

The specialists amongst the valves

Valve World Expo 2016: Trend towards stainless steel valves for all things hygienic

Stainless steel valves always stand in the limelight, thanks to resisting the horrific temptation of corrosion. They allow for perfect hygiene. As such, they are used often enough by the food and pharmaceutical industries. Such rustproof valves offer a happy ending for manufacturers and dealers.

Stainless steel valves have been an impressive success story in the last few years. "Current demand is very good. A lot is being invested worldwide in plant engineering for the pharmaceutical industry," states Marco Becker, head of distribution marketing, Gemü. A development which has come to stay. "Thanks to 'global health trends', a growing world population and industrialisation in emerging markets the trend will remain positive for the time being," even though the sector can't disconnect itself entirely from the global economy, adds Becker.

Requirements are increasing

Mankenberg also shares this view of the situation. "The trend in the last decades continues to be increasingly towards stainless steel," the company declares. Demand for the material is rising in many sectors. Reasons are "higher standards also abroad and rising quality and purity requirements for plants," reports Heiko Bischoff, export manager, Mankenberg. Compared directly to steel, stainless steel offers far different qualities in terms of corrosion resistance, purity and longevity. Mankenberg has even made stainless steel valves its company standard – its share of production is around 75 percent, and still rising.

Gemü also has such praise for valves made from the material. In the pharmaceutical, food and biotech industries "the focus is on sterility, aseptic handling and safety," explains head of distribution marketing, Becker. The surfaces of stainless steel valves can be processed very well, making it possible to produce a precisely defined surface. This allows "a stainless steel valve or tubing made from stainless steel to be cleaned and sterilised very easily".



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Corrosion resistance

Stainless steels become corrosion resistant thanks to the formation of a passive coating on the surface. Such a metal oxide or metal oxide hydrate coating has a high chrome content, and prevents the steel from coming into direct contact with aggressive media. Should the coating itself be damaged, a new one forms itself most of the time – the material is self-healing, so to speak. In order to make sure this is the case, stainless steels have a chrome content of at least twelve percent and a carbon content of no more than 0.12 percent. Adding molybdenum, for instance, again increases resistance.

Stainless steels are not only corrosion resistant and hygienic, but also wear-resistant, low-maintenance, long-lived, durable, weldable and temperature-resistant.

For the pharmaceutical and beverages industry stainless steel V2A with the material numbers 1.4301 and 1.4305 is used. The rustproof steel 1.4301 – also called AISI 304 – is a chrome-nickel steel approved for a permissible temperature stress of up to 600°C. One of its properties also is its polishability.

Pharmaceuticals on course for growth

These are properties the valve sector can exploit. They are especially in demand by the pharmaceutical industry, which has been growing for years. Global turnover of pharmaceuticals in 2014 was 864.4 billion euro, states the German Pharmaceutical Industry Association (BPI), a growth of 6.4 percent year over year. Latin America is the strongest growth market with a rise of 17 percent, followed by North America with growth of 12 percent. Asia, Africa and Australasia trail behind, with an increase of six percent. Based on absolute sales, North America is the largest market with a turnover of 322.5 billion euro, while Asia, Africa and Australasia are second place with 246.8 billion euro. Europe comes in third, contributing 213.8 billion euro. As such “more than 70 percent of total sales in the global pharmaceuticals market is achieved in North America, Europe and Japan,” declares the BPI.

The BRICS states Brazil, Russia, India, China and South Africa offer a lot of potential, even despite economic growth slowing down in the five

emerging markets in the last few years. The outlook is nonetheless positive, as sales are expected to grow in the respective countries. “The role of the pharmaceutical markets in the BRICS states will continue to increase for the pharmaceutical industry,” emphasises the BPI.

Life expectancy is growing

The BPI sees several reasons for the continued growth of the pharmaceuticals market: “To date, many diseases are unresponsive to therapy; life expectancy of people is on the rise and the changed consumer interest, as well as the search for more quality of life, increases demand for health-related services and products”.

A further important market for manufacturers and dealers of stainless steel valves is the food industry. While profitable, development of sales isn't positive worldwide. Germany serves as an example. Here, turnover in March 2016 decreased by 3.1 percent compared to the same period a year earlier. The mid-term business outlook of the sector for 2016 is quite restrained, at least according to the Federation of German Food and Drink Industries (BVE). Last year, sales contracted, and are seen to remain flat in 2016.

Several reasons speak for the restrained expectations in Germany. “Uncertainties and increased pressure on earnings are growing for the food industry,” explains Laura Busch, a consultant at the BVE. Higher labour costs, increased demand for skilled workers, as well as the growing demands of consumers for quality and sustainability are the greatest concerns of companies this year, according to a survey of the federation. “The increasing market concentration and consolidation in the food industry and consumers' need for information of origin and production methods are further burdens, as well as high prices and scarcity of resources, and more and more regulation and red tape”.

Pharmaceutical valves a role model

Despite all of this, the consumer climate in Germany is “better than in the European neighbour states,” states the BVE. German consumers are prepared to spend more on higher quality products. Even though the food industry serves a rather sensitive market, it is a very large market that requires scores of stainless steel valves. After all, worldwide demand for

foodstuffs is growing, owing to the fact the worldwide population will grow from currently 7.1 billion people to 9.1 billion people in the year 2050.

Both the pharmaceutical and food industry increasingly have the same requirements for valves. Based on requirements continuing to rise, experts believe valves used in food production will be comparable to valves used in pharmaceutical plants.

An important role in the sanitisation process in food production and drug manufacturing is the principle of steam drying in clean rooms. "Under this process, the components to be dried are exposed to steam which is generated from distilled water and must be as free as possible from condensate," explains Mankenberg. A liquid separator separates the condensate from the steam under operating pressure, using the centrifugal principle. The interaction between high temperatures and the highly reactive pure water quickly leads to intergranular corrosion, which is also called intergranular attack. The company therefore uses a low-carbon stainless steel, "which ensures a high corrosion resistance in the event that very aggressive media are separated".

Controlling steam pressures

For a more complex manufacturing process numerous pressure control valves are required. In the food industry, beverages are often enough aerated. Carbon dioxide is supplied as a fluid, due to high pressure. It becomes gaseous again when depressured. Here, pressure reducing valves are necessary to achieve the change in state.

Pressure reducing valves allow the controlled vaporisation of fluid carbon dioxide coming from cylinder batteries, thereby creating gas. The gas won in the process is used to aerate mineral water. "A valve should have a high flow coefficient for CO₂ pressure reduction," states Mankenberg, "as the regulator could freeze over due to thermal expansion. The valve would basically freeze up".

In drug manufacturing and food production, valves are responsible for a large number of functions such as mixing, separating, discharging, feeding or cleaning, and nearly all of these are sterile processes. This is why Gemü places its bets on multiport valve blocks. Residual volume has to be low, and there may be no internal welds. Stainless steel is the preferred material.

Trend towards heat sterilisation

When developing valves for the pharmaceutical and food industry, manufacturers need to make sure dead space, cavities and gaps are eliminated, otherwise there is a risk of corrosion and bacterial growth.

Various types of valves are used, ranging from shut-off and control valves to diaphragm valves, butterfly and safety valves. Both the pharmaceutical and food industries are increasingly replacing cold sterilisation with heat sterilisation, a development requiring manufacturers to take note. Seals need to be designed to deal with higher cleaning temperatures.

The individual requirements of customers and the versatility of stainless steel, for instance in handling critical media in food production and drug manufacturing, have seen Berluto expand its stainless steel business. The company therefore now offers numerous different float valves made from stainless steel. And Berluto is not an isolated case.

Focus on specialists

Spending money here will bring a return on investments for the valve industry. There is no doubt that the requirements for components to be used in the pharmaceutical and food industry will continue to rise, just like the global population. Stainless steel valves will increasingly be in the limelight. The stage is set for companies specialised in such products.

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