BASF: a world-leader in chemicals *and* valve manufacture

Courtesy BASF SE.

With 113,000 employees, sales of EUR 74 billion in 2014 and serving industries ranging from agriculture to automotive and from pharmaceuticals to pulp & paper, BASF tops the list of the world's largest chemical companies. Valve World therefore jumped when given the opportunity to visit BASF's headquarters in Ludwigshafen, Germany, to meet with various managers responsible for the procurement, specification, manufacturing and maintenance of valves, control valves and safety valves.

By David Sear

My directions for travelling to BASF were clear. Leave the E50 motorway at junction 23, head south on the L523 and look out for the signs for the Q920 Building. So I was well prepared for the trip, but nevertheless completely taken aback by the sheer scale of BASF's site in Ludwigshafen. Before even reaching the correct parking garage I counted about half a dozen access gates and, had I carried on, would have passed many more.

For the BASF facility here is simply huge, measuring over six kilometers from top to bottom. In all, the site covers ten square kilometers and is home to a vast network of integrated plants as well as the company's global headquarters. And with almost 36,000 employees, BASF is the largest employer in the Rhine-Neckar metropolitan region.

But back to Q920 which houses BASF's Engineering and Procurement Centre. It was here that I met two engineers responsible for valves at BASF, Dr. Guenter Spiegel and Mr. Matthias Huk, as well as the man in charge of global valve sourcing and procurement, Mr. Holger Suhren. Later in the morning Dr. Spiegel and Mr. Suhren took me on a quick trip through the Ludwigshafen facility before making introductions to two managers inside BASF's valve workshops, namely Mr. Wolfgang Klein and Andre Kaiser.

I am deeply grateful to all five gentlemen for their time and especially for sharing their "valve insights". In fact, so much was discussed that it has proven impossible to incorporate everything into a single story. Therefore in the next three issues of Valve World you will be treated to three separate articles, focusing on the key topics of procurement, engineering and maintenance (see box on page 38).

However, there is one point that deserves a special highlight, namely that BASF is not just a major buyer of valves but also a valve manufacturer in its own right. I had this fact pointed out to me by Mr. Kaiser during a visit to one of the workshops for manual valves. "We manufacture high pressure valves, fittings and vessels for highly sophisticated applications. Not just

Covering ten square kilometres, BASF's headquarters in Ludwigshafen, Germany, is simply huge. Courtesy BASF SE.

for use in our own chemical plants but also for hundreds of customers world-wide. Indeed, BASF Hochdrucktechnik (High Pressure Technology) is a regular exhibitor at the world-renowned ACHEMA trade fair. So I think it is very special to say that we not only produce valves, but use them as well in our production facilities."

There are historical reasons behind this development. At the start of the twentieth century, ammonia synthesis based on the Haber-Bosch process was developed in Ludwigshafen. Carl Bosch was awarded the Nobel Prize for Chemistry in 1931 for the development of this high-pressure chemical process. The materials challenges associated with the attendant high pressures were investigated and solved by the newly built high-pressure workshop and the first material testing department in the chemical industry.

When fully assembled, BASF's high pressure valves can weigh anything up to 2½ tons. Courtesy BASF SE.

Forged stainless steel is a common material for BASF's high pressure valves. Courtesy BASF SE.

Seeing as BASF therefore basically pioneered research into high-pressure technology it was a logical step for the company to engineer and manufacture by themselves the equipment that was needed, including of course the valves. "This is why BASF is renowned as the inventor of the high pressure technology," comments Mr. Kaiser. Today BASF is one of a very small handful of companies who have the skills and equipment needed to manufacture high pressure valves continues Mr. Kaiser, pointing to an autofrettage unit. "Here for example we can apply an enormous pressure to the inside of the valve bodies for a carefully set period of time. What this does is expand the inner part of the body beyond its elastic limit, resulting in internal compressive residual stresses when the pressure is released. The physics may sound complicated, but the result is a much more durable valve with enhanced resistance to stress corrosion cracking and micro-cracking."

It should be noted that when Mr. Kaiser refers to 'high pressures', he really does mean high. In chemical plants operating at world-scale production levels, high pressure is defined as anything at or about 325 bar. "In fact, the safety valves we manufacture for the low density polyethylene process (LDPE) have an operating pressure of 3600 bar!"

Now as might be expected, demand for such high-pressure valves is very special and indeed BASF'S average production in this segment is comparatively small. "The market is quite volatile," concludes Mr. Kaiser. "Still, I would say that we have fulfilled a good number of orders in recent months. Trust me when I say that everyone at this workshop is very proud of what we can manufacture."

A Special Highlight: BASF is the only vendor in the world that actually manufactures as well as operates high-pressure valves in its own chemical production plants

Meet BASF's valve experts

The following interviews will be presented in upcoming issues of Valve World:

Mr. Holger Suhren discusses procurement in March 2016

Dr. Guenter Spiegel and Mr. Matthias Huk talk about engineering in the April number

Mr. Andre Kaiser and Mr. Wolfgang Klein give a "behind the scenes" view of maintenance in the May publication