MODULAR-DESIGN REACTOR WITH GMP OPTIONS

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THE MODERN REACTOR

The desire for continuous production is widespread in the chemical and pharmaceutical industries, but particular reactions still have to be carried out in separate batches and hence in stirred vessels. Often the small production amounts, in various time-dependent production stages, are crucial and make batch reactors the most cost-beneficial alternative. The QVF advantage lies in equipment that has universal use and can be modified quickly. This is achieved by the use of the modular QVF glass system. The combination of high quality DeDietrich glass lining DD3009 and universally corrosion resistant borosilicate glass 3.3 enables the use in a broad field of applications. Guided by the variety of customer-specific needs we have developed a reaction unit from the standard components of our existing equipment programmes.

GMP REQUIREMENTS

Responsibility for the quality of your products and, above all, delivery to international quality standards in the world market now makes it necessary to take into account the perspective of GMP-compliant production for all sensitive products. We agree that there is no "GMP-Unit" as such but only processes certified according to GMP. Therefore the construction and the choice of the material are important for this certfication. The prevention of cross-contamination plays a special role, particularly reaction units that are used for a variety of types of production. It is often significant in what way the cleanness of the equipment is achieved, whether by increased cleaning costs or by a special clean-friendly, minimal dead space construction. The three-stage GMP concept of QVF is compatible with these requirements. The most expensive GMP execution is not always the most suitable solution for you.

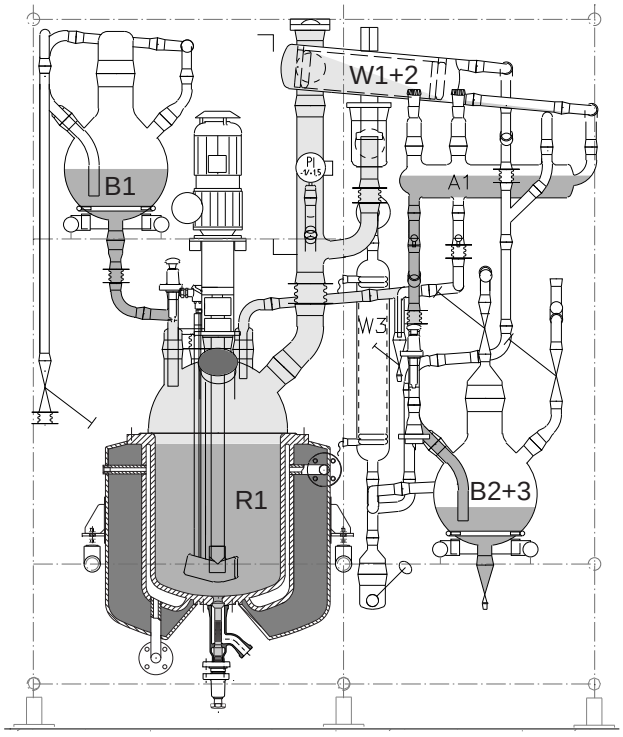

Fig.1: Schematic: Compact 63 litre GMP-compliant reaction unit

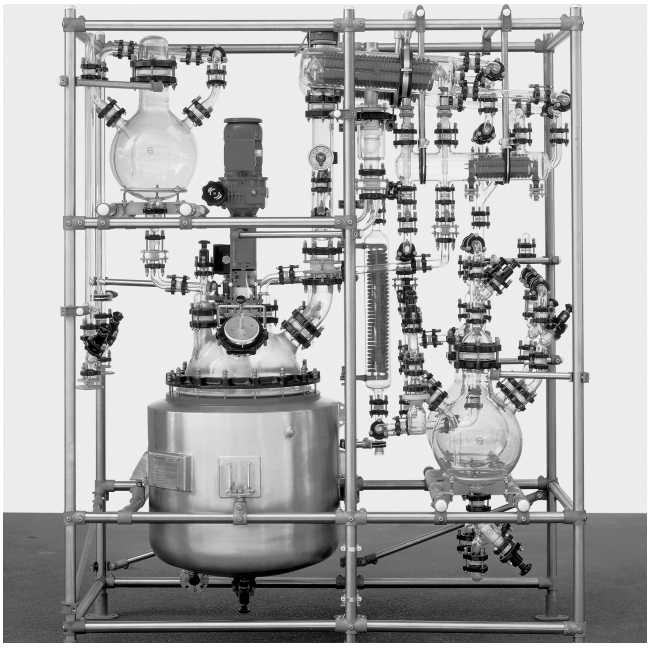

Fig.2: Photo: Compact 63 litre GMP-compliant reaction unit

ADDITIONAL REQUIREMENTS

In addition to the GMP requirements the modern chemical industry makes heavy demands on the reaction unit. One main objective is the safety and reliability of the equipment. By using highly industrial components with the QVFY safety buttress end the QVF components allow you to adapt your equipment to your requirements and at the same time to comply with all technical regulations. As a HPO-certified company we reject laboratory fittings in such industrial equipment. In spite of this obligation we offer you compact solutions that have all you desire in the way of user-friendliness.

THE MODULAR-DESIGN PRINCIPLE

Just as with the QVF construction set system, with our QVF standard reaction unit series covering 16 to 100 litre we offer a range of combination options and thereby an equipment solution to your process requirements. The core component is a glass lined vessel specially developed by DDPS with 100 mm foam glass insulation. With its compact design it permits reliable scale-up. With accessories like agitators, receivers, condensers and measurement equipment you can select your design choices or from our wide list or we will be pleased to customise a solution for you.

THE GMP REACTION UNIT

Especially eye-catching is the compact 63 litre GMP-compliant reaction unit. The accessories allow you to comply with the most complex design requirements. The equipment is able to distil a two liquid phase mixture and, permits the withdrawal of the light or heavy phase The flow of the light and heavy phase can easily and quickly be interchanged (see fig. 3) by the special phase separator having also an integrated cooling coil.

All liquid pipes are assembled with a 5° slope and equipped with QVF GMP gaskets (avoiding dead volumes in the flange connection), so that liquid can drain off fully. Fornthe same reason the bellows, far as necessary, are only placed in vertical lines.

With safety devices like relief valves or bursting discs operating safety is ensured and the electronic instruments for pressure and temperature measurements can be linked to process control systems.

OPTIONS

Deviating from the standard designs we offer the following alternatives for all equipment sizes:

- Lengthened glass cover for better internal viewing
- Double-acting mechanical seal
- Anchor, turbine, propeller and impeller agitators
- Baffle with in-built thermometer
- Additional feed vessel
- Graduated cylindrical feed vessel
- Column in the vapour pipe
- Stainless steel structure
- Various measurement and control options
- Hydraulic lifting device
- Realisation of your special needs

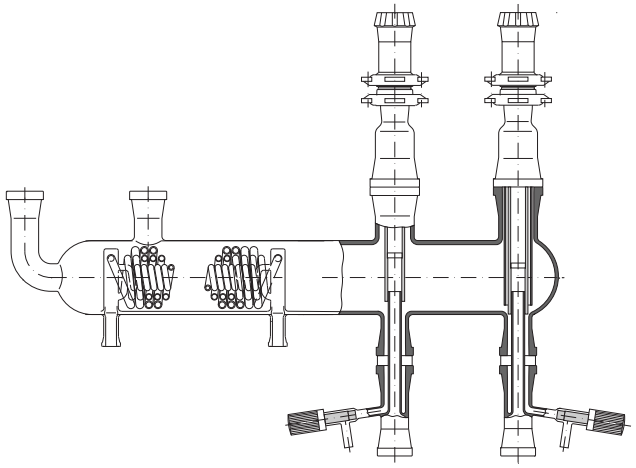

Fig. 3: Sketch: Phase separator with cooling coil and possiblity to interchange flow direction of heavy and light phase

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