Safely equipping isolators

Gas-tight butterfly valves are an effective tool to contain the dispersal of hazardous gasses, viruses or other media. Jozo Colic, RICO Sicherheitstechnik, explains its use and benefits in pharma applications and cleanrooms.

From the initial planning to the final design: Each individual part concerning cleanroom or isolator technology has to meet high safety requirements. Especially the absolute tightness plays an important role in these demanding applications, where critical particles and hygiene determine every-day work. Gastight butterfly valves for the isolator plants manufacturing industry or operators of cleanrooms are an optimal solution to separate or reduce airflows and provide 100% gas-tightness. Because sealing certain areas is a key issue in this field. In isolator applications, which are often used for the production of pharmaceuticals, the sealing poses an imperative measure. Thus, a specific atmosphere for processing sensitive or hazardous substances is created that must stay in the working area. It is also important that neither germs nor bacteria enter the area, which could contaminate the product.

Sealing isolators often concern containment solutions or toxic processes,

which are involved in weighing, filling, loading and unloading of freeze dryers or other critical procedures. To use these processes, a barrier is built between the operator and the product through the isolator housing. A ventilation system including a monitored pressure control built within the manufacturing plant increases the safety of the products as well as the user.

The loading and unloading of substances take place via so-called mouse holes or adequate transfer systems. The plants provide additionally supply and return air systems that clean the airflow. The isolator interior, including its installations, is sterilised via an integrated gas supply system before the process start of aseptic applications to ensure an ideal condition for the production procedure. In this regard, it is essential that the gas does not reach the ambient air, hence requiring 100% gas-tightness. The gas-tight butterfly valves are suitable for the supply as well as the return air side of the isolators.

Customer specific implementation

The RAPIDO gas-tight butterfly valves of the RICO Sicherheitstechnik AG can be delivered in different nominal widths and are capable of controlling the airflow in the ventilation duct and therefore to seal the pipe 100% gas-tight. Depending on the application area, the dispersal of hazardous gasses, viruses or other media is effectively contained due to the absolute tightness.

Gas-tight butterfly valves are also available in different versions; options are based around the housing, the valve disc and the sealing material, but also around the drive. Depending on the needed requirements, the drive can be controlled manually, pneumatically or electronically.

RICO reviews its proven butterfly valves constantly in a move to meet the market's current requirements. The round butterfly valve has been welcomed in the marketplace due to its compact and light design and also because it is available with a smooth housing surface as well as with a proven test groove, the so-called "PERFEKT" system, which allows for

testing the valve's tightness in its installed condition by means of a hand pump. As a control measure, the PERFEKT system saves time in case of a leak; it is an effective tool to control the gas-tight capability.

The test pressure is built via a test groove, which is screwed in the housing. The seal implemented at the disc valve ensures that no pressure is released. For many users, it is an important criterion that the tightness of the butterfly valves is checkable while already installed. These requirements are essential for optimal working conditions. However, it is not only the daily work routine that must be integrated in a security concept. The thinking of prevention in critical situations determines the practice in many companies and institutes. Therefore, solutions are installed, which protect the people and environment in the event of an emergency. Not only economic losses could be a consequence, but also the health of human beings could be in danger, if contaminated air is leaked into the immediate environment. The possibility to seal certain areas gas tight is therefore an important factor.

Another advantage is the very low wear that offers an outstanding functionality and hence the maximum possible security. Accruing maintenance work can be conducted quickly and uncomplicated without creating lengthy operation interruptions.

The controls are in general orientated towards the supplier's requirements. The valves are therefore thoroughly tested. Especially regarding isolator plant applications, a frequent verification of the valve function is conducted automatically: plants in the pharmaceutical field, for instance, have to undergo a pressure test before its commissioning. The process cannot start if the test is not successful. It would immediately stand out if anything was leaking.

In addition to the isolators, RAPIDO can also be used in cleanrooms. In this field, they are predestined for air regulation during filter changes and other applications. The whole breathing air e.g. in laboratories and other institutions running cleanrooms is exchanged several times a day. The air flows exclusively through pipes and different ventilation zones, in which for example so-called HEPA-filters (High-Efficiency-Particulate-Airfilter) are in operation.

Since the HEPA-filters are capable to filter even the smallest particles and aerosols on which viruses and other pathogens can attach themselves to, they ensure a safe filtration in the air supply and exhaustion. There are 100% gastight butterfly valves installed upstream and downstream the filters. These can be closed manually during the filter cleaning process, to interrupt the airflow temporarily. Cleanroom systems in general have to provide very high levels safety. Solutions installed in these surroundings always aim for the protection of people, products and environment.

All in all, the gas-tight RAPIDO butterfly valves create an ideal condition for smooth processes in isolators, cleanrooms and production plants with especially high requirements regarding cleanliness and hygiene. It also offers employees a high level of safety since the reliable control of the plant's leak tightness is easily managed.