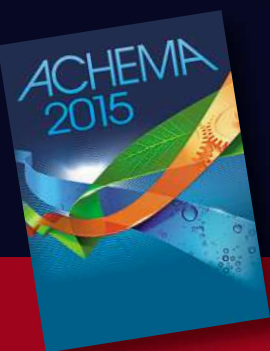




# ACHEMA

## Worldwide News

1|2014



Frankfurt am Main,  
June 15–19, 2015  
[www.achema.de](http://www.achema.de)

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A special edition from

**PRO·CESS**  
Chemie · Pharma · Verfahrenstechnik

2014



# CLOSING THE INNOVATION GAP

The Harvard economist Larry Summers has stated that the world is running out of capacity for growth as the wealthy are not investing enough. Meanwhile, the internet investor Peter Thiel feels that the world is running out of innovations as the inventors and entrepreneurs are not sufficiently courageous to bring about revolutionary changes.

Should these statements not be seen as an open invitation for young and not so young entrepreneurs, courageous individuals and those who are more balanced in terms of risk assessment, to come up with innovative ideas? There is surely enough money that is ready to be invested. And there are a number of arguments in favor of investing in the process industry that combines scientific understanding with the engineer's art of implementation.

Based on an understanding of natural processes, the process industry develops solutions for urgent problems associated with the global population growth, the limits of infrastructure and the requirements of everyday life. At the same time, it builds and operates assets with a positive effect on employment and drives the cycle of work and capital. The market for its products is the entire world.

Entrepreneurs have to overcome many hurdles. Neither schools nor universities prepare young people for entrepreneurship and the variety of tasks that have to be mastered in addition to technical developments.



■ **HANS-PETER ILGNER**

Member of the Board, Business Angels FrankfurtRheinMain e.V. ■



■ **PROF. DR. KURT WAGEMANN**

Executive Director of DEHEMA e.V. ■

Whilst time-to-market may have shortened significantly in this age of rapid communication, the reaction time of competitors is also much quicker. Market entry needs to be fast and this represents a challenge for founders and small companies that are not granted a period of grace, but instead have to manage the implementation of innovations and the set-up of company structures at the same time as they enter the market.

We cannot rely only on established companies in order to think and develop the hitherto “unthought”. The unobstructed perspective of scientists and technicians on what is feasible and necessary is essential not only in terms of understanding existing solutions but also for identifying gaps. We need the thoughts of those who do not yet think within structures but who instead think outside of the box.

Besides showcasing what is already available, the ACHEMA Congress has always given an outlook on the future. Now ACHEMA and its partners are introducing the ACHEMA's Founders' Award — a launchpad for the accelerated start up of companies, which closes a gap between the congress and the exhibition. We envision revolutionary ideas being developed — such as not eating the grain but baking bread and storing for seeding. If we succeed in translating similar concepts to the energy sector this would again change our way of life. Once the first step has been made, access to capital becomes easier — as mentioned previously, there is more than enough money available for investment. ACHEMA is undoubtedly the place to present innovative ideas to a future market.

*“We need the thoughts of those who do not yet think within structures but who instead think outside of the box.”*

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There is a 21st-century gold rush going on in the United States, and while a large part of its success is already locked in, larger questions remain for its effects in the next decade, and the overall impact it will have on the chemical process industries worldwide. ■



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Hydrogen that cannot be used directly can be converted and stored by chemical means. ■

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# “THE TREND-SETTING EVENT FOR OUR INDUSTRY”

Kathrin Rübberdt, Head of Communications at DECHEMA, and Thomas Scheuring, CEO of DECHEMA Exhibitions, in a chat on the upcoming ACHEMA 2015.



Pictures: DECHEMA

• **Dr. Scheuring, one year to go until ACHEMA 2015 — are you relaxed or starting to get nervous?**

**SCHEURING:** Neither of the two — there's too much work to be done to be relaxed, and we are too optimistic to be nervous. Optimism in this case means I am sure the 31st ACHEMA will once again deliver what previous ACHEMAs always did: To be the trend-setting event for our industry with tons of new developments and innovative technology on display.

• **Are there any industry branches which show particular growth potential?**

**SCHEURING:** We are, already now, close to be fully booked in the automation group as well as in the pharma and packaging group. So obviously these both sectors show substantial growth, but other groups like thermal and mechanical process technology, or the whole sector

of fluid handling are also very much in demand.

• **You have selected three focal topics for the upcoming ACHEMA: Industrial biotechnology, process analytics, as well as industrial water management. Which expectations are connected with these topics, and how do attendees find their way through the wealth of information?**

**SCHEURING:** It has always been our aim to particularly address special topics which touch the pulse of our industry. As show organizers we are facing the challenge to identify topics which are hot, exciting and new — but at the same time advanced and mature enough to offer something you can display. For ACHEMA 2015 we are confident that all these three topics are wisely chosen: White biotech will revolutionize our industry through

new products and new reaction pathways, process analytics is the link between process automation and the laboratory sector, and water plays a key role as a valuable resource all over the world. Since it's not an easy task to guide attendees through the exhibition accordingly we will offer specifically dedicated information material for each of the three focal topics.

• **Today there are many alternatives besides trade fairs to get in touch with people from all over the world. Do you consider the new communication tools as a threat or an opportunity?**

**SCHEURING:** We are aware of the fact that marketing budgets are highly fought over today, much more than they were ten years ago. And we have also realized that new communication tools offer new options for our visitors to be better prepared when attending an event, and to facilitate appointments between people who want to arrange meetings beforehand. So our goal is to offer as much support as possible to our attendees prior to the show. But at the end of the day, nothing beats a personal talk. To meet colleagues from all over the world face to face is something you just can't replace by some gadget.

• **We are currently witnessing a worldwide shift of economic gravity centers. The rise of the BRIC states is an example, as well as the shale gas boom which brings the US back to the process industry's landscape. How do you respond to these changes?**

**SCHEURING:** The BRIC states — particularly China where we are holding our own AchemAsia — have been in the focus of our promotion campaign for a long time. Main goal is to bring key people from these regions to Frankfurt as attendees,





increasingly also as exhibitors when it comes to countries like China or India. ACHEMA's role as a communication hub for our industry becomes tangible on specific events for these target groups, for instance the "India Day" or our "Chinese Networking Reception". And we are

holding press conferences in all these countries well before the exhibition to raise awareness within the local professional community. So it's no surprise that we see a steady increase of attendees from all of these countries. The shale gas boom in the US is a different story. We expect some kind of reorientation of US companies towards their home market, probably with less focus on overseas markets. It goes without saying that we,

particularly our US representative, are intensely discussing this perspective with our US customers. From an international viewpoint there is little doubt that ACHEMA in Frankfurt is still the place to be if you want to stay in touch with your international clientele.

***"At the end of the day, nothing beats a personal talk. To meet colleagues from all over the world face to face is something you just can't replace by some gadget."***

... Dr. Thomas Scheuring, CEO of DECHEMA Ausstellungs-GmbH

• In the last issue of our newsletter you mentioned the Gulf region as one of our industry's hotspots. Any news on that?

**SCHEURING:** Correct—the Gulf is one of the key regions for the process industry, due to the large fossil resources, the cheap energy, and the willingness of local governments to increasingly invest in the downstream and refining sector. But we are not the only ones to realize the region's potential, so the competition in

the trade fair sector is already quite fierce. And local organizers are naturally having an edge over us as foreign organizers. At the moment it seems to be a story with a somewhat open end—we just very recently had to accept the fact that we as trade fair organizers from abroad are not always as welcome as we had hoped to be. Furthermore, it looks like the opinion leaders among our exhibitors are quite well connected by now in the regional process industry, so they not necessarily get an additional benefit from a platform organized alongside the ACHEMA concept.

• Would you please finalize the following statements:

**ACHEMA's long tradition is ...**

**SCHEURING:** ... an incentive and an obligation at the same time.

• Germany as an industrial base ...

**SCHEURING:** ... will play a decisive role in the world economy as long as our strive for innovation prevails.

• International networking ...

**SCHEURING:** ... is the key to fresh ideas for our profession.

• ACHEMA's most significant feature in the year 2045 ...

**SCHEURING:** ... will be what it always has been: Bringing together key people from all over the world.

• Dr. Scheuring, thank you very much for your time.

#### ... Save the Date

Next ACHEMA:  
June 15–19, 2015  
Frankfurt am Main/Germany  
Information Service for new exhibitors:  
Tel. +49-69-7564-423  
Visit, Travel Information:  
Tel. +49-69-7564-249  
Congress: Tel. +49-69-7564-254  
[www.achema.de](http://www.achema.de)



# ACHEMA

# CONFERENCE 2015

Is research delivering for industry? That is, in a nutshell, the key question and background motif of the conference being held in conjunction with the ACHEMA exhibition.

DR. THOMAS SCHEURING

**W**hile there are enough scientific congresses for our discipline, only few of them are particularly addressing a practice-oriented perspective. And although there might be some competition between conference and exhibition at ACHEMA, both parts benefit from each other. Attendees get insights through the conference in addition to the exhibits, and on an advanced level – and exhibitors have the chance to enhance their product presentations by some technological context.

Furthermore, school and university students have their own special programme at ACHEMA, giving the next generation – tomorrow's customers and employees! – an all-round introduction to the world of process engineering.

ACHEMA 2015 will be highlighted by three focal topics which touch the pulse of our industry:

- 'Biobased World': key venue for industrial ("white") biotechnology
- Innovative Process Analytical Technology (PAT): bridging the gap between automation and analytics
- Industrial Water Management: concepts for ecologically and economically efficient water cycles

The ACHEMA Congress itself spans the complete spectrum of process engineering themes, complementing the classical topics with cutting-edge lecture series, and thus reflecting the multifaceted diversity of the exhibition:

- Energy Efficient Processes
- Flexible Production (resources/dynamics)
- Alternative Raw Materials
- Thermal & Electrical Power Engineering
- Power to Chemicals

- Advanced Fluids
- Nanotechnology
- Electrochemical Technologies
- Bioprocesses: Reactors, Monitoring, Modelling, Downstream Processing
- Novel Biocatalysts: Development and Application
- Single-Use Technologies
- Progress in Laboratory and Analytical Techniques
- Digital Plant Engineering
- Modular Plant Conceptions
- Catalysis
- Microprocess Engineering
- Reaction Engineering
- Mixing and Separation Technology
- Solids Processing
- Plant Components
- Pharmaceutical Production
- Safety
- Plant Control
- Materials and Materials Testing

#### ACHEMA Praxis Forum

- Pharmaceutical Production
- Plant Components
- Laboratory Techniques
- Plant Control
- Mixing & Separation Techniques

The web portal for submitting contributions is online via <http://www.achema.de/congress> until 31 August 2014. Lecture time is 20 minutes, and the conference language is English. Abstracts of all accepted contributions will be accessible in advance through *ACHEMAonline*. ■

#### Further Information

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# MAKING THE MOST OF EXCESS ELECTRICITY

The German “Energiewende” is nationally one of the most controversial issues; internationally, politics, experts and economists are watching closely how Germany is going to handle the transition from fossil energy resources to wind, solar and other renewable resources. Taking the political commitment as given and leaving out questions of price and economic compensation, there remains a range of technical issues. One of them, the use of excess electricity, has been the topic of a recently published discussion paper; this is a condensed version of the original document.

Picture: Fotolia © XK

Hydrogen that cannot be used directly can be converted and stored by chemical means.



PROF. DR. WALTER LEITNER  
PROF. DR. FERDI SCHÜTH  
PROF. DR. KURT WAGEMANN

In order to reach the goal of reducing national CO<sub>2</sub> emissions by 80% until 2050, electricity generation in Germany is successively shifted towards regenerative sources with a focus on wind and solar power. According to current forecasts, by 2020 more than 100 GW of wind and solar power will be installed. This amounts to ca. 200% of German demand. The excess electricity that is generated at times of high solar intensity or intense wind has to be used wisely. The following thoughts on different options are based on the principles of minimal energy loss and usage with the highest possible added value. This leads to a hierarchical order of usage.

### Step 1:

#### Use Electricity Directly

A relevant option is the increasing electrification of industrial processes. Examples are thermal split of methane to obtain hydrogen and carbon or the plasma-chemical generation of acetylene and

The authors: W. Leitner, RWTH Aachen; F. Schüth, MPI für Kohlenforschung Mülheim; K. Wagemann, DECHEMA e.V.

#### Reports and Position Papers

Current positions on topics of chemical technology, biotechnology, education and interdisciplinary issues you will find at:  
[www.dechema.de/en/studien-path-123212.html](http://www.dechema.de/en/studien-path-123212.html)



hydrogen from methane. Electrocatalytic processes to convert for example CO<sub>2</sub> or for more complex syntheses are also conceivable. If these concepts and flexible production processes — that need yet to be developed — are combined with locating energy-intensive industries close to generation facilities, an improved demand side management will become feasible.

### Step 2: Convert Electricity to Hydrogen and Use It Directly

If excess electricity cannot be used directly, the electrolysis of water is the most relevant secondary option. The resulting hydrogen can be used in various ways to produce chemicals or energy. The first priority is to use it directly in industrial processes, realizing the highest possible value added. Potential buyers are chemical plants (hydrogenation, hydroformylation, processing of CO<sub>2</sub> to formic acid or methanol), biorefineries and petrochemical refineries as well as metallurgical plants.

Storing hydrogen in large caverns can serve as a temporary buffer for production peaks or for leveling out supply for continuous processes.

A further option could be to feed hydrogen to the existing natural gas grid and use it energetically together with the gas.

### Step 3:

#### Chemical Storage of Hydrogen

Hydrogen that cannot be used directly can be converted and stored by chemical means. One option is to produce high-energy molecules as fuels. Secondly, hydrogen can be bound reversibly in chemical molecules and set free according to demand. Suitable reactions include processing with CO<sub>2</sub> to methane, methanol or formic acid or using Fischer-Tropsch to produce alkanes as fuels. Aromatic hydrocarbons can also be used as “hydrogen carriers”.

### Step 4:

#### Re-Conversion to Electricity

The method for electricity generation depends on the form in which hydrogen is stored and ranges from gas turbines to units for re-

versible electrolysis and traditional gas power plants.

Besides technical requirements, the implementation of the various options for use, storage or electricity generation depends on economic conditions and societal acceptance. Which process will be implemented will be decided by the market conditions where storage is part of the electricity system as a whole. It is therefore necessary to create a broad scientific and technological basis for these processes.

The future energy system requires long-term and seasonal storage capacities. Mechanical or electrical storage offer insufficient energy density. Chemical storage is the only method meeting the requirements. Politics, industry and research have to work hand in hand in order to meet the technological challenges and avert economical risks for German industry while at the same time opening pathways for a non-fossil and non-nuclear future for Germany and for technology export worldwide. ■

# CHANGING THE BALANCE

An ongoing boom in gas and oil supplies in the United States is changing the balance of global chemical production.

NICHOLAS BASTA

There is a 21st-century gold rush going on in the United States, and while a large part of its success is already locked in, larger questions remain for its effects in the next decade, and the overall impact it will have on the chemical process industries worldwide.

The source of this gold rush is the impact of hydraulic fracturing (“fracking”) on a massive expansion of natural gas and natural gas liquids (NGLs) in the US economy. Already, fracking is reshaping the landscape of regions of the US such as Texas, Pennsylvania, and swaths of the Midwestern United States, including the Dakotas (North and South), Ohio and West Virginia. Obscure geological terms like “Bakken shale” and “Marcellus shale” are becoming the common lingo of landowners and governmental regulators around the country. The fracking revolution has already reshaped US energy policy on a massive scale; but for the global chemical industry, the question to ask is how broadly fracking technology will reshape NGL supplies in Europe, Russia, the Middle East and elsewhere.

The United States has been a major producer of oil and gas for over a century, but in the past two decades, it has watched as supplies of those commodities dwindled, and as its leading petrochemical producers have shifted their investments to the Middle East, North Africa and certain regions of South Asia and South America, as more — and more economical — supplies of NGLs became available. Now, the shoe is definitely on the other foot: the American Chemistry Council is charting investment in US-based petrochemical production of over \$100 billion over the next ten years. That investment, in turn, will inject some \$70



Picture: WEG Wirtschaftsverband Erdöl- und Erdgasgewinnung

Preparations for a fracking

billion in product value, annually, into the world economy by 2020.

“This is a historic milestone for America’s chemical industry and proof that shale gas is a powerful driver of manufacturing growth,” said ACC President and CEO Cal Dooley, in a statement last February. “Thanks to the shale gas production boom, the United States is the most attractive place in the world to invest in chemical and plastics manufacturing. It’s an astonishing gain in competitiveness.”

What makes this “astonishment” all the more significant is that the United States, a highly developed economy, draws resources from around the world to sustain its economic growth. Production and utilization of petrochemicals is already highly integrated into its economy. Now, as its economy — as is the case in much of the rest of the developed world — is healing from the effects of the global financial crisis and economic downturns of 2008–2009, a gift has dropped from the sky (literally, has risen from the earth) in the form of massive supplies of low-cost energy and feedstocks. The most dramatic effect, arguably, is that plans that started in the mid-1990s for importing liquefied natural gas (LNG) at a handful of locations along the

US eastern seaboard and Gulf Coast have not just been shelved — a few of them are being revamped to provide export capacity of LNG. Their world has literally turned upside down (more about the implications of this export potential later).

There are several cautionary notes to sound: the environmental impact of large-scale fracking in regions of the US not accustomed to a gold-rush mentality — notably the state of New York — are a concern and are meeting significant local resistance. The US Environmental Protection Agency is dithering on regulations of what is injected into the deep wells that draw shale gas to the surface, and how the produced water that comes up with the gas is to be treated. And there are major “midstream” hurdles to overcome — the gathering stations, fractionation plants, pipelines, storage facilities and other infrastructure necessary to bring both gas and crude oil to processing plants in the Gulf Coast and elsewhere.

But the possibly biggest hurdle — and one that shows the scope of the boom already underway — is that the current slate of capital investments, peaking around 2015–2017, could draw literally half of all craft workers — pipefitters, welders, millwrights and the rest — avail-

N. Basta is a business and technology journalist in New York.

able in the entire United States to the Gulf Coast area. That's a tall order.

### Energy Supply Bulge

For several years running now, every time the US Energy Information Administration (EIA), a government analytical agency, performs a projection of future domestic gas and oil supplies, it has upped its estimates. The latest, generated in late 2013 (a complete report will be available from EIA about the time this article is published) forecasts a near 50% increase in domestic production of oil, NGLs and other liquids, from around 10 million bbl per day equivalent in 2008, the start of the boom, to a peak in the late-2010s at around 15 million bbl/d.

Natural gas production, running at around 17 trillion cu.ft./yr in the mid-2000s, is rising like a tidal wave. It will double to around 35 tcf/yr by 2030 — and then keep rising! (EIA makes a variety of projections, based not just on exploitable resources but also the economic capacity to exploit them; thus this projection could be moderated in the intervening years by other macroeconomic forces.)

EIA's forecasts have already built in an expectation that the US will be exporting gas and liquid hydrocarbon products in the near future. It is a subject of active discussion both among energy and chemical traders and political leaders; the questions surrounding it have only intensified after Russia's annexation of Crimea, and the turmoil going on in Ukraine in its aftermath. (Ukraine is both a major beneficiary of Russian gas for its internal energy needs, and a major transmission point for Russian gas into Europe.)

Purely on a pricing criterion, US gas consumers

are now seeing prices that are among the lowest in the world. A study by the American Chemistry Council, normalizing gas prices around the world in 2012, showed US average around \$2.70 per million BTUs. The comparable prices in other parts of the world: China (\$9.05); United Kingdom (\$9.48); Germany (\$11.86); Korea (\$15.57); Japan (\$15.59). Other regions, specifically the Middle East, Rus-

sia itself and Canada, had prices equal to or below the US price; the catch there is that their economies would need to be highly export-driven to affect overall petrochemical supplies in the world.

### The Ethylene Benchmark

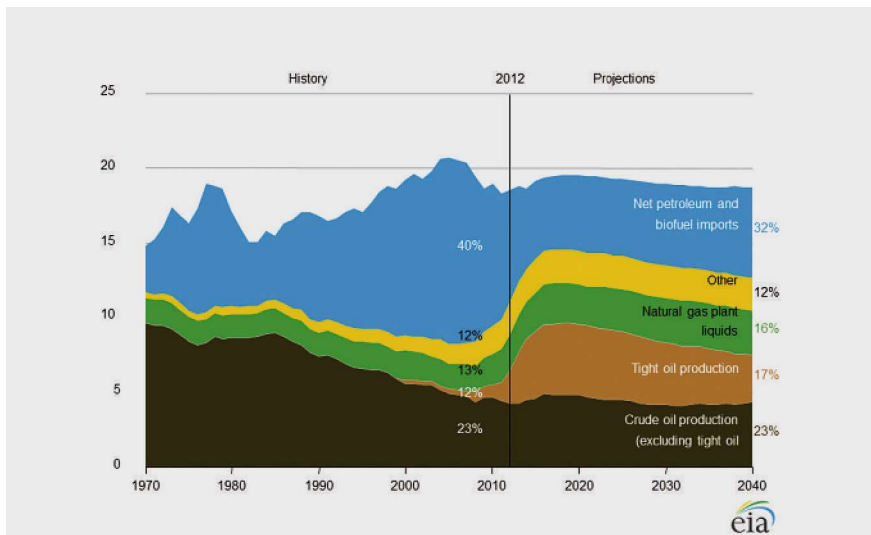
What is a definite today is that ethylene, a most basic petrochemical, has seen its price halved in the United States since



the mid-2000s. Ethylene, produced by cracking ethane gas (or, for oil-based producers, naphtha cracking), is both the starting point for a significant fraction of specialty chemicals, and a benchmark for petrochemical supplies and production.

Just in the past two years, as the full impact of the shale gas boom has been comprehended, the number of ethylene cracking furnace projects has jumped to eleven. Most of these are in the early engineering and permitting stages right now, although projects by ExxonMobil, Dow Chemical and Sasol (all in the Gulf Coast area) are fairly advanced. ExxonMobil is planning a 1.5-million metric-ton/yr expansion at its Baytown, TX, facility—already the largest petrochemical plant in the US, and the largest ethylene production site in the world. Shell, Chevron Phillips, Occidental and Formosa Plastics join the other petrochemical producers with plans for world-scale ethylene plants to come online in the next five years.

The ethylene boom is having a ripple effect among engineering and construction (E&C) firms as well. The so-called “Ethylene Club”—KBR, Fluor (which is partnered with Japan’s JGC), Lummus, Technip and Linde is growing; Linde has an alliance with Bechtel to bring the latter’s procurement and construction capabilities into the mix. Technip, having absorbed Stone & Webster in 2012, is well positioned to pick up business in North America.



U.S. petroleum and other liquid fuels supply by source, 1970–2040 (million barrels per day)

Source: EIA – U.S. Energy Information Administration

Ethylene of course is not the only feedstock to benefit from the shale gas boom. Ammonia-based fertilizer plants will be planned; as well as propylene derivatives and others. Nor should the prospects of gas-to-liquids plants be overlooked; while the parallel boom in shale oil is changing the dynamics of oil refining just as petrochemicals’ dynamics have changed, the availability of cheap gas makes production of transportation fuels attractive.

Most chemical producers of all types, as well as metals, minerals and other forms of basic manufacturing, are benefiting from the lowered costs of heat and energy wrought by the shale gas boom. It’s not just as a feedstock, but also as an

energy source, that US-based manufacturers will enjoy economic advantages. Gas prices have been fairly volatile in recent months, as a cold winter jacked up spot prices, but even if the export market for gas and petroleum liquids emerges as EIA expects, the outlook is bright. Eventually other countries will see a similar gas-supply boom as fracking technology is exploited, especially in China, Argentina, Algeria, Canada and Mexico.

All in all, the world is still an unstable place when geopolitics, economic turbulence, and overall energy supplies are considered. But for the time being, and from a North American perspective, supplies and production of chemicals are on a comfortable upward trend. ■

## STAINLESS STEEL TWIN FERRULE FITTINGS

Standardised tolerances and surface finish guarantee leakproof pipe connections in high pressure, as well as vacuum applications. The special design of twin ferrule fittings allows vibrations and pressure pulses to be absorbed, without any fear of leakage. This ensures a wide range of applications in industry, laboratory, and measurement system areas. The use of high quality stainless steel guarantees a long service free life, also in the chemical industry. Schwer Fitting’s “U2” twin ferrule fittings, from 316 stainless steel as standard, are supplied assembled and ready to use. Even under heavy vibration conditions couplings guarantee a safe operation at high pressure or vacuum. This is achieved through four effective design details:



Picture: Schwer Fitting

- The back ferrule affords damping of tube circuit vibrations through a spring like action. Furthermore, it prevents a carry-over of tightening torque from the coupling nut to front ferrule.

- The front ferrule circumferentially seals the surface between the tube and the coupling. Due to the inner taper the front ferrule is pressed into the tube so that a pressure-tight impression is formed.
- Silvering of the coupling nut thread prevents seizing of the stainless steel coupling. This allows multi-use of a coupling.
- A deep pipe bore, and entry taper, guarantees accurate positioning and centering of the tube.

On request, parts can also be supplied from Hastelloy, Titanium and other highly alloyed materials. Special tests and approvals are possible.

➤ More information, [www.schwer.com](http://www.schwer.com)



## BRIGHT INVESTMENT OPPORTUNITIES IN SAUDI ARABIA

Sadara Chemical Company is a new joint venture established in October 2011 between the Saudi Arabian Oil Company 'Saudi Aramco' and the Dow Chemical Company 'Dow'. This new undertaking by the two giants in their businesses is a \$ 20 billion investment with a product mix that is highly specialized. Sadara will be a game-changer and among the world's most competitive petrochemicals enterprises, offering a highly stable earnings profile made possible by a confluence of enabling conditions that will perfectly position Sadara for success. It is precisely the kind of project Saudi Arabia wants to pursue both for its commercial attractiveness and for its positive impact on the Saudi national agenda.

The PlasChem Park initiative led by the Royal commission of Jubail and Yanbu (RC) and Sadara will contribute to the local GDP through employment, elimination of imports, and enhancing the value of the exports thus making a positive impact to the Saudi economy.

### PlasChem Park in Jubail

The PlasChem Park is an 8 square kilometer site dedicated for chemical and conversion industry in Jubail 2 next to Sadara new complex. This is a collaborative effort between Sadara and the Royal Commission to establish a world class industrial park for chemical and conversion industries in Jubail. The PlasChem Park will be located next to Sadara Complex in Jubail and it will consist of two main parks; the Chemical Park and the Conversion Park.

The Chemical Park tenants will receive intermediates from Sadara streams such as C4's, cracked fuel oil, pygas, waste streams and use these streams for their chemical content to produce final products. These products can be sold in the lo-

cal or export market or supplied to the Conversion Park tenants for further processing and conversion. The Conversion Park tenants will receive final products mainly from Sadara or the Chemical Park or other Jubail

players for further conversion by investors involved with fabrication or custom formulation. Additional first-hand insight from key players in Saudi Arabia's chemical sector is available on [www.achema.de](http://www.achema.de) by view-

ing Sadara's live-webinar recently recorded in cooperation with Dechema.

... For more information, feel free to contact Ms Sinian Huang: [huang@dechema.de](mailto:huang@dechema.de)

### International Events Organized by DECHEMA

- **May 06–09, 2014:** EuroPACT 2014 – 3rd European Conference on Process Analytics and Control Technology, Barcelona/Spain
- **May 13–16, 2014:** EBSA 2014 – 17th Annual Conference of the European Biosafety Association, Ghent/Belgium
- **May 26–28, 2014:** Biomaterials – Made in Bioreactors, Radebeul/Germany
- **June 3–5, 2014:** Trends in Metabolomics – Analytics and Applications, Frankfurt am Main/Germany
- **June 25–27, 2014:** 3D Cell Culture 2014 – Advanced Model Systems, Applications & Enabling Technologies, Freiburg/Germany
- **September 7–11, 2014:** 20th International Solvent Extraction Conference 2014, Würzburg/Germany
- **September 8–11, 2014:** 6th Int. Conference of the Federation of European Zeolite Associations (FEZA), Leipzig/Germany
- **September 8–12, 2014:** EUROCORR 2014 – European Corrosion Congress, Pisa/Italy
- **September 14–17, 2014:** 10th International Conference on Distillation & Absorption 2014, Friedrichshafen/Germany

### Further Information:

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## MEET THE EXHIBITORS OF ACHEMA 2030



Picture: DECHEMA

Have you ever thought about the fact that each and every company present at ACHEMA today has at some point started from scratch? Somewhere somebody one day had an idea he was enthusiastic about, and he set upon the journey of entrepreneurship ...

In 2015, creative minds will again start on this exciting journey—but not alone. The ACHEMA Gründerpreis (ACHEMA Founder's Award) that is established for the first time aims at easing their first steps. Organized by DECHEMA, the Business Angels FrankfurtRheinMain and the High Tech Gründerfonds and supported by the VCI, the VDI and the AiF, the ACHEMA Gründerpreis offers the participants support in several ways. Innovative business ideas in the areas of energy, industrial biotechnology and analytics and measurement may be submitted—no matter whether they are still only an idea, at the concept stage, whether a detailed business plan has already been prepared or even a start-up company has been established.

All accepted participants are assigned to a mentor who advises them on how to establish or improve their scheme. At the end of this mentoring process, each participant should have a sound business plan.

Participants that enter the competition with a business plan at hand have right from the start the opportunity to meet potential investors. At matching

meetings and other events, they can present their business plan to venture capitalists and business angels. Thus, they have the chance to receive financing quickly and independent of their success or the timeline of the competition.

All business plans submitted before the end of 2014 enter the second stage of the competition. An expert panel from science, industry and financing will examine all contributions carefully and will select ten participants from each topical category. These potential founders will give a presentation to the panel and answer any questions regarding the economic and scientific feasibility of their concept.

Three finalists from each category will be invited to ACHEMA 2015. They have the chance to present their innovation to a global audience of 170,000. The winner in each category will be announced in a public ceremony. Each winner receives 10,000 Euro—and of course the invaluable visibility only the leading event for the process industries can offer.

So, if you are interested in innovation, don't miss the stand of the ACHEMA Gründerpreis finalists in Hall 9.2 during ACHEMA. Who knows—you may meet one of the most important exhibitors of ACHEMA 2030?

❖ **If you are a potential founder, apply today at [www.achema.de/gruenderpreis](http://www.achema.de/gruenderpreis)**

Find the solution  
and win a coupon  
of Amazon of €100

Closing date:  
**May 30, 2014\***  
redaktion@process.de



The solution is changing the process industries,  
but may also help to make use of the prize.

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## Crossword

### across

- A** provides protection, information and good looks  
**B** he combines **a**, **c** and other components in a meaningful way  
**C** brings you safely from one place to the other — in this case, from the lab to full scale  
**D** liquid pellet  
**E** According to Orson Welles, Hollywood is the only one which does not have laboratories for the purpose of experimentation.  
**F** visions brought to life  
**G** If knowledge is power, this is certainly a tool that helps to rise high — or at least to improve **d**

### down

- a** rule of thumb: in large plants, there is one for every employee  
**b** Relationships should go beneath, chemistry often happens right here  
**c** the gatekeeper in the plant  
**d** most useful when also doing the right things  
**e** 1.851 definitions as a noun and 31 as a verb in the diary — and still the very tangible core of ACHEMA's industries  
**f** where **e** is born  
**g** the process of removing all **D**s  
**h** defined by absence

\*There is no cash prize alternative. The judge's decision is final and without a right of appeal. Employees of Vogel Business Media or their relatives are excluded from the drawing. The winner will be notified and announced on [www.process-worldwide.com](http://www.process-worldwide.com).

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