Hygiene at the man-machine interface
Ergonomics on meat-processing machinery

The control units of the machinery from Seydelmann are designed from scratch according to the principles of hygiene-compliant design and offer a highly ergonomic operation as well. In this way, the man-machine interface also meets the highest requirements. The control elements used are pushbuttons, indicator lights, (key) selector switches, potentiometer drives and joystick switches from Elan, which have been developed especially for food-processing machinery.

Needless to present Maschinenfabrik Seydelmann KG to quality-minded butcher or slaughterhouse companies. There is a good chance that the company already uses one or more machines from Seydelmann. And even when not, the name is a hallmark: Seydelmann designs and manufactures machines for meat chopping, e.g. cutters, vacuum cooking cutters and grinders for fresh and frozen meat (image 1). Also mixers, mixer-grinders and emulsifiers are included in the programme, which excels in long life and high quality.

The product spectrum ranges from machines for small quantities up to 8 ton heavy cutters, which can process 700 kg of roast per batch. Often, the individual machines are also interconnected to form complete production lines. The good reputation of the company, which has sites in Aalen (factory) and Stuttgart (sales office) and sets approximately 230 collaborators to work, is not only restricted to the home market. The export share amounts to approximately 75%.

Large degree of vertical integration, high quality
Traditionally, the Seydelmann machinery is characterised by a large degree of vertical integration, which is undoubtedly a decisive factor for their high quality. The entire steel construction assembly is an in-house process, as is the manufacturing of the control units. When designing and manufacturing the machines, the toughest hygienic requirements are placed on materials and technology. The carefully processed high-grade steel surfaces are entirely smooth to avoid the slightest deposit of material residues.

Operation: ergonomics first
The operating principle concept is completely focussed on ergonomics and hygiene. Dipl.-Ing. Bernd Werlein, Electric Construction Manager: "We ensure that all operating and control elements are ergonomically arranged and that the functions can be activated without visual contact." This can be achieved by means of control

Image 1: Seydelmann offers a comprehensive range of high-quality emulsifiers for the meat industry.

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Image 2: The N programme was designed compliant with the hygienic requirements placed on machinery for the food-processing industry.

panels equipped with pushbuttons, (key) selector switches and indicator lights from the N programme from Elan (image 2) as well as with joystick lever switches (image 3).

Joystick switches and pushbuttons: intuitive actuation

This switchgear can be moved in four directions through the actuating lever and trigger different functions. Bernd Werlein: “Every switch is configured with logically related functions. This provides for an intuitive operation of the machine as a result of which user errors are almost completely avoided.” The engineers furthermore have provided mutual electric interlocking devices, which exclude a combined actuation of incompatible functions. In this way, only few operating and control elements with logical and intuitive functions are needed. For some operating cycles, joystick pushbuttons, whose actuating lever latches in the actuated position, are used as an alternative to joystick switches.

Image 3: Joystick switches and buttons are used both in hygiene-critical areas and outdoor applications

Hygiene-compliant design and construction

During the construction of the operating and control elements (image 4), hygiene is considered of the same importance as ergonomics. That is why Seydelmann uses control and operating elements of the N programme from Elan, which have been developed especially for the food-processing industry. These components have been designed and manufactured in accordance with the European Standard EN 1672-2, which lays down the general design principles for the hygienic requirements of food-processing machinery. The special shape of the devices, in which corners and edges are largely avoided and smooth surfaces have been created, makes cleaning of the device heads simple and effective. In this way, a thorough residue-free cleaning of the device heads is enabled and cross-contaminations are avoided. It goes without saying that the materials used are suitable for food applications. The programme includes, amongst others, pushbuttons and illuminated pushbuttons, selector switches with short knob, different kinds of selector switches, mushroom buttons, indicator lights, step switches with 2 to 12 positions, potentiometer drives, main switches up to 63A, emergency stop control devices and high-grade steel enclosures. The range has been designed under analogous consideration of EN 1672-2 “Food Machinery – General Design Principles, Part 2: Hygiene Requirements”, as documented by a prototype test with the “hygiene” test certificate of the Prüfstelle der Fleischerei-BG (Testing Agency of the Employers’ Liability Association for the Butcher’s Trade).

Also for rough ambient conditions

Smooth contours and surfaces however are only one aspect of hygiene-compliant design. Another aspect and at least of equal importance, is protection against the ingression of humidity and water. If hygienic requirements have to be met, thorough cleaning is required. This applies especially to the meat industry, which is processing hygienically sensible products of the product risk level P2 in accordance with the “risk graph for the hygienic risk on food-processing machinery”. Here, the cleaning, which is often performed by special cleaning agencies in larger companies, is accordingly thorough.

High-pressure cleaning

The high-pressure cleaner belongs to the basic equipment. Although the control panels are not directly pressurized by the hot water jet, indirect and unintentional contact is inevitable. Both the N programme and the joystick switches have protection class IP 69K, which means that even if an 80°C hot water jet is sprayed onto the device heads from all sides with a pressure of 100 bar, no humidity can penetrate into the interior enclosure or through the sealing of the control panel.

Image 4: The joystick switches installed on the control panel provide for an intuitive operation of the machine

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It is evident that manufacturing this kind of control panels requires a high degree of expertise. That is why Seydelmann prefers manufacturing the control units in the house instead of delegating this task to its suppliers. Besides the effective sealing, the handcrafted finish of the front plate with graved operating instructions and pictograms is persuasive as well. This matches with the high-quality optical aspect of the control and operating elements, which are simultaneously robust and durable, even in case of rough operation (image 5).

Image 5: Clear optics, persuasive finish: control panel with switchgear from the N programme

Working in a productive manner with safety technology from Schmersal

Inside the meat-processing machines and in the control cabinets, safety technology from Elan's sister company Schmersal is used. For instance, the position of the protective cover of cutters is detected by means of a position switch with safety function. As long as the cover is open, the machine cannot be started.

Image 6: Failsafe standstill monitors contribute to productive working: the safety functions are sooner enabled than with a failsafe delay timer

For the noise attenuators of the cutters, Seydelmann has realised a stepwise safety concept: if the operator opens the cover of the cutter, the knife speed automatically is reduced to half the maximum speed, in order to increase the productivity. Bernd Werlein: "The safety functions must be optimally integrated in the processes – the operator does not want to wait, he wants to work in a productive manner." That is why the conventional small failsafe delay timers, which are generally used to transmit the enabling signal e.g. of the safety guard or the manual protective covers at the outlet of the grinders, are replaced with failsafe standstill monitors of the FSW 1206 type from Schmersal (image 6). These devices detect the real speed of the hazardous movement, as a result of which the enabling signal is transmitted sooner than with a delay timer. In this way, a high productivity and a maximum degree of safety are guaranteed.

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