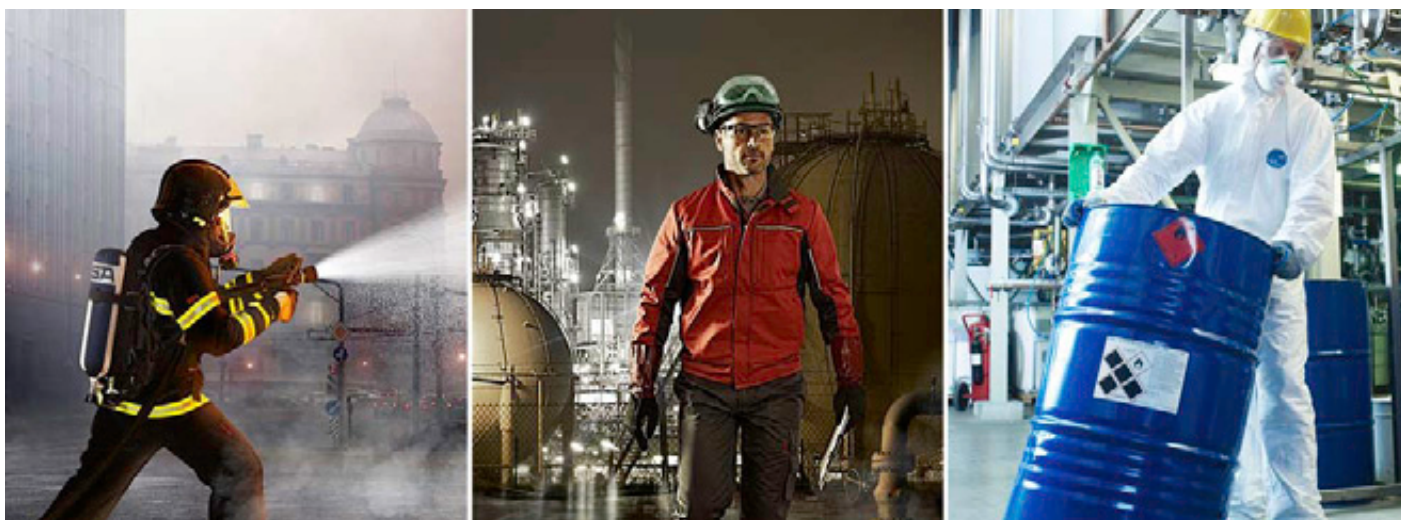
The reorganized Expert Park was also fa-

vorably received: this is where specialists in milling, cutting, laser marking, injection molding and coating showed how process chains in medtech production can be skillfully exploited in order to create more added value.

**15th to 17th September 2015  
Lucerne, Switzerland**

The WMTF's partners and the medtech industry expressed a clear wish to see the WMTF return in 2015. The current challenges faced by the sector are many and varied. The effects are perceptible and measurable. Thus, for example, innovation-led activity in the Swiss medtech industry has declined significantly according to a KOF study. The organizing partners have taken this state of affairs on board. Now that the first two WMTFs in 2012 and 2013 have established the event's position in the market, the next World Medtech Forum Lucerne will be held from September 15 - 17, 2015.

Messe Luzern AG CH 6005 Luzern



**At A+A, DuPont will present new Type 3 chemical suits from its DuPont™ Tyvek® and DuPont™ Tychem® portfolios as well as innovative heat & flame and arc protective solutions made with DuPont™ Nomex®**

## Innovative protective clothing against chemicals, heat & flame and interactive online tool for selecting protective apparel

At this year's A+A, DuPont will underline its extensive competence in innovative protective clothing that helps people perform at their best. The focus of the company's trade-fair presence will be on newly developed Type 3 chemical protective suits, an interactive online tool assisting users in selecting appropriate protective clothing, and innovative heat & flame and arc protective solutions for fire fighters and industrial applications. In addition, DuPont will be showcasing the range of its Tyvek®, Tychem®, ProShield® and Nomex® brands in Düsseldorf.

### **New: Type 3 protection with enhanced wear comfort, and an interactive selection tool for protective clothing**

Among the highlights in the segment of chemical protective clothing will be the commercial preview of two newly developed Tyvek® and Tychem® suits. Both combine Type 3 protection with enhanced wear comfort and high freedom of movement. Based on proven Tyvek® material technology, these coveralls afford protection against non-pressurised and pressurised chemical sprays, solid airborne particles, radioactive particles, and biological hazards.

DuPont™ SafeSPEC™ 2.0 is a new Internet-based tool providing interactive support to safety engineers in selecting the most appropriate

chemical protective suit for a given application. Upon entering the desired criteria, the user is given product suggestions from DuPont's portfolio so as to enable him to compare the individual solutions. Moreover, SafeSPEC™ 2.0 provides extensive product information such as performance characteristics, permeation data, as well as data sheets and literature for download.

### **Innovative protective solutions made with DuPont™ Nomex® for fire fighters and industrial applications**

At A+A, DuPont will also present its latest innovations of Nomex® fabrics and showcase innovative developments from its Nomex® Partners in the field of heat & flame protective apparel for fire fighters, as well as Multi Hazard protection for the thermal industrial market. The DuPont™ Nomex® Partner Program is a network of carefully selected spinners, weavers, knitters and garment manufacturers dedicated to high quality standards and committed to the use of genuine Nomex®. In return, these partners get to benefit from the technical expertise of DuPont and have access to new developments and to the most advanced in-house testing facilities.

Today, more than three million fire fighters around the world are protected by turn-

out gear, station wear and accessories made from Nomex® fibres. At A+A, DuPont will show an innovative range of Nomex® fabrics addressing multiple hazards, demonstrating that the material – apart from heat & flame protection – can also provide effective protection against electric arc flash and small molten metal splashes.

**5th bis 8th November 2013  
Duesseldorf**

The product portfolio from DuPont comprises tailor-made solutions protecting against a wide range of hazards, from apparel resisting heat and naked flames to protective clothing against impact injuries and cuts, chemicals, biological hazard materials, toxic particles or, quite generally, dirt and dust. Depending on the requirements, these products offer partial or whole-body protection. Through extensive research and development designed to meet the needs of industrial users, the company creates a reliable and secure basis to ensure its protective apparel will at all times conform to the latest state of the art while meeting or even exceeding the safety standards imposed by standards and legislation.

DuPont Protection Technologies

## Reproducible results with the Leica Application Suite (LAS)

# Total Recall with Leica Microscope Assistant – now free of charge

Leica Microsystems now provides Leica Microscope Assistant, the software module Leica LAS Store and Recall, free of charge with all coded and automated microscopes. With Leica Microscope Assistant, users can restore all settings to their microscopes to reproduce the same conditions they used to acquire an image. While Leica Application Suite (LAS) automatically saves all microscope settings, including illumination intensity and contrast methods, magnification and exposure time, with each image, users can recall these settings with one mouse-click on the image via Leica Microscope Assistant. This makes the software module a time saver and quality control for the user – and recording of configuration and settings in a lab book is made unnecessary.

“With Leica Microscope Assistant, results are quickly reproducible,” says Alexander Micheluzzi, Marketing Support Specialist, Leica Microsystems. “The microscope, illumination and microscope camera can be automatically reset to the stored status. Samples can be easily compared under exactly the same conditions, which makes re-examining samples very convenient for industrial as well as life science applications.”



*Leica Microscope Assistant (Leica LAS Store and Recall Module) quickly and easily restores all microscope settings including illumination intensity, contrasting method, magnification and exposure time which Leica Application Suite stores directly with the image.*

Leica Microsystems GmbH  
D 35578 Wetzlar

## Cherwell keeps up to date with Hospital Pharmacy QA requirements

# Cherwell highlights products for environmental monitoring and process validation

Cherwell Laboratories, experts in environmental monitoring and process validation, will be demonstrating their comprehensive product range at the NHS Pharmaceutical QA Symposium for Technical Services on 24th & 25th September 2013.

The annual QA Symposium, to be held at Crowne Plaza, Chester is aimed at pharmacy professionals working in pharmaceutical production and quality assurance environments within the NHS or commercial sector. The event has been structured to encourage delegates to create their own experience around their individual needs and interests. This is achieved through a variety of presentations and workshops available, plus an exhibition area featuring pharmaceutical companies and equipment suppliers.

It is an excellent opportunity for both delegates and suppliers to keep up to date with the QA requirements for hospital pharmacies and to improve performance and delivery of services.

The company will be displaying their range of specialist products for environmental monitoring and process validation, whilst offering practical advice and support to delegates. The Cherwell product range on display will include a selection of Redipor Prepared Media products; such as petri dishes, settle plates, bottled media, broth bags, vials and ampoules. A range of biological indicators for validation of sterilisation processes and SAS microbial air samplers for environmental monitoring will also be available to view.



“We are very happy to have supported this annual meeting for several years,” commented Andrew Barrow, Sales Manager, Cherwell Laboratories. He added, “Cherwell works with their customers to provide the most appropriate solution for their individual requirements, and will be available throughout the event to discuss any specific requirements.”

Cherwell Laboratories Ltd  
OX26 4XB BICESTER  
Vereinigtes Königreich Großbritannien und Nordirland



## Unique, compact design, safe table top etcher, ideal for R&D

# Kalor Table Top Etcher

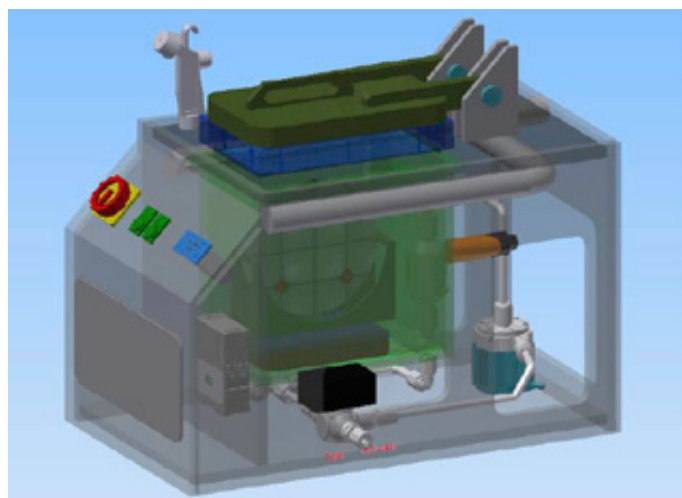
Repeatability in a compact design: the fully self-contained single wafer chemical processing system handles a variety of substrates up to 8" (200mm) and is easy to install and use. The mailbox-style rectangular tank is specifically designed to minimize chemical consumption. The system uses from 2 liters for 4" (100mm) substrates up to approx. 6 liters for 8" (200mm) substrates, which can be heated, and optionally filtered and continuously re-circulated to extend chemical life.

The uniquely designed substrate holder facilitates processing of 1 up to 4 wafers at a time, only touching the wafer outer edge and can easily be adjusted to fit multiple substrate sizes.

**Safety:** the system is designed primarily to ensure both workplace safety and state-of-the-art process performance. All Teflon® wetted surfaces ensure compatibility with harsh chemicals and high-purity fluids. The unit is closed by a manual lid, optionally hinged and/or water-cooled lid for fuming chemicals with extract to remove vapors safely to your facilities exhaust.

**Reliability:** semiconductor grade components ensure long-term reliability and performance.

The Teflon® chemical bath heater is protected by a Teflon® perforated floor grid. The unit comes complete with safety Liquid Level sensor, platinum tipped ground wire and type-J Process and Over-temperature thermocouples, as well as a process temperature high limit thermocouple. A microprocessor based Process / Temperature



Controller ensures safety, process accuracy and repeatability. Chemicals can be drained safely and easily via the integrated drain valve.

SPS-Europe B.V.

Midden Engweg 41 NL 3882 TS Putten

Telefon: 31341360590 Telefax: 31341360589

E-Mail: jola.hilhorst@sps-europe.com Internet: <http://www.sps-europe.com>

## New at CiK Solutions: Precision Temperature Chambers

Temperature chambers of the Kambic series are top class products. Their metrological performance is highly praised and their operation intuitive and flexible.

There is a distinction between temperature chambers, drying and heating cabinets and high temperature ovens for sterilization or drying, for the removal of moisture or for the reduction of mechanical stresses by annealing.

The temperature chambers are widely

used in the pharmaceutical and food industries, for example in long-term stability testing, but there is also a variety of applications for other industries and areas such as aging tests, material tests or material conditioning (for example plastic parts in the automotive and electrical industry) and many more.

The customer can select from 18 different models with 3 different chamber sizes ranging from 55 to 1,000 liters, in tempera-



ture ranges starting at -75°C up to +600°C. A wide range of accessories completes the product range.

CiK Solutions GmbH  
DE 76131 Karlsruhe

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