04/13

schneider
Tailored to Your Business

FOCUS

FEEDBACK FROM ABOUT 1,000 CUSTOMERS

Results of the customer satisfaction survey

AS-SCHNEIDER A4 SERIES

High-temperature valves in modern high-performance power plants

UNION BONNET TANDEM VALVE UP TO 550°C

Dear customers, dear readers!

What can we do to make our offering meet your needs even better? Finding and implementing answers to that question spurs us to new efforts every day.

You are the focus of our company, and nobody knows your needs better than you do. That's why we recently carried out a customer satisfaction survey. The results are very motivating. 96.7 percent of our customers call AS-Schneider a particularly reliable supplier.

Honesty is very important to us. We always try to keep our promises. That is why we are particularly happy about the score of 1.6 you gave us (on average) for "conforming to promised characteristics". We also received a 1.6 for "completeness of delivery" and "correctness of delivery". And you had high praise for the competence and friendliness of our team.

Of course, we were very happy about these highly positive survey results and the outstanding response (about 1,000 customers provided an evaluation). Thank you for the praise we received from you and for your trust in us. And we promise that despite the positive results, we will not forget the purpose of the survey: the continued improvement of our product line. We therefore consider these high scores to be a motivation to concentrate our full strength on optimising the areas you evaluated as good. This includes the area of custom product solutions.

What we have done in this area recently can be found in the pages of this edition of FOCUS. We would be happy to present our current product innovations to you, for example the new A4 Series for high-pressure and temperature applications, developed particularly to customer specifications. Our specialists have succeeded in designing a Primary Isolation Valve with the latest technology that can withstand extraordinary loads: temperatures of up to 750°C and pressures up to 400 bar – for plant's lifespan of at least 40 to 50 years.

The prototypes of our new development have already undergone long-term testing to demonstrate that they meet all requirements. You can read more about the interesting background and the details that had to be taken into consideration during the design of this valve – from the welds to the complicated material procurement – and about the solutions we found for them, in our report starting on page 4.

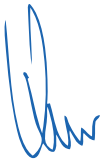
Among the things we put on our to-do list for 2013 was the further extension of our production and sales subsidiaries. Process optimization is also an important key topic. We will be investing millions this year to continue to improve our performance in this area. Our goal is to be able to guarantee you, dear Customer, 100 percent quality, service and flexibility. We are particularly investing in our production facilities in Nordheim, Germany and Harman, Romania.

We can see from the survey that communication is another topic that you as customers find especially important. The expansion of our service thus puts more emphasis on customer relations and consulting. Our goal is to be able to offer you even more contacts – worldwide. We hope that our own subsidiaries and representatives overseas will make us even more accessible and reinforce our on-site presence in international markets. To achieve these goals, we have already taken quite a few measures in the past year and we will continue along this course: After the opening of our subsidiary AS-Schneider Middle East in Dubai in 2012, we are now planning the launch of our own subsidiary in the United States for the second half of 2013. The new AS-Schneider America Inc. will be headquartered in Houston, Texas.

These are the focus points we have set for this year. It would be great if our goals could contribute to fulfilling your goals.

What else can we do for you? Please let us know.

Best regards



Rolf Kummer
Managing Director AS-Schneider

Compact Union Bonnet Tandem Valve

for instrumentation lines

AS-Schneider B1 Series Union Bonnet Tandem Valves are used as primary isolation valves for instrumentation lines where highest requirements are placed on the safety of the shut-off function.

The safety of the maintenance personnel is paramount when performing service work on pipe assemblies. Especially with media under high pressure and temperature or with hazardous media two valves positioned in series are often used. This tandem arrangement shall provide a positive isolation from the process.

The AS-Schneider B1 Series was especially developed for these high demands. The B1 Series comprises two separate independent Union Bonnet Valves in a single body. This engineering design represents a very compact solution and is available in many materials (1.5415, 1.7380, A182 F91, 316/316L …).

The high-quality valve head units are flange-mounted to the valve body with a union nut (union bonnet design); the bore size is 8 mm.

The sealing to atmosphere is performed by the non-rotating valve stem. This design achieves a low actuating moment, reduces the load on the sealing and thus increases the service life. Another advantage is the avoidance of seizing between valve tip and valve seat.

The B1 Series is equipped with a metal back seat, which relieves the stem sealing when the valve is completely open and guarantees positive sealing even when the packing fails.

The B1 Series Union Bonnet Tandem Valves are available for pressures up to 600 bar and temperatures up to 550°C.

AS-Schneider A4 Series

for high-temperature valve applications

In times of increasingly stringent requirements complying with environmental legislation and scarcity of raw materials the effective and environmentally responsible handling of the available resources becomes more and more important. This applies also to the area of power generation.

Because of the continuous technological development of power plants development researchers have succeeded in **raising the efficiency** from approx. 30 % **to 45 – 50 %**. This means cutting the CO_2 emission roughly in half with the same amount of power produced. This remarkable increase in efficiency was essentially achieved by operating the power plant at higher pressures and temperatures.

Raising the steam parameters to **temperatures of up to 750°C and pressures of up to 500 bar**, however, requires materials and power plant components that can withstand these extreme conditions. Especially for valves that are to be used under these extraordinary loads for plant's lifespan of about 40 to 50 years, top quality and optimization are a must.

Special requirements concerning valves

To ensure the reliable operation of the valves first off all the **right materials** must be selected. Normally steels with 9 to 12 % of chromium are used for temperatures up to 630°C (example: material 1.4901 or ASTM A182 grade F92). Only nickel-based alloys such as 2.4663 (Alloy 617) are used for temperatures above 700°C. These alloys are very expensive, and their difficult machining requires extremely high production know-how.

When a power plant is started up and shut down the piping components as well as the fittings are subjected to extremely high temperature differences. These **temperature differences** strain the materials and due to different thermal expansion of the components they may cause **undesirable tensions**. Another risk consists of the fact that the valve stem can expand less during the heating phase than the valve body and as a result the valve tip will slightly lift off the valve seat causing internal leaks. Consequently, special attention must be given when selecting the materials for the valve components to ensure that the materials used have the **same thermal expansion coefficients**. To prevent the valve tip from lifting off during temperature changes the initiation of the closing force of the valve tip via a spring assembly, which compensates the thermal expansion differences, is recommended.

However, not only the metallic materials of a valve must withstand the **extremely high pressures and temperatures** but also the sealing elements, especially the packing, which seals the valve stem dynamically toward the atmosphere. **Graphite packings** are used here as a rule. In the presence of atmospheric oxygen, however, graphite starts to oxidize at 550°C. To minimize the risk of oxidation, it is therefore feasible to move the stem seal to an area where temperatures are significantly lower. This can be achieved by extending the bonnet and using additional cooling ribs.

Last not least, the **welding joints** must be closely scrutinized. Especially high-temperature materials such as 1.4901 are very sensitive to the formation of **heat cracks** during welding. Even if the valve itself has no welds, it must be kept in mind that when the valve is welded into the pipe assembly the weld must be subjected to **heat treatment afterwards**, which, depending on the size of the seam, can take at least **half an hour at about 750°C**.

Particularly high requirements on the weld apply for so-called **black-white connections** which occur frequently at the process to instrument interface. To avoid having to make the welding joint on-site, this special connection is already made on the primary isolation valve. The production of such welds requires comprehensive know-how of welding and also the subsequent heat treatment and must be evidenced by a welding procedure qualification record.

AS-Schneider A4 Series

Development for the COMTES700 research project

AS-Schneider received the order by ALSTOM Power Boiler GmbH to develop an isolation valve which should be used in the COMTES700 test plant and is able to withstand temperatures up to 750°C at 400 bar.

The high requirements on the valve design and the very difficult mechanical machinability of the material Alloy 617 presented a special challenge to our development team.

Purchase of the material also turned out to be complicated. The research project had special material specifications (Alloy 617mod), so the material could not be procured through the usual channels. Each component manufacturer had to register his material demand in advance at the performing steel forge. For the subsequent production of components not planned the individual component supplier had to help each other out with left-over material.

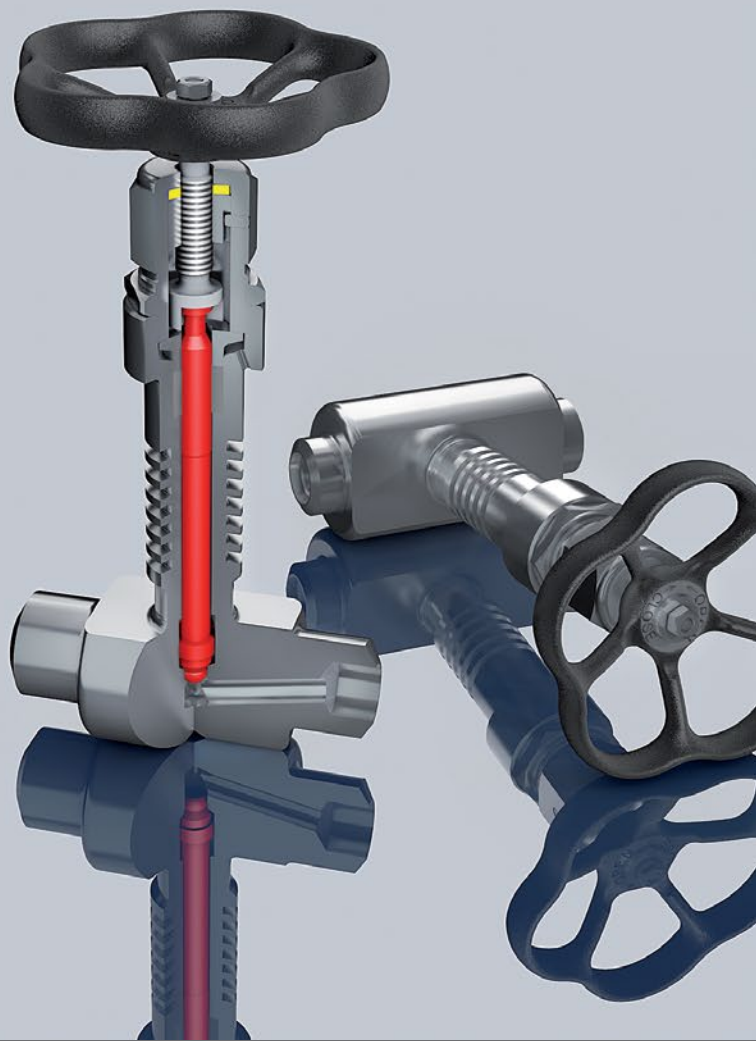
The performance specification for the AS-Schneider A4 Series was prepared based on the VGB directive R 107 L "Ordering and design of valves in thermal power plants". The essential points were:

- All materials used must be suitable for the high temperatures and exhibit the same thermal expansion coefficients to rule out material tensions and leaks on the valve seat during the temperature changes from room temperature to 750°C.
- The valve head units shall be solidly welded to the valve body to prevent leaks even from developing.
- The valve shall be equipped with a metal back seat which completely relieves the packing (stem seal toward the atmosphere) when the valve is fully opened.
- Packing and stem thread must have a sufficient distance to the valve body so that the temperature on these components is markedly lower and reliable operation is thereby guaranteed even at 750°C.
- The closing force of the valve tip must be introduced via a spring assembly which can compensate the thermal expansion differences to prevent the valve tip from lifting during temperature changes.
- A vent hole must be present above the packing through which the hot steam is directed away from the handwheel in the event of a leaking packing.

You can simply rely on the AS-Schneider development team!

In close collaboration with ALSTOM, we were able to bring the specified requirements in line with the latest technology. The resulting prototypes were tested successfully during long-term testing at 700°C in the COMTES700 system.

Meanwhile, the AS-Schneider A4 Series is available in different materials such as 1.4901 (P92) and Alloy 617 and has proven successful in many power plants of the new generation.



We are there when you need us

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Area Sales Manager Eastern Europe

Stefan Heine
Sales Engineer Northern Germany

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Sales Engineer Southern Germany, Austria and Switzerland

Mihai Tache
Sales Engineer Romania

Tim-Frederik Kohler
Sales Director APME & The Americas

Umar Mukthar
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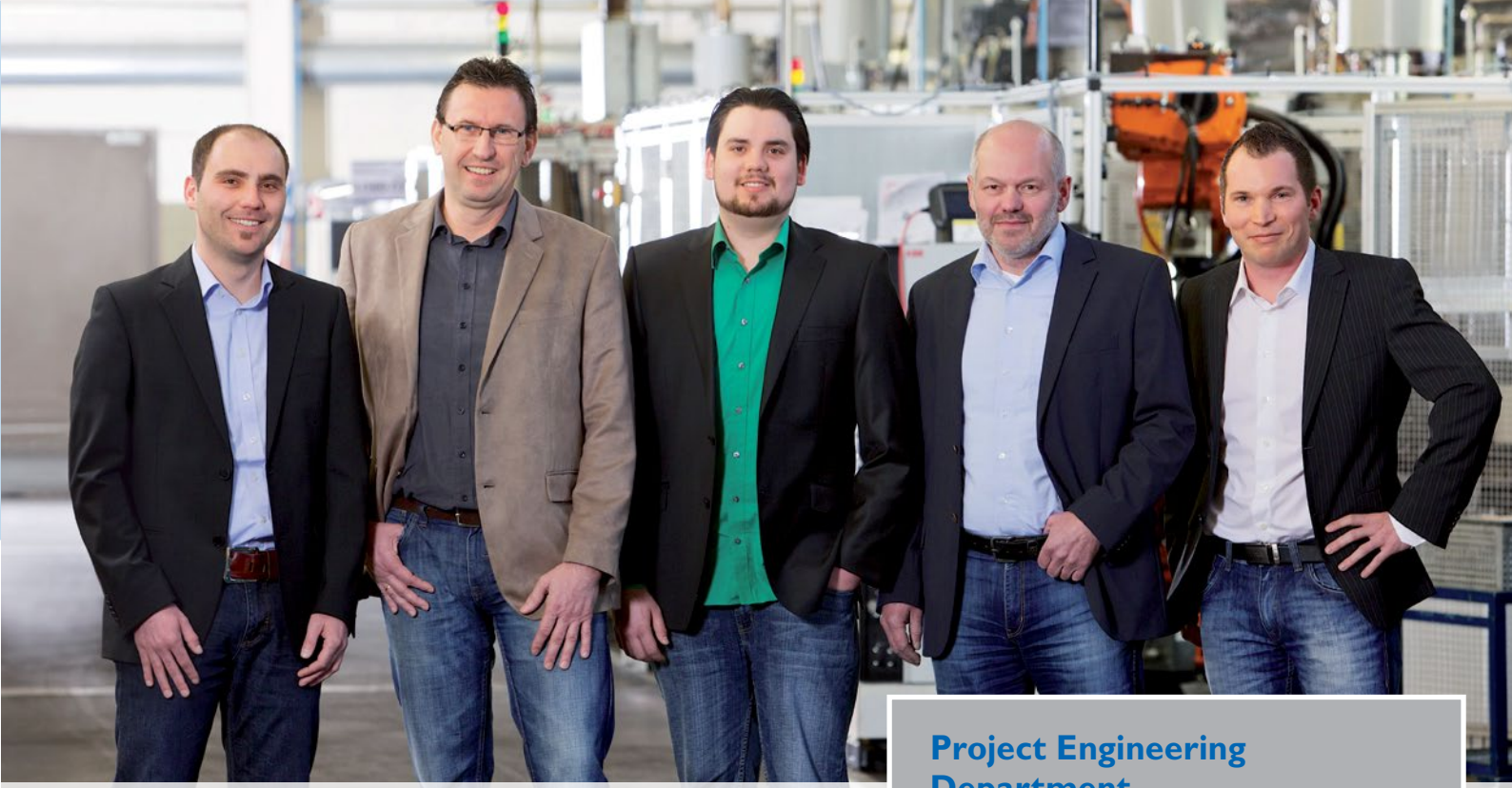


Project Engineering Team

Left to right: Andreas Ambacher, Norbert Kuhn, Benjamin Godi, Uwe Frank, Raphael Schneider

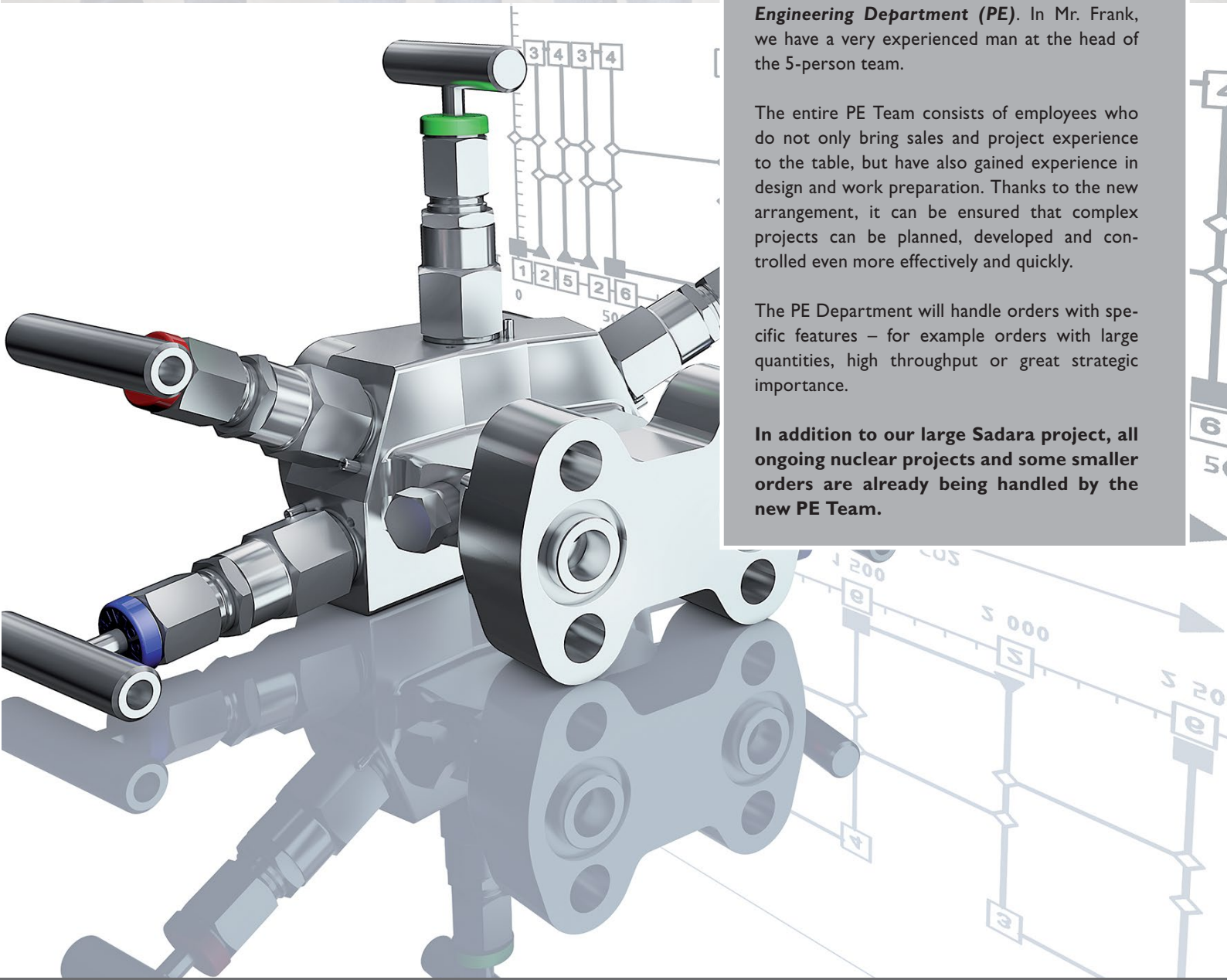
Project Engineering Department

Uwe Frank is the head of the new ***Project Engineering Department (PE)***. In Mr. Frank, we have a very experienced man at the head of the 5-person team.

The entire PE Team consists of employees who do not only bring sales and project experience to the table, but have also gained experience in design and work preparation. Thanks to the new arrangement, it can be ensured that complex projects can be planned, developed and controlled even more effectively and quickly.

The PE Department will handle orders with specific features – for example orders with large quantities, high throughput or great strategic importance.

In addition to our large Sadara project, all ongoing nuclear projects and some smaller orders are already being handled by the new PE Team.



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