



QVF® is a trademark of
De Dietrich Process Systems

Universal-Reactor

Complete solution from borosilicate glass 3.3



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UNIVERSAL-REACTOR

Highlights

- Reaction unit incl. EX-instrumentation
- Easy cleaning due to self-draining construction
- Certificates for material in contact with product
- Robust stirrer drive
- For operation in EX-rated areas"

Concept

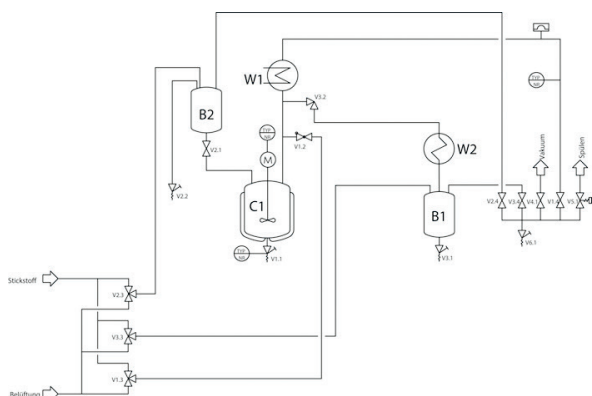
The complete solution if the 3 neck flask becomes too small !



50l Universal-Reactor

The QVF® Universal-Reactor is the solution when larger quantities shall be synthesized than can be done with a 3-neck flask in the lab scale. With this unit it is possible to run safely reactions with larger quantities in the liquid phase under inert gas between -20 and +150°C. Light boiling components can be distilled off. The QVF® Universal-Reactor is equipped with the required in-strumentation, ready of operation and needs only to be connected to heating and cooling media. The construction of the reaction unit permits simple and reliable cleaning via CIP-nozzles. The instrumentation of the unit is ex-rated according to German resp. European regulations so that the complete unit can be operated in ex-rated areas.

Function



Flow chart



Valve arrangement of the vacuum connection

The addition of the reactants into reactor is done through the hand hole with a quick release closure. By applying vacuum to the feed vessel another reactant can be sucked into the feed vessel and afterward dosed through a dip pipe directly into the liquid reaction phase. The valve assemblies permit to operate the complete unit as well as single receivers under vacuum or slight inert gas overpressure up to +0,5barg.

Tempering of the jacketed reaction vessel is done by thermo liquids in a temperature range between -50 and 200°C. This way the temperature in the reactor, which is captured precisely by a Pt-100 temperature sensor in the bottom outlet valve, can be ad-justed below or at the boiling point of the reaction mixture. This permits operation under total reflux or distillation. The mixing process and the heat transfer can be adjusted reproducibly at the continuously adjustable stirrer drive. The OPTIMIX(R) baffle system provides maximum mixing performance without splashing the reaction solution against the inner wall of the reactor. After the reaction solvents or other light boiling components can be withdrawn out of the reactor into the distillate receiver by distillation. Temperature sensitive products can be distilled under reduced temperatures under vacuum.

Technical description

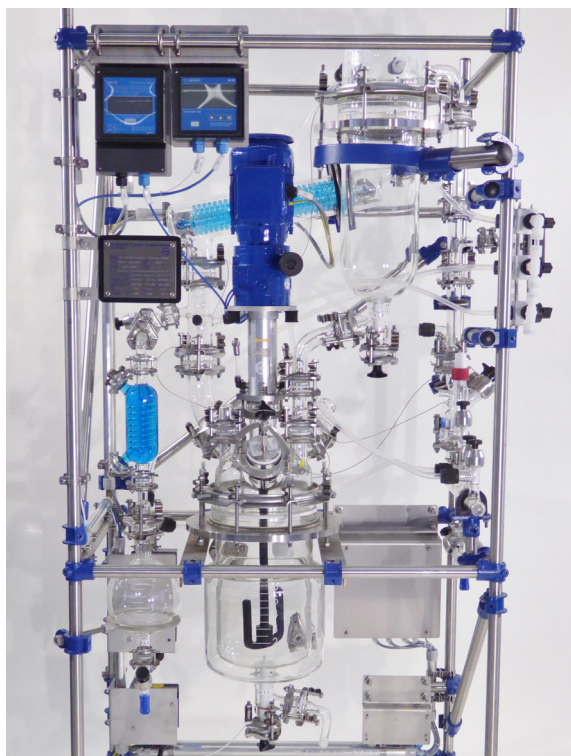


Fig. : 6l Universal reactor

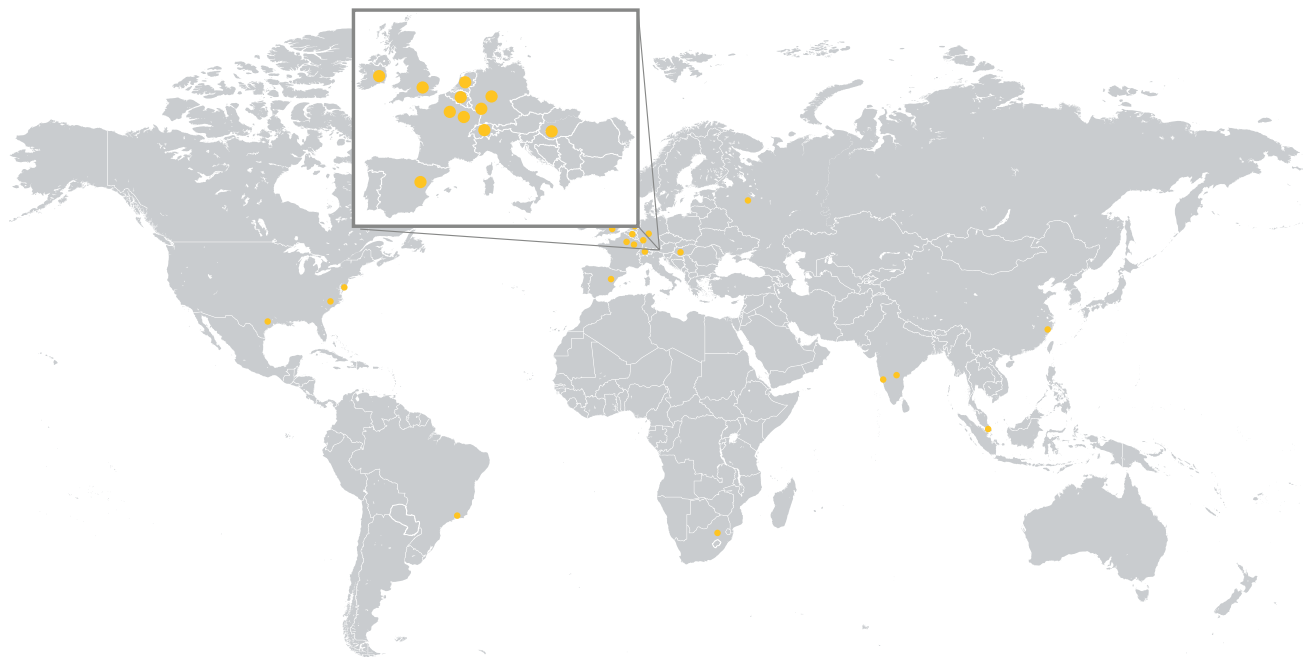
The jacketed reactor, the feed vessel, the distillate receiver, condenser section and the main piping are made of borosilicate glass 3.3. The gaskets and bellows are made of PTFE having FDA-material certificates. The flange couplings up to DN 300 are made of stainless steel, the larger ones are made of coated steel. The tightness of the glass flange connections is certified by TA-Luft. In order to optimize self-draining the glass piping for liquids is inclined and equipped with fire polished QVF(R) SUPRA-glass flanges. This is complementary to the CIP-nozzles providing easy and reliable cleaning of the inside of the reaction system. The hoses are made of PFA. The PTFE coating of the steel shaft of the stirrer as well as the stirring turbine are made of dissipative PTFE. The stirrer shaft is reliably sealed by a single mechanical seal. The stirrer is operated by an electric motor with a continuously adjustable gear box. The speed of the stirrer is adjusted manually and is captured digitally as well as the temperature and the pressure in the reactor. 3 OPTIMIX(R) baffles are connected to the inner wall of the reactor improve mixing without blocking nozzles of the reactor cover. The gap between the baffles and the reactor wall guarantee good liquid flow and avoids dead volumes. To prevent an over pressure of more than +0,5barg the unit is equipped with a bursting disc and a pressure relieve valve open slightly before that pressure. The intrinsically safe electrical wires are installed separately from the other power supply lines. For operation in zone 1 IIB and according to CLC/TR50404 and TRBS 2153 all metal flange couplings equal and larger than DN50 are connected with a stainless steel cable to the metal structure which needs to be earthed. All electrical and mechanical instruments are ex-rated and permits also the operation of the unit in zone 1 IIB. Optionally the unit can be equipped in a way that the operation is possible in zone 1 IIC outside and zone 0 IIC inside the unit.

Technical data

Nominal reactor volume	l	6	10	16	25	50
Nominal reactor diameter	DN	200	300	300	300	450
Feed vessel	l	2	5	5	10	20
Distillate receiver	l	5	10	10	20	30
Condenser	m ²	0,3	0,3	0,3	0,7	1
Cooler	m ²	0,03	0,06	0,06	0,1	0,3
Stirrer shaft	mm	18	18	18	44	44
Motor power	kw	0,25	0,25	0,25	0,37	0,37
Amount of CIP-Nozzles		1	2	2	2	2
Height	mm	1900	2000	2100	2600	2700
Width	mm	900	1100	1100	1500	1700
Depth	mm	700	850	850	850	1000
T in the reactor	°C	-20 to +150				
P in the reactor	barg	-1 to + 0,5				
EX-area inside		1 IIB				
EX-area outside		1 IIB				

Options

- OPTIMIX-Baffles
- Triple walled reactor
- Triple walled OPTIMIX reactor
- Inert gas connection
- Vacuum connection incl. pressure release valve and burtsing disc
- CIP-Nozzle made of PTFE
- CIP-Nozzle made of ss
- RPM-Measurement
- pH-Measurement
- Magnetic coupling
- Safety tub



DE DIETRICH SAS

Château de Reichshoffen
F 67891 Niederbronn Cedex
Phone +33 3 88 80 26 00
Fax +33 3 88 80 26 95
www.dedietrich.com

BENELUX

De Dietrich Process Systems N.V.
B - Heverlee-Leuven
Phone +32 16 40 5000
Fax +32 16 40 5500
info@benelux.dedietrich.com

BRAZIL

De Dietrich Do Brasil Ltda
São Paulo
Phone +55 11 2703 7380
Fax +55 11 2702 4284
brasil@dedietrich.com.br

CHINA

De Dietrich Process Systems Co. Ltd
Wuxi
Phone +86 510 6696 7500
Fax +86 510 6696 7599
info@dedietrichchina.com

FRANCE

De Dietrich S.A.S.
Zinswiller
Phone +33 3 88 53 23 00
Fax +33 3 88 53 23 99
sales@dedietrich.com

De Dietrich Process Systems Semur
S.A.S.
Semur-en-Auxois
Phone +33 3 80 97 12 23
Fax +33 3 80 97 07 58
info.semur@dedietrich.com

GERMANY

De Dietrich Process Systems GmbH
Mainz
Phone +49 6131 9704 0
Fax +49 6131 9704 500
mail@qvf.de

GREAT BRITAIN / IRELAND

De Dietrich Process Systems Ltd
Stafford
Phone +44 1785 609 900
Fax +44 1785 609 899
sales@ddpsitd.co.uk

Shannon
Phone +35 361 366924
Fax +35 361 366854
moconnor@dedietrich.ie

HUNGARY

De Dietrich S.A.S.
Budapest
Phone +36 20 56 83 444
info.hu@dedietrich.com

INDIA

De Dietrich Process Systems (India)
Pvt. Ltd.
Mumbai Office
Phone +91 22 6742 42 70
Fax +91 22 28 505 731
sales@dedietrich.co.in

Hyderabad Factory
Phone +91 40 2980 5442
Fax +91 40 2980 5441
sales@dedietrich.co.in

SINGAPORE

De Dietrich Singapore (PTE) Ltd
Singapore
Phone +65 68 61 12 32
Fax +65 68 61 61 12
info.sg@dedietrich.com

SOUTH AFRICA

De Dietrich South Africa (PTY) Ltd
Dunswart
Phone +27 11 918 4131
Fax +27 11 918 4133
info.za@dedietrich.com

SPAIN

De Dietrich Equipos Químicos S.L.
Barcelona
Phone +34 93 292 0520
Fax +34 93 21 84 709
comercial@dedietrich.es

SWITZERLAND

De Dietrich Process Systems AG
Bubendorf
Phone +41 61 925 11 11
Fax +41 61 921 99 40
info@rosenmund.com

UNITED STATES

De Dietrich Process Systems Inc.
Mountainside, NJ
Phone +1 908 317 2585
Fax +1 908 889 4960
sales@ddpsinc.com

Charlotte, NC
Phone +1 704 587 04 40
Fax +1 704 588 68 66
rosenmund@ddpsinc.com

The international business group De Dietrich Process Systems is the leading provider of system solutions and reactors for corrosive applications as well as plants for mechanical solid/liquid separation and drying. The system solutions from De Dietrich Process Systems are used in the industrial areas of pharmaceuticals, chemicals and allied industries.

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