

# BASF moving to Industry 4.0



## Interview with valve experts Günter Spiegel and Matthias Huk

Courtesy BASF SE

*If you want to see valves in action, as it were, then a trip to BASF in Ludwigshafen comes highly recommended. In just a few minutes you can drive past numerous integrated plants and spot hundreds of valves, control valves and safety relief valves, in a variety of designs and from numerous manufacturers. During a recent visit, Valve World had the distinct pleasure of meeting not one but two recognised valve experts, namely Senior Manager Central Services & Engineering Expertise Dr. Günter Spiegel (manual on/off valves) and Senior Engineering Manager Matthias Huk (automated on/off valves and control valves).*

By David Sear

Asked if he can share his vision on valve developments, Günter Spiegel says "globally-speaking there is a fair demand for valves. Especially valve automation will have growing importance. However, there are differences depending on the exact region and the specific industry – the chemical sector is very diverse."

Dr. Spiegel, who is something of an authority both inside and outside BASF when it comes to valve technology, notes

that at the same time there is another interesting trend taking place, namely mergers amongst valve manufacturers. "This is especially prevalent in Europe but in China, too, it seems that a new phase of acquisitions has started. I would not be surprised to see yet more companies merge in China. I believe that this process could help to create a stronger supply base, which is currently very fragmented in some areas."

Having outlined how he sees the market for valves developing, Dr. Spiegel touches on standardization which is gaining importance within BASF. "We operate a large number of often diverse plants. Standardisation in all its guises – technical, commercial, etc - can therefore be an excellent way to minimize expenses for engineering, procurement and maintenance. Standardization also facilitates optimization of the

portfolio management as well as valve interchangeability. However, standards should never be seen as a panacea and BASF will continue to use application-specific solutions wherever appropriate." Asked if he could review the steps taken thus far at BASF to promote standardization, Dr. Spiegel notes the following. "In the 1990s we introduced a programme of technical standardization; first in Europe and later in North America and China. Within a global company which is active in a wide variety of chemical businesses from basic chemicals to active pharmaceutical ingredients this was a major milestone which took large effort and time to put into reality. In a second major step we introduced supplier standardization, called the MVV programme. And as of 2007 we have been working with MVVs, or main valve vendors." (See the March 2016 issue of Valve World for an interview with BASF's Mr. Suhren on MVVs.) Dr. Spiegel continues: "from my perspective, the MVV initiative as a way of further integrating suppliers into our engineering processes so they can help us in selecting the best choice valve for each application, for example, when we are building a new plant. I see the MVV as a way to focus on partnerships."

## Smart Plants

Total cost of ownership (TCO) is another concept that has been embraced by BASF. Dr. Spiegel: "when we buy valves we don't just look at the initial costs, we also want to know what maintenance is required, whether repairs will be likely and what the average costs would be. We want valves with a proven reliability and from suppliers who ideally have a global presence and who can provide proper customer support."

This attention on total costs is especially applicable for equipment destined for new-build facilities, of which BASF has a good share. Dr. Spiegel: "BASF wants to be a top player in every market we are active in so as a company operating in a technical business we need to commission efficient and economical plants which can be built within a minimum timeframe. So again, product standardisation, automated systems and knowledgeable suppliers will help us greatly in this ambition."

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Stating that operational excellence is a must in BASF plants, Dr. Spiegel says that suppliers should set equally high standards



*The hydrogen plant at BASF's Verbund site in Ludwigshafen produces hydrogen from natural gas and water vapour in a multi-step process. Excess heat from individual process stages is also used to create steam and feed this into BASF's pressurized (40 bar) network. Photo courtesy BASF SE.*

## END USER FEATURE

in their own businesses. However, he notes that BASF is still seeing too many basic problems in supplied valves. Dr. Spiegel: "for example, casting defects in valve bodies, mechanical failures in the trims, valves delivered made of the wrong materials, incorrect tags, delays in deliveries .... these are problems which I would suggest are fairly basic and which could and should be resolved." Finally, asked about future developments in valve technology, Dr. Spiegel says that he expects to see additional use of digital systems and microprocessor technology. "Electronic tags, smart actuators and fast data exchange can help us develop so-called "Smart Plants" as we step up to Industry 4.0."

### Actuator dimensioning

The further development and integration of smart solutions is a topic that is also important to Matthias Huk, responsible for both control valves as well as automated on/off valves at BASF. Asked if he could give an example, Mr. Huk brings up the issue of actuator dimensioning. "Dimensioning is a challenging topic, as it is necessary to take sometimes unpredictable factors into consideration, such as the influence of temperature, the pressure differential, etc. In practice dimensioning is a particular concern with metal-seated ball valves."

In that respect being able to see the torque delivered by the actuator would be a real benefit, he continues, emphasizing that the torque figures are not simply 'nice to know'. Mr. Huk: "many automated on/off valves have a safety function and are regularly tested to ensure their reliability. However, the fact that the valve operates during a test says nothing about the reserve torque available from the actuator, which could well have dropped from 20% to 1%. That means there is an element of uncertainty about whether the valve might fail in the near future. Having torque figures would greatly facilitate maintenance support, save costs and enhance safety."

Obviously BASF goes to great pains to ensure that automated valves can be operated as and when required. As Mr. Huk explains, actuators are therefore often specified with a built-in safety factor of 1.5, meaning that the actuator has a 50% reserve capacity to operate the valve. "However, things can change over time. The operating conditions might be altered, the actuator power output might drop off,

so it would be very handy to have a built-in smart sensor that could give us real-time feedback about the actual torque delivered by the actuator. For example, that could be an intelligent solenoid valve or limit switch that can detect the reserve of the actuator to turn the valve. That way, we would have the reassurance of knowing whether the system was operating safely or not."

Asked who might be able to take the lead in finding a satisfactory solution, Mr. Huk says that he has seen prototypes being developed by a number of manufacturers although finished products are not yet available for sale. "Of course, it is easy to find control valves fitted with torque sensors but to date they have not been integrated into automated on/off valves. That's because the technology behind control valves has over the years, from pneumatic positioners to 4-20mA systems to the integration of microprocessors, meaning it was but a small step to add on diagnostics capabilities. By comparison, automated on/off valves are normally fitted with much simpler control devices, such as limit switches and solenoids. This makes it far less straightforward to add on diagnostics functions."

### NAMUR influence

Although of course valve and actuator manufacturers have to set their own priorities when it comes to product development, Mr. Huk is convinced there

is a solid business case for torque sensors for automated on/off valves. "Simply put, the requirements are this: we need a device with which we can measure oversizing as a percentage of the required torque. I am sure that the manufacturers themselves can determine the best technical solution to achieving that."

Mr. Huk is not unduly worried that leaving the development to third parties will cause standardisation problems. "It is quite true that standards already exist for features such as the valve-actuator interface, the solenoid, the limit switches, etc. However, diagnostics is a much more complicated topic. Each control valve manufacturer seems to have developed its own diagnostic technology, making it hard to standardize. So in this instance, too, I think it better to wait and see what the market has to offer."

As an active member of NAMUR Mr. Huk is well aware that engineers elsewhere are equally keen to see a torque sensor on the market. "Namur is the voice of the end users in nearly 150 member companies of the process industry and I have the pleasure of being the Chairman of NAMUR Working Group 3.4, looking at final control elements. NAMUR does carry quite some influence so let me just say that we are doing all we can to encourage the development of new smart sensors. These smart sensors will also help us take another step towards Industry 4.0."

## Meet BASF's valve experts

**This is part three of our four-part report from BASF in Ludwigshafen, Germany. Part one in February addressed BASF's high pressure valves whilst in part two BASF's Mr. Holger Suhren (Global Category Manager Valves) considered procurement. In the fourth and final article scheduled for May, Mr. Andre Kaiser and Mr. Wolfgang Klein will discuss maintenance. Missed an episode? All prior interviews can be found at: [www.valve-world.net/basf\\_valves](http://www.valve-world.net/basf_valves)**



*Dr. Günter Spiegel, Senior Manager Central Services & Engineering Expertise: "Especially valve automation will have growing importance."*



*Matthias Huk, Senior Engineering Manager, leads the BASF Working Group on control valves and is also an expert on automated on/off valves.*