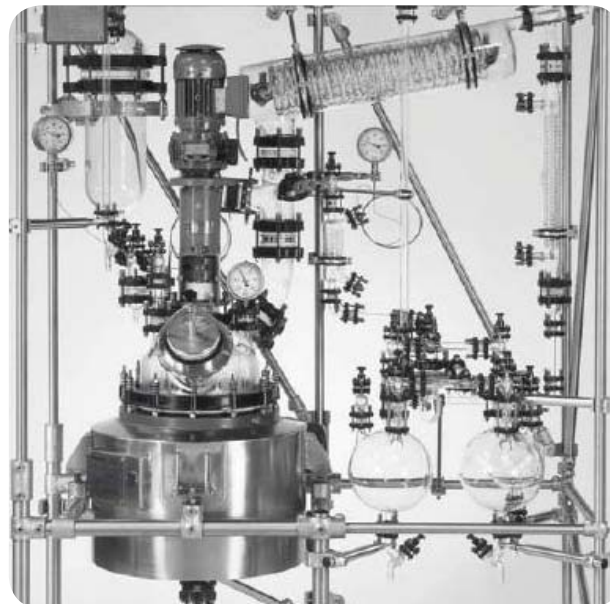


### Product Description

The QVF Pharma Reactor System, featuring the VERI Reactor, is specially designed for the two process stages of reaction and distillation. The reaction stage operates under total reflux, whereupon the solvent can be distilled off as effectively as possible in the concentration phase. Both stages can be carried out under either positive pressure (0.6 bar) or vacuum. The materials of construction used are borosilicate glass 3.3, glass-lined steel and PTFE.

Pharmaceutical applications resulted in demands for the design of the VERI Reactor. The development goals were maximum purity and optimized heat and mass transfer combined with suitability for GMP use.

To suit the availability of space in the majority of laboratories the VERI Reactor is designed for reaction vessel capacities from 16 to 63 litres in a compact layout with reduced head-room requirements.



VERI Reactor 16l

### VERI Reactor Applications

Reaction units are of considerable importance to the chemical and pharmaceutical industries in production and development. Particularly where small volumes are concerned, batchwise reaction and distillation is an economic process.

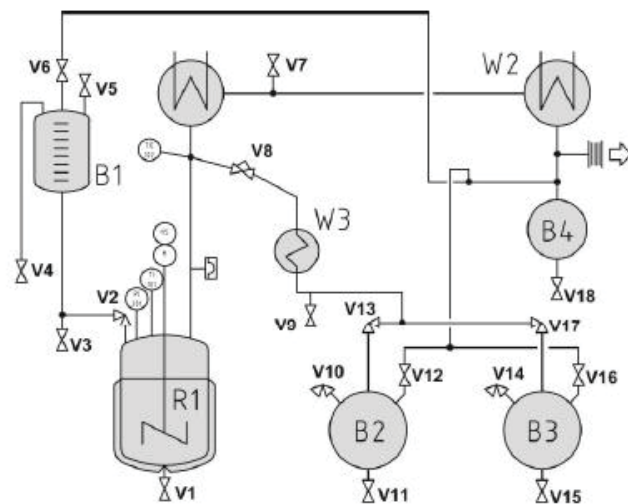
vessel	heating area m <sup>2</sup>	W1 m <sup>2</sup>	W2 m <sup>2</sup>	B1 l	B2/B3 l
16	0,25	1,0	0,2	5	5
25	0,37	1,0	0,2	10	10
40	0,53	2x0,7	0,3	20	20
63	0,75	2x1,0	0,3	20	20

VERI Reactor technical data

### OPTIONS

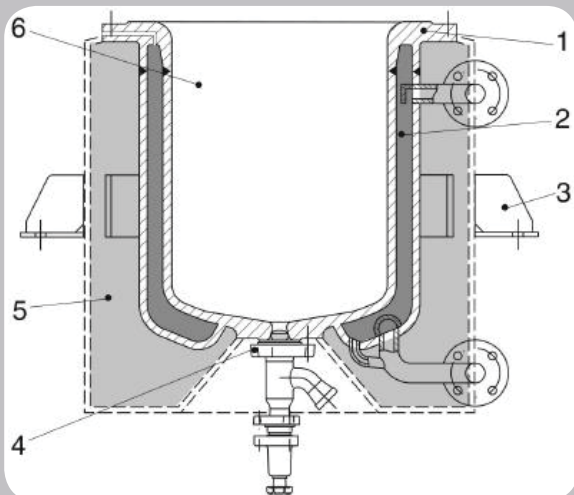
The VERI Reactor can be expanded to handle various special functions due to its modular construction. The following options are available:

- Hydraulic lifting device for the reaction vessel
- Phase separator
- Electronic speed indication
- High pressure version
- Coat glass components
- Weighting cells for reactor, feed and distillate vessel
- Doubling-acting mechanical seal
- Anchor, turbine and propeller type stirrers
- Process control engineering



VERI Reactor 16-63l

### Reaction Vessel



The enamelled reaction vessel developed by DDPS has the following special features:

1. Block flange for connection to the glass cover
2. Heating jacket up to the flange
3. Support brackets without thermal bridge
4. Block flange with minimal dead space bottom outlet valve
5. Polished insulating jacket with foam glass, stainless steel, tightly welded
6. White enamel to improve visual control

### Distillation Overhead Assembly

The distillation overhead assembly uses components from QVF's high quality SUPRA-Line which are approved as meeting the Pressure Equipment Directive and the equipment safety regulations and which carries the CE mark. With its safety flat buttress end it provides not only a GMP-compliant coupling but also a wide variety of well thought-out individual solutions.

To ensure that the equipment drains completely the horizontal piping carrying the product is largely installed at an angle of 5°. The inclined condenser has a rinsing neck and the receiver vessel can be emptied and rinsed out during the process means of valve V3.

The integral sampling valve V9 is used to take samples from the current distillate flow, even when operating under vacuum. In the basic version of the VERI Reactor the instrumentation is restricted to basic functions. In addition to the temperature of the vessel content and the distillate, the pressure is indicated by a tantalum membrane manometer. A bursting disk provides protection against excess pressure. The rotation speed of the enamelled impeller stirrer can be adjusted by means of the handwheel on the drive. All the valves are located close to the vessel involved, thus enabling direction and correct operation. Valve V8 controls the adjustment of the integral reflux separator.

*Right: Safety flat buttress end with GMP gasket*

### Safety Flat Buttress End with GMP Gasket

In addition to the basic benefit of the glass buttress end the "safety flat buttress end" SPF developed by QVF has two special features which make it the obvious choice for a GMP-compliant plant. All nominal bores up to DIN 300 have fire-polished sealing faces and a groove. The groove stabilizes and ensures positive location of the PTFE gasket seated on the extremely smooth sealing face. Together with the special GMP gasket, which, via centering in the groove and on the outer edge, effects a seal on the inside diameter of the flange, the safety flat buttress end provides a coupling with minimal dead space in pipelines laid out at an angle of at least 5°.

