particle technology
PALAS® PARTICULAR 2 | 2008

INFORMATION FOR CUSTOMERS AND PARTNERS OF PALAS® GMBH

PALASCOUNTS

25 years Palas® - a reason to celebrate

Award of the VDI honour plaque to managing director Leander Mölter

▶ Together with numerous guests from industry, science and economics the Palas® team celebrated on September 11 and 12 the 25th anniversary of the aerosol technology company. Supplemented by an open day and a jubilee celebration this year's Aerosol Technology Seminar (ATS) took place in this context in somewhat modified form.

During the anniversary celebration, which took place at the hotel Novotel Karlsruhe Kongress, Prof. Dr.-Ing. Klaus Gerhard Schmidt from the Institute for Energy and Environmental Technology (IUTA e. V.) awarded Palas® managing director Dipl.-Ing. Leander Mölter the VDI honour plaque and handed him the VDI honour needle. "It is unusual that such a small company is so committed", stressed Schmidt and enumerated the multiplicity of committees, in which Palas® was and is represented.

Dear Readers,

▶ The year 2008 has been completely focused on our company's 25th anniversary. Therefore, the past festivities and the Aerosol Technology Seminar (ATS) which took place in this context are prioritised in this edition of Palas® Particular. We feel particularly honoured by the acknowledgment of our work and of our commitment in committees which was expressed to us. The positive feedback of our partners and customers bears us out in continuing centring the proximity to practice and the customer orientation in our work.
A central topic at the ATS were the requirements to aerosol-technological procedures in medical applications. Here, highest reliability and accuracy are in demand. In the future, we want to amplify our contribution to the development of optimised procedures for aerosol measurements in the pharmaceutical industry - with the welas® system we can offer already today a suitable and upgradable solution.

Leander Mölter
Managing Director
Palas® GmbH

"Close ties established with experts"

Mölter received many congratulations and respect declarations also at the opening of the ATS. "You supported and brought forward the standardisation work of the VDI ", said Dr. Rudolf Neuroth, managing director of the KRdL in the VDI and DIN. According to Dr. Neuroth Palas® is characterised apart from creativity and commitment by having an eye for the market needs. He also emphasized that the technologies developed by Palas® have found their way into the development of standards. Herbert Hoffmann, representative of the IHK Karlsruhe and managing director of the Technology Factory Karlsruhe, said that Mölter not only always stood up for his company, but also established close ties with experts. In the 80s the aerosol and particle technology company was one of the first tenants in the rooms of the founder centre in the fan-city, before it moved 1992 to the larger today's location in Karlsruhe-Hagsfeld. "With Palas® we have in Karlsruhe a company acting in an entrepreneurial and voluntary way far beyond the region. "

Prof. Dr.-Ing. Christoph Helsper from the University of Applied Sciences Aachen, campus Jülich, – in a friendly manner connected with Palas® for many years and since 22 years moderator of the ATS – had prepared for this specific occasion an interesting overview of the history of the aerosol generation and congratulated Mölter to his achievement since 1983. In his function as managing director he steered his company surely also in difficult times.

Mölter thanked his employees and partners of many years and used this event as an opportunity to remind with a minute's silence of the already deceased companions and mentors Prof. Löffler, Prof. Leschonski, Prof. Büttner, Prof. Spurny and Peter Haller.

Prof. Klaus Gerhard Schmidt hands Palas® managing director Leander Mölter the VDI honour needle

Anniversary celebration and open day

Following the ATS an anniversary celebration with a champagne reception and a festive meal offered opportunity for a further inspiring information exchange. The guests enjoyed the impressive atmosphere and an extravagant musical anniversary program: The opera singers Alexia Basile (mezzo-soprano) and Joachim Herrmann (baritone) performed a varied program consisting of theatre, songs and cabaret as well as of amusing hymns on the Palas® products.

On September 12 an open day with equipment demonstrations, tours of the company and papers offered the opportunity to the numerous visitors from industry and research, partners, customers and naturally to the families of the employees as well as friends of the Palas® GmbH to inform themselves on site about the work of the company.

▶ IN THIS EDITION

ATS – papers from praxis and research

Pharmaceutical and medical applications of the aerosol measurement technology were in the focus

▶ Experts from industry and research gave papers at the Aerosol Technology Seminar (ATS) 2008 of the Palas® GmbH. The seminar took place on September 11 in the context of the 25th anniversary celebration. Medical questions related to the inhalation of particles and the challenges to the aerosol measurement and generation for applications in the pharmaceutical industry were one of the main topic. Prof. Dr. Joachim Heyder from the Helmholtz Centre Munich GmbH, Institute for Inhalation Biology, supplied for this topic important basics on the procedures at the depositing of aerosol particles in the human lung. Subsequently, Prof. Günter Oberdörster from the University of Rochester, Medical School, Department of Environmental Medicine, dealt with the effect and kinetics of inhaled nano-particles. "A potential toxicity of synthetic nano-particles depends on many factors" explained Oberdörster. "Most nano-particles will not cause harm-effects at expected low expositions, some have however a higher toxicity." From it results the task to identify these particles and to judge the associated risk.

Well visited: The 22nd Aerosol Technology Seminar (ATS) in Karlsruhe

Pharmaceutical particle measurement: "Often users stick to an once registered method"

The aerosol inhalation plays an important role at the treatment of respiratory desease, because the active substance is separated directly in the target organ. Dr. Dieter Hochrainer from Boehringer Ingelheim Pharma GmbH & Co. KG supplied a critical overview of the established methods for the characterisation of such pharmaceutical aerosols. He stressed that aerosols are one of the most difficult pharmaceutical forms regarding the generation and characterisation by measurements for approval and quality control. So the dispersions of the aerosol generation and of the measuring procedures are to be as small as possible. Hochrainer explained that the most important modern systems are soft inhalators for the propellant gas-free aerosol generation by means of micro nozzles, dosing aerosols with a dosing valve with formulation of propellant gas and powder nebulisers. The Andersen cascade impactor, which proved of good value for particle size measurement, is the most common. However, after each measurement, it has to be decomposed, cleaned and reassembled. A more simply manageable procedure is the Next Generation Impactor (NGI). This one is characterised by the possibility of automation, it has however not displaced the Andersen cascade impactor so far. "That can be due also to the fact that for an once officially registered product one sticks to the measuring method communicated with the registration", explained Hochrainer. The measurement of size distributions with laser diffraction methods, at which the aerosol is led through the laser light and the scattered light is measured, is an elegant procedure, with which whole size distributions could be measured within seconds. However boundaries are set for the employment of this procedure in pharmacy, because it cannot be differentiated between active and auxiliary agents. "A need for simpler, but meaningful measuring methods continues to exist in the pharmaceutical industry", summed up Hochrainer.

"welas® is suitable for the measurement of pharmaceutical solution aerosols"

The aerosol spectrometer welas® system made by Palas® GmbH is suitable as alternative measuring method for pharmaceutical solution aerosols - this conclusion was drawn by Maren Kuhli from the Pharmaceutical Institute of the Christian Albrechts University of Kiel, Department for Pharmaceutical Technology and Biopharmacy. "The advantage is – compared to other methods – the fast measurement and quantifying concerning size and quantity of the aerosol ". A sensor welas® 2070 and a suitable dilution system are an optimal feeding system for the measurement of the particle size of aerosols from pharmaceutical nebulisers. "The measured particle size distributions correspond to those measured with the help of the laser diffraction analysis and cascade impaction." In addition this feeding system offers the possibility of quantifying the aerosol mass by correlation between optically determined mass concentration and pharmaceutical mass determined by HPLC.

Further topics: soot separation, parabolic flight and cloud research

The paper of Prof. Dr.-Ing. Klaus Gerhard Schmidt and Dr.-Ing. Stefan Haep from IUTA e.V. and Dr.-Ing. habil. Frank Schmidt from the University Duisburg-Essen dealt with the important aerosol-technological application field filter testing. They reported on the separation of soot on car cabin air filters and presented a study related to the employment of soot as test aerosol for the filter testing. According to that soot generated with the Palas® soot generator DSP

Prof. Christoph Helsper

Dr. Dieter Hochrainer

Prof. Günter Oberdörster

Prof. Joachim Heyder

Prof. Klaus Gerhard Schmidt

Dipl.-Ing. Leander Mölter

welas® digital: high resolution signal processing

With a new signal detection electronics for the welas® system measurements are possible in even higher quality and higher concentrations.

▶ Due to the use of a new more efficient processor the signal processing is now completely digitised and supplies an optimised resolution. The crucial advantage compared to the analogue technology is that the signal of each individual particle is marked with a time stamp and saved during the measurement. Thus the clear time allocation of each measured particle is later possible. Thereby transient effects can be examined with welas® digital with a time measuring accuracy of 10 ms.

Coincidence detection at the single signal

A further crucial improvement is the coincidence detection at the single signal. Since the welas® system is a counting method, always only one particle may be present in the measuring volume. Otherwise a so-called coincidence error leads to the fact that the particle diameter is determined too large and the quantity too small. In order to avoid such falsifications of the measurement results, the hitherto existing welas® electronics already has a coincidence detection warning the user as soon as a maximum concentration is exceeded. welas® digital however recognises each individual coincidence-afflicted signal, so that this does not enter the determination of the size distribution.

This happens by analysing the signal length: If two particles are at the same time in the measuring volume, the resulting signal length is longer than at one particle. All coincidence-afflicted signals are marked and saved for the calculation of the correct concentration. The measuring range of a sensor is thereby substantially extended concerning the upper concentration limit. Even the determination of the size distribution at small concentrations is improved, since coincidence-afflicted signals - although rarely - can occur at small concentrations.

New control software

The new product is supplemented by a new control software. This one fulfils the requirements of digital signal processing and has beyond that different representation possibilities for transient tests as well as an interface to the "Palas® measurement analysis station".

New employees and stable welas® prices

▶ Since September **Dr.-Ing. Maximilian Weiß** has been enforcing our team in the range of the welas® systems. His focuses are the development of exhaust-gas measuring technologies particularly for diesel engines of the automobile industry as well as measurements in the range of process automation and process control. In this field Palas® is developing new offers in particular for the chemical and pharmaceutical industry.

Starting from December **Mr. Alexander Vögele** will be our new employee in the field of electrical engineering.

Another good message for our customers: Due to optimisations in production we succeeded in keeping the prices for the welas® systems stable for next year as well.

Continuation from page 2

3000 is comparable regarding morphology and particle size in the maximum of the distribution and number concentration with soot from diesel-motor combustion. A good correlation results also at the determination of the fractional separation efficiencies. Furthermore, Dr.-Ing. Haep presented together with Dr.-Ing. Siegfried Opiolka, likewise IUTA employee, a new measuring instrument for the proof of fluorescent tracer particles. This new measuring method offers advantages at the determination of the protection degree of safety work benches and the leakage detection at installed filters, since it recognises only the fluorescent test particles and is blind regarding other existing particles.

Dr. Werner Holländer from the Fraunhofer ITEM informed in his paper with the title "The intolerable ease of the aerosol research" about a not everyday's research instrument - parabolic flight experiments. Beside exciting facts and pictures on the preparation, execution and the special challenges of such a flight manoeuvre Holländer presented scientific results within the range of the aerosol research and filtration, which were obtained on such flights. Since during the parabolic flights the zero gravity is "cancelled" for approx. 20 seconds, "inexpensive" tests can be accomplished in zero gravity. "Why do we need parabolic flights for our tests?" asks Dr. Holländer. Answer:

- ▶ Because gravitation can change parts of the system to be tested: example cloud.
- ▶ Because gravitation can mask other effects: example impaction and sedimentation during filtration.
- ▶ Because gravitation can change substantially the physics of the system: example horizontal drop stream.

Dr. Ottmar Möhler from the Research Centre Karlsruhe spoke about the optical particle measurement in the cloud research. We already reported in detail on the work of the researchers from the Institute for Meteorology and Climatic Research in edition 1/2007 of the Palas® Particular. Möhler and his employees effect for example optical particle measurements with the welas® system down to -90 °C in an aerosol and cloud chamber, briefly AIDA (Aerosol Interactions and Dynamics in the Atmosphere). In this chamber the formation and behaviour of clouds are simulated, whereby important realisations are won about the role of clouds in the climatic happening. The seminar program was supplemented by papers of Palas® employees presenting technical new developments - for instance a new scattered light determination for high concentrations and high time resolution - and latest information on the particle filter test technology. Managing director Dipl.-Ing. Leander Mölter finally concluded the ATS with a paper on the history, present and future of the company.


Dr. Werner Holländer


Dr.-Ing. Maximilian Weiß


Dr. Ottmar Möhler


Dr. -Ing. Siegfried Opiolka


Dipl.-Ing. Martin Schmidt


Maren Kuhli

A picture says more than 1,000 words

Impressions from ATS, anniversary celebration and open day on the occasion of the company's 25th anniversary

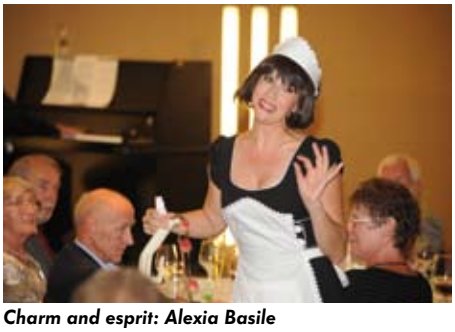
Greetings and anniversary certificate from the IHK

Nina Heim had the organisation under control

Festive ambiance at the celebration

The complete Palas® team was celebrating

The opera singers Joachim Herrmann and Alexia Basile



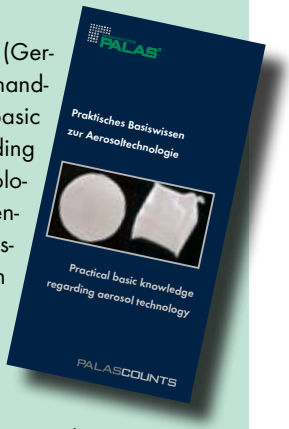
Charm and esprit: Alexia Basile

Open day at Palas® with technical discussions

...and entertainment like the balloon flight

Knowledge for the waistcoat pocket:

"Practical basic knowledge regarding aerosol technology"



▶ The bilingual (German/English) handbook "Practical basic knowledge regarding aerosol technology" including scientific basics – published by Palas® on the occasion of its 25th anniversary – is now available.

On 64 pages, the most important formulas and information on particle measurement technology are communicated compactly and application-orientated in the following chapters:

- Introduction
- Particle technology
- Physical characteristics of particles
- Aerosol generation
- Particle size and quantity measurement
- Definitions, terms and explanations regarding particle measurement
- Palas® core competencies
- Literature

Thanks to its handy format, the brevier fits into any pocket and is always ready to hand.

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▶ PALAS® AGENDA

Palas ® will participate in the following conferences and exhibitions (excerpt). We are looking forward to meeting you there!

- **48th SOT Annual Meeting and ToxExpo**
  15.03. – 19.03.2009
  Baltimore, USA
- **American F & S Society Annual Meeting**
  04.05. – 07.05.2009
  Minneapolis, USA
- **Achema**
  11.05. – 15.05.2009
  Frankfurt, Germany
- **Automotive Testing Expo**
  16.06. – 18.06.2009
  Stuttgart, Germany
- **EAC**
  06.09. – 11.09.2009
  Karlsruhe, Germany
- **23rd Palas® ATS**
  13.09. – 15.09.2009
  Karlsruhe, Germany
- **Filtech**
  13.10. – 15.10.2009
  Wiesbaden, Germany

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