

**PFAUDLER**

— Glass-Lined Technology

# DIN BE Reactors

A solid design  
which can take a lot



**GMM**  
Pfaudler

# PFAUDLER

— Glass-Lined Technology

For over 130 years, Pfaudler is the leader in developing new technologies to meet the highly specific chemical processing needs of its clients. One reason why our glass-lined equipment is trusted by over 90% of the world's top chemical companies is the sheer reliability of our reaction technologies and comprehensiveness of our glass-lined accessories. These technologies are critical to the safe containment of corrosive contents, maintaining the vessel pressure and ensuring the final batch quality.

In short, our glass-lined technologies are absolutely integral to an effective process.

## PRODUCTS & EQUIPMENT

### Glass Lined Reactors

### Glass Lined Mixing Systems

### Baffling Technologies

### Storage Tanks & Receivers

### Glass Lined Columns

### Accessories

### Glass Lined Instrumentation

### Glass Lined Heat & Mass Transfer



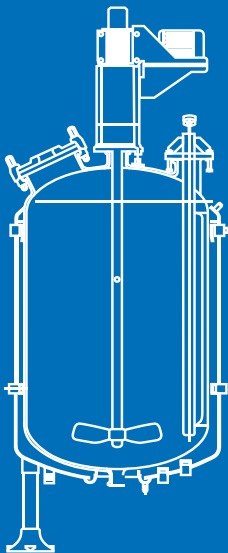






**ACID  
CONCENTRATION**  
**H<sub>2</sub>SO<sub>4</sub> | HNO<sub>3</sub>**

**MIXING**



**GLASTEEL**

—  
**ANTI CORROSION**  
**ANTI STICK**  
**ANTI STATIC**



# Pfaunder DIN BE Reactors

## A solid design which can take a lot

The DIN-BE reactors are used everywhere in the world and are considered a measure for security, reliability and an economic operation. This series includes our large reactors with the thick-walled jacket and a rated capacity starting with 1.600 litres. There are good reasons for the industry to opt in favour of Pfaunder reactors when it comes to DIN-reactors.

### TOP FEATURES

#### 01. A reliable operation and service life

Our Pfaunder enamel WWG offers an excellent resistance when subjected to corrosive and mechanical/abrasive strains. This results into a long service life.

#### 02. More safety in production

The lengths of the sealed surfaces have been reduced to a minimum since the manhole is the largest opening. This increases safety of operation. In addition, there is more room for more and larger nozzles.

#### 03. More flexibility and more efficiency in agitation

Cryo-Lock® completes the range of Pfaunder DIN-BE-reactors. Using this fully enamelled agitating system which offers many variations it is possible to achieve an optimum adaptation

to process requirements. From an economic point of view you will gain in two respects. The sequence of production and the quality of products can be optimised. A quick change of turbines saves additional time.



# Pfaunder Cryo-Lock®

A large degree of reliability

Onto an enameled agitator shaft turbines being enameled are also "shrunk on". For this purpose, the agitator shaft is cooled down using liquid nitrogen - it shrinks. In this way, the turbine can easily be fitted. When the shaft heats up again it expands - and the turbine is absolutely safe and in position.

## The advantages are self-evident:

- Shaft and drive unit remain in place when the turbine is exchanged. This saves both time and money.
- The turbines are introduced through the manhole. A larger opening is not necessary. This serves for a safe operation.
- The connection between shaft and turbine is fully enameled. This makes it corrosion resistant and no seals or gaskets are required.
- If the agitator shaft has to be dismantled, this can be done using the manhole for all reactors up to a rated capacity of 16.000 litres. The drive unit remains in place.

## A free choice with agitators

There are different agitators depending on process requirements:

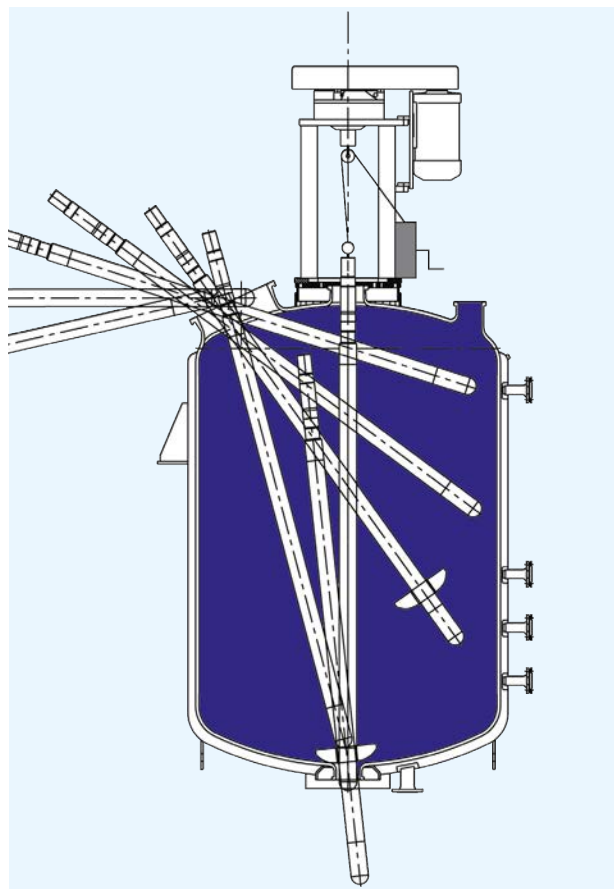
- i.e. the CBT turbine with four impeller-like wings. High shearing effect. Highly performing especially during gas dispersion. Reduces mixing times for homogenization.
- i.e. the Cryo-Lock® Turbofoil, the energy saver among agitators, with a high degree of efficiency. It accelerates mixing processes and saves a lot of energy thanks to its shape.
- If necessary, it is possible to combine several turbines of different shape on one agitator shaft.

## Quatro-Pipe – the baffle wich does more than just baffle

Quatro-Pipe is also a sophisticated development from our research.

The Quatro-Pipe is mounted onto one reactor flange. It can fulfill four different functions simultaneously:

- The Quatro-Pipe has the same properties as any other baffle and offers the same effect.
- At the same time, it assumes the function of a dip pipe.
- Using a temperature sensor, layed in enamel, the temperature inside the product can be measured and monitored quickly and exactly.
- Upon request, a probe for the detection and signalling of damage to the enamel in the agitator reactor can be provided.



Process of installing and removing a Cryo-Lock® agitator shaft into/from a DIN reactor BE through the manhole opening of the apparatus

# Technical Information

## General data of DIN BE reactors

The technical data summarized on this page applies to all Pfaudler BE reactors to DIN. For model-specific data, please refer to the following pages.

### Operating conditions:

- The minimum/maximum temperature TS is  $-25 \dots +200^{\circ}\text{C}$
- The maximum admissible pressure PS inside the reactor is  $-1 \dots +6 \text{ bar}$ .
- The maximum admissible pressure PS in the jacket area is  $-1 \dots +6 \text{ bar}$ .

### Standards:

The reactors comply with the requirements of the Pressure Equipment Directive 2014/68/EU. Their design, production and testing complies with the AD2000 set of regulations.

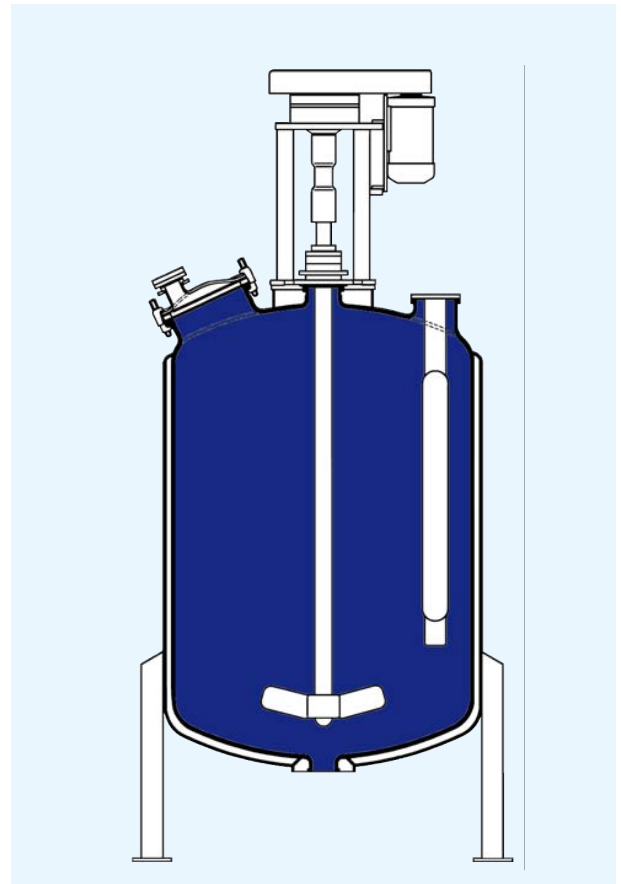
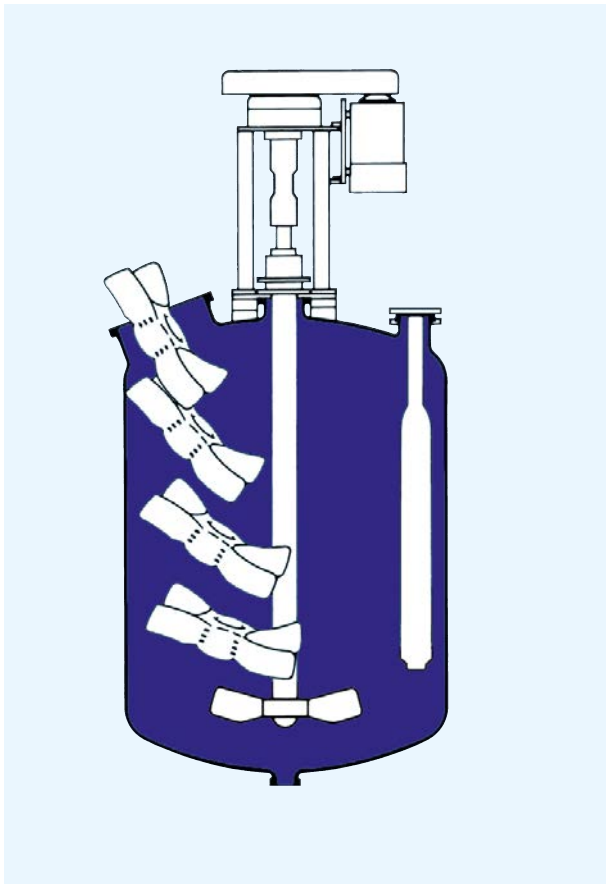
### Glass-lining:

Glass-lining is achieved using Pfaudler glass. Testing and quality to DIN 28063.

### Coat:

Preliminary treatment: Rust removal using a jet-blasting process, degree of purity Sa 2 1/2 to DIN EN ISO 12944-4.

Base coat: Rust-proofing primer and welding primer type aluchrome, two layers of coating, minimum dry layer thickness  $60 \mu\text{m}$ , temperature resistance up to  $200^{\circ}\text{C}$  permanent load, color reddish brown (dull), similar to RAL 8004.



Nominal reactor size to DIN 28136-1	Nominal diameter of the manhole to DIN 28136-3	Nominal diameter of the outlet nozzle to DIN 28136-1	Agitator shaft removable through the manhole	Nominal diameter of the Pfaudler outlet nozzle (option)	Agitator shaft removable through the manhole	Nominal diameter of the agitator nozzle to DIN 28137-2	Agitator shaft removable through the agitator nozzle
1.600	DN 500	DN 100	Yes	DN 100	Yes	DN 150	Yes
2.500	DN 500	DN 100	Yes	DN 100	Yes	DN 150	Yes
4.000	DN 500	DN 100	No	DN 150	Yes	DN 200	Yes
6.300	DN 500	DN 150	Yes	DN 150	Yes	DN 200	Yes
8.000	DN 600	DN 150	Yes	DN 150	Yes	DN 200	Yes
10.000	DN 600	DN 150	Yes	DN 150	Yes	DN 250	Yes
12.500	DN 600	DN 150	Yes	DN 150	Yes	DN 250	Yes
16.000, D = 2600 mm	DN 600	DN 150	Yes	DN 150	Yes	DN 250	Yes
16.000, D = 2800 mm	DN 600	DN 150	No	DN 200	Yes	DN 250	Yes
20.000	DN 600	DN 150	No	DN 200	Yes	DN 250	Yes
25.000, D = 2800 mm	DN 600	DN 150	No	DN 200	Yes	DN 250	Yes
25.000, D = 3000 mm	DN 600	DN 150	No	DN 200	Yes	DN 250	Yes

# Reactor System BE

## Technical information

The Pfaudler BE reactors to DIN consist of the following modules:

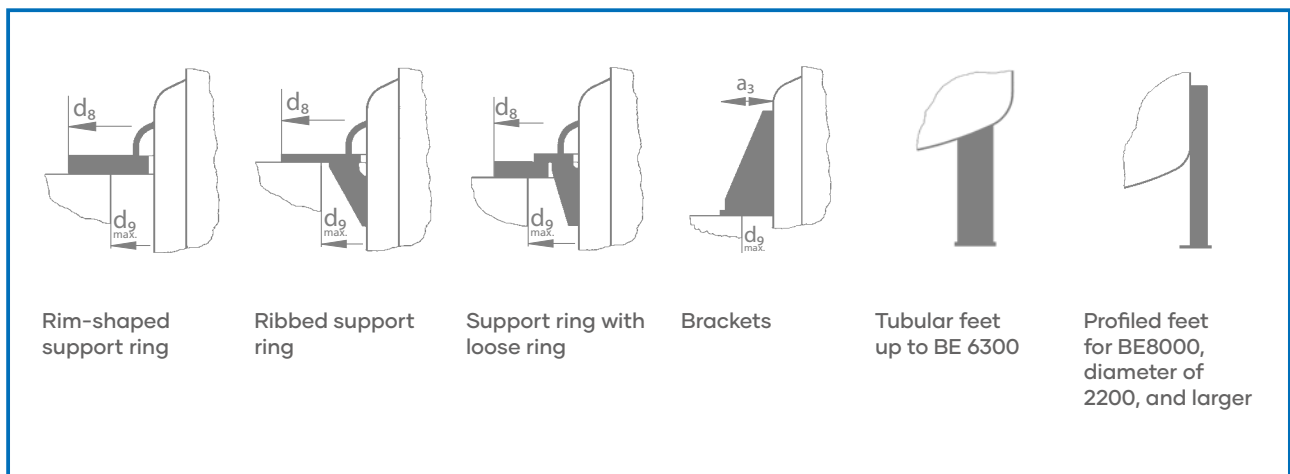
- Reactor
- Agitator
- Baffle
- Drive
- Accessories

The technical data have been provided on the following pages according to reactor sizes and marked in different colors.

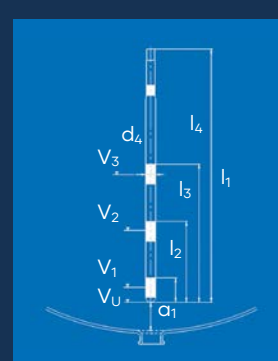
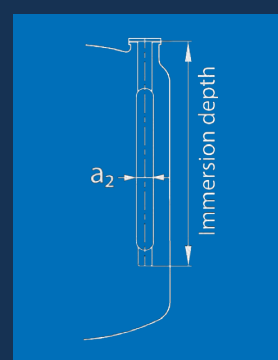
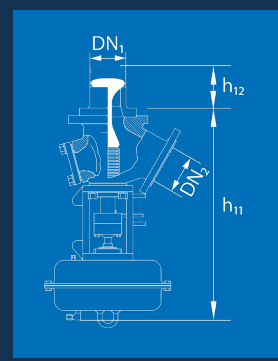
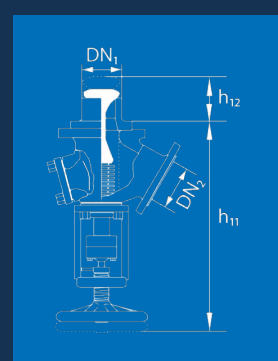
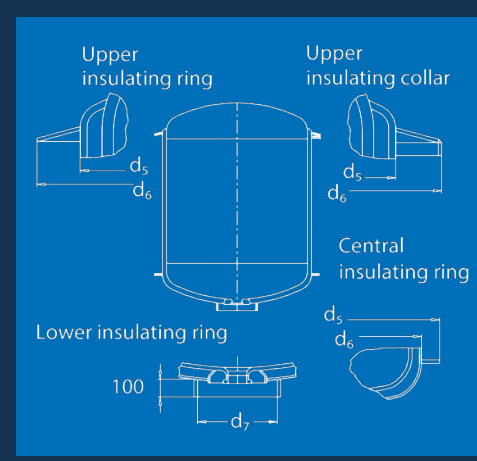
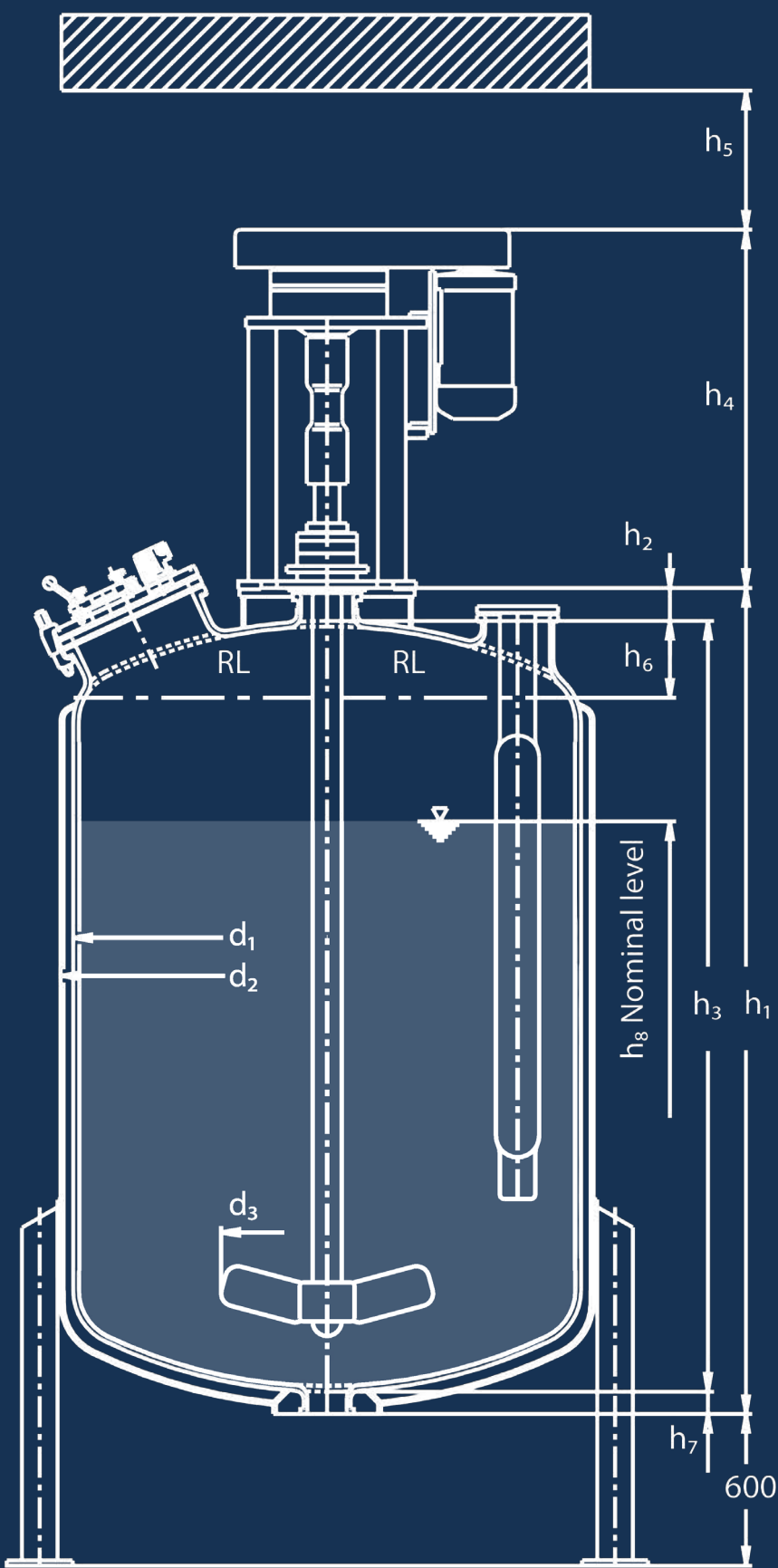
### Supporting structures

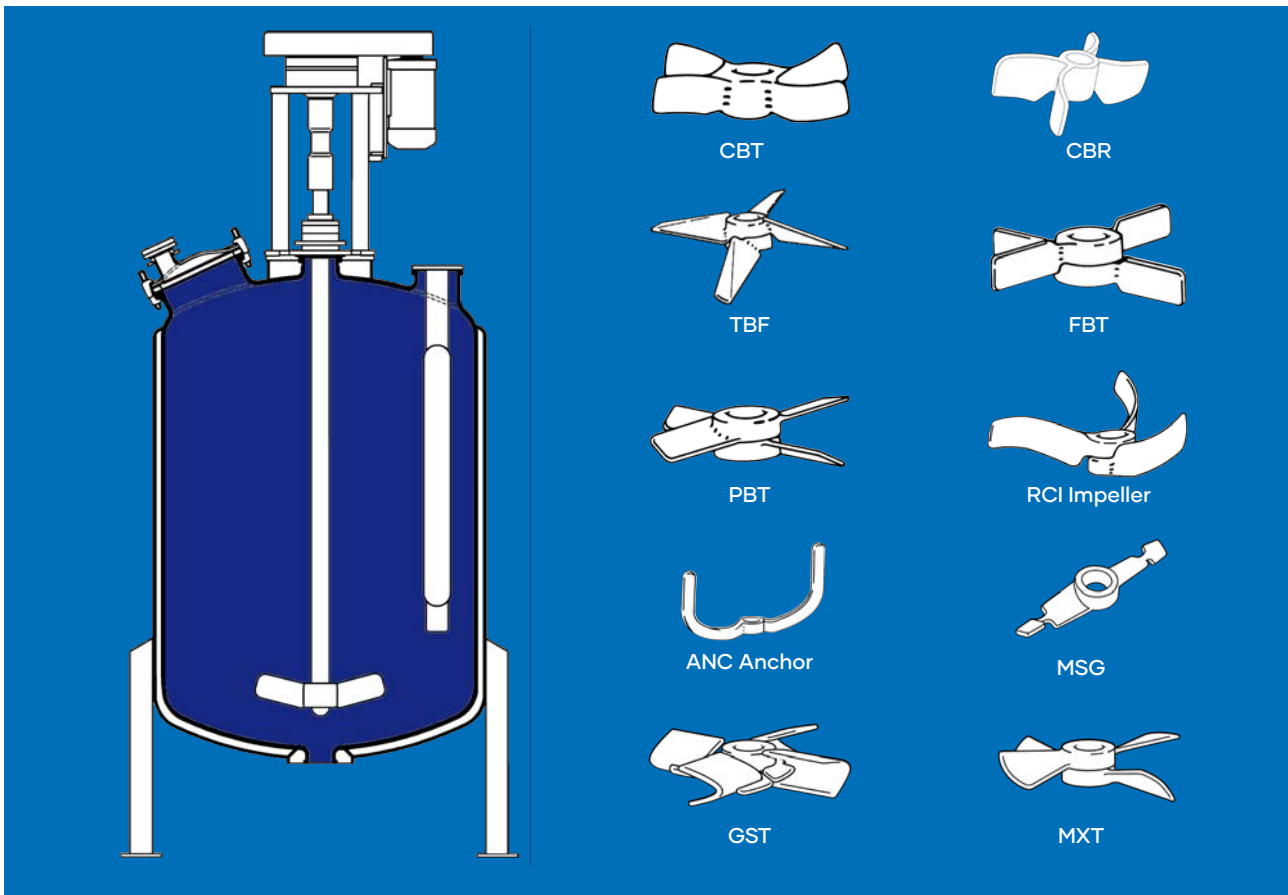
All reactors are available with the following supporting structures:

- rim-shaped support ring to DIN 28145-4
- ribbed support ring without loose ring to DIN 28145-4, design A
- ribbed support ring with loose ring to DIN 28145-4, design D
- brackets
- tubular feet to DIN of 28145-8 (up to BE 6,300)
- profiled steel feet to DIN of 28145-8









# Reactor System BE

## Technical information

### Reactor

- Inner vessel form BE to DIN 28136.  
The reactors size BE 10,000, BE 12,500 and BE 16,000 with a diameter of 2,600 are manufactured with larger baffling nozzles DN300 (N4 and N9) contrary to the DIN standard
- Jacket
- Agitator flange to DIN 28137-2
- Split flanges to DIN 28150
- Gaskets for glass-lined nozzles to DIN 28148 optionally with gasket insert made of AF3000, AF3000m or GR3000

### Jacket connections

to DIN EN 28151-1, optionally:

- In position A1/A2, without agitating nozzles
- In position B1/B2, with agitating nozzles; the agitating nozzles are included in the part numbers

### Manhole unit

The manhole unit is available in two different designs:

- Glasslook® with up to two fused-in sight glasses DN 100 and an optional lamp.
- Fillook® with Fillook® cover DN 150 and fused-in sight glass DN 100.
- Fillook® Multiport with Fillook® cover DN 150 as well as separate fused-in sight glass DN 100; with lamp (optional) and two additional flange connections DN 50 PN 16.
- Folding manhole cover with opening device to DIN 28153-1, form KE1, sight glass DN 100 to DIN 28121, form EB, and manhole protection ring to DIN 28153-1.
- Manhole cover with swiveling device to DIN 28153-1, form SE 1, sight glass DN 100 to DIN 28121, form EB, and manhole protection ring to DIN 28153-1.

Glasslook®, Fillook® or Fillook® Multiport are optionally available in different designs.

### Coating system

Rust-proofing aluchrome primer, 2 layers, 60 µm minimum dry layer thickness, temperature resistance -25/+200 °C

## Agitators

Specifically for the BE reactor to DIN: Cryo-Lock®, the flexible agitator system made by Pfaudler:

- A shaft to which different turbines can be attached quickly and easily depending on the process requirements. Great selection of agitator shapes, including multi-step turbine arrangements, are possible.
- The economical system: Energy-saving turbine shapes. Quick, low-cost turbine replacement with shaft installed and drive unit in place. Turbines are introduced through the manhole. Shaft replacement can also be achieved through the manhole with most types.
- The safe system: The manhole is the biggest opening - shorter gasket length, higher resistance to pressure, lower leakage rate.

## Turbines

**CBT** The universal stirrer, high shearing force, radial flow.

**CBR** The turbine for residual quantities, stirring properties similar to CBT; in connection with an extended shaft, the stirrable residual quantity is dramatically reduced compared to the CBT turbine.

**TBF** The economical turbofoil: high axial flow with comparatively low baffling effect, low torques/low power consumption.

**FBT** High shearing forces, pure radial flow

**PBT** Medium shearing force, combined radial/axial flow.

**RCI** The „classic“ impeller in a modern shape: strong radial flow, relatively strong baffling equipment required.

**ANC** The anchor-type agitator for highly viscous products, low shearing forces, tangential flow, high torque.

**MSG** Multi-step countercurrent agitator, suitable for homogenization and suspension.

**GST** The gas dispersion turbine, especially suitable for mixing gases and fluids, superior homogeneity of gas admixture.

**MXT** Maxflow turbine, high-performance agitator for mixing substances with a higher viscosity.

Single or multistorage configurations can be proposed. The Pfaudler mixing department will recommend the optimal agitator and turbine configuration for each process.

## Baffles

- Paddle type in flange design
- C baffle in flange design
- Quatro-Pipe, a multifunctional baffle performing up to four functions in a single reactor nozzle
- Baffling function - like a flange-type baffle with homogeneous baffling effect
- Dip pipe function
- Temperature monitoring
- Glass monitoring reports glass damages inside the reactor (as an option).

## Drives

- Top-mounted belt drives or direct drives
- Connections for reactors to DIN 28136 with a capacity of 63 ... 40,000l
- For agitator flanges to DIN 28137-2
- Easy to access from all sides through open profile construction
- Quick replacement of mechanical seal
- Gearbox with reduced-noise toothing
- Long life through reinforced bearings
- Minimum axial and radial play

The agitators comply with the requirements of the Explosion Protection Directive 94/9/EC (ATEX).

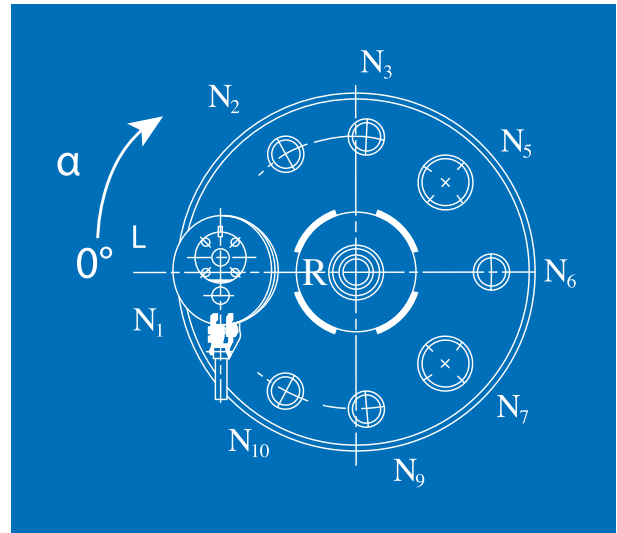
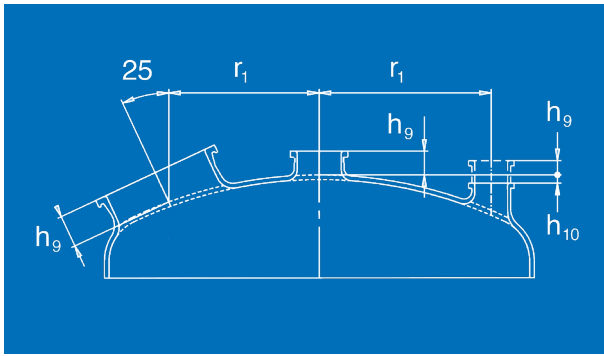
## Mechanical seal

- Double-acting with two sets of primary rings
- Additional emergency gasket
- Chambered gasket between mechanical seal and intermediate flange
- Integrated cooling jacket - the cooling and sealing functions have been separated. Cooling is ensured even if the seal runs dry.
- Low-maintenance operation, long useful life
- Modular design: Basic types can be scaled as necessary
- The accessory set, consisting of a glasslined intermediate flange, gaskets and a thermomanometer for all mechanical seals.

## Motors

Motors are rated according to real media physical properties and operating conditions.





# BE 1600

## Reactor specifications

Nominal Volume	1600l
Overall Capacity	2309l
Overall Jacket Capacity	353l
Heat Exchange Surface	7,33m <sup>2</sup>
Total Weight	approx. 3000 kg

## Baffles/Quatro Pipe

Quatro-Pipe for nozzle	DN200
Immersion depth (ET):	1550mm
Width of baffle (a <sub>2</sub> ):	180mm
Volume below Quatro Pipe/baffle:	290l

## Insulation

[mm]

Design	d <sub>5</sub>	d <sub>6</sub>	d <sub>7</sub>
Upper insulating ring	1500	1700	-
Upper insulating collar	1500	1700	-
Central insulating ring	1500	1700	-
Lower insulating ring	-	-	500

## Main dimensions

[mm]

h <sub>1</sub>	h <sub>2</sub>	h <sub>3</sub>	h <sub>4</sub>	h <sub>5</sub>
1973	100	1800	1210	525
h <sub>6</sub>	h <sub>7</sub>	h <sub>8</sub>	d <sub>1</sub>	d <sub>2</sub>
236	73	1180	1400	1500

## Agitator shafts

[mm]

Number of honed areas	d <sub>4</sub> [mm]	a <sub>1</sub> [mm]	l <sub>1</sub> [mm]	l <sub>2</sub> [mm]	l <sub>3</sub> [mm]	l <sub>4</sub> [mm]	V <sub>y</sub> [l]	V <sub>1</sub> [l]	V <sub>2</sub> [l]	V <sub>3</sub> [l]
1	65	198	2160	210	-	-	161	333	-	-
2	65	198	2160	210	650	-	161	333	978	-
3	65	198	2160	210	500	790	161	333	758	1183
1	65	60	2300	210	-	-	16*	134	-	-

\* for turbine type CBR and anchor type agitators

## Nozzle arrangement

[mm]

	DN	α°	r <sub>1</sub>	h <sub>9</sub>
N1	500	0	475	125
N2	100	60	575	25
N3	100	95	575	25
N5	200	135	550	50
N6	100	180	575	25
N7	200	225	550	50
N9	100	265	575	25
N10	100	300	575	25
L	100	0		
R	150	-	Center	80
K	100	-	Center	-

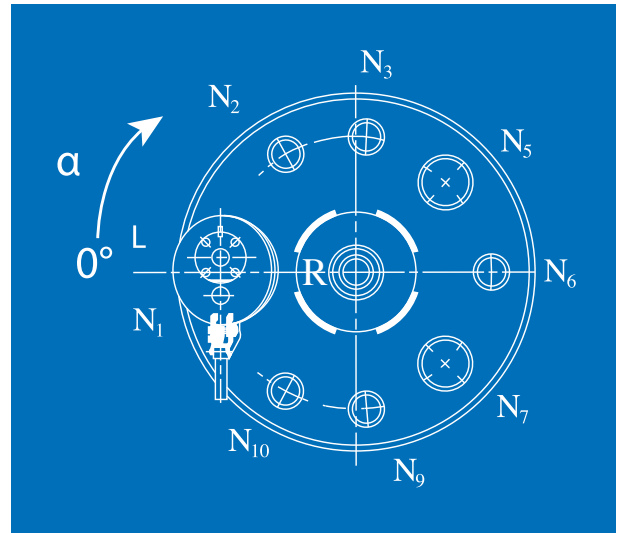
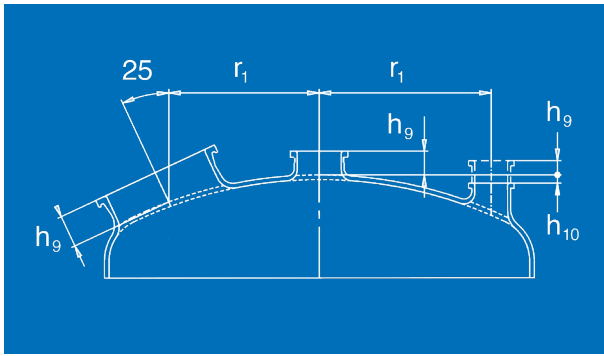
\* K is the bottom outlet nozzle

## Turbines

[mm]

Type	d <sub>3</sub>	d <sub>4</sub>
CBT	735	65
CBR	735	65
TBF	760	65
FBT	685	65
PBT	685	65
RCI	840	65
MSG	750	65
GST	600	65
MXT	600	65

Protection of honed area made of FEP



# BE 2500

## Reactor specifications

Nominal Volume	2500l
Overall Capacity	3472l
Overall Jacket Capacity	453l
Heat Exchange Surface	9,61m <sup>2</sup>
Total Weight	approx. 3870 kg

## Baffles/Quatro Pipe

Quatro-Pipe for nozzle	DN200
Immersion depth (ET):	1750 mm
Width of baffle (a <sub>2</sub> ):	180 mm
Volume below Quatro Pipe/baffle:	457l

## Insulation

[mm]

Design	d <sub>5</sub>	d <sub>6</sub>	d <sub>7</sub>
Upper insulating ring	1700	1900	-
Upper insulating collar	1700	1900	-
Central insulating ring	1700	1900	-
Lower insulating ring	-	-	500

## Main dimensions

[mm]

h <sub>1</sub>	h <sub>2</sub>	h <sub>3</sub>	h <sub>4</sub>	h <sub>5</sub>
2232	100	2060	1210	525

h <sub>6</sub>	h <sub>7</sub>	h <sub>8</sub>	d <sub>1</sub>	d <sub>2</sub>
259	72	1405	1600	1700

## Agitator shafts

[mm]

Number of honed areas	d <sub>4</sub> [mm]	a <sub>1</sub> [mm]	l <sub>1</sub> [mm]	l <sub>2</sub> [mm]	l <sub>3</sub> [mm]	l <sub>4</sub> [mm]	V <sub>u</sub> [l]	V <sub>1</sub> [l]	V <sub>2</sub> [l]	V <sub>3</sub> [l]
1	65	202	2415	210	-	-	195	419	-	-
2	65	202	2415	210	760	-	195	419	1476	-
3	65	202	2415	210	580	950	195	419	1130	1841
1	65	60	2555	210	-	-	18*	156	-	-

\* for turbine type CBR and anchor type agitators

## Nozzle arrangement

[mm]

	DN	α°	r <sub>1</sub>	h <sub>9</sub>
N1	500	0	550	125
N2	100	65	675	10
N3	100	95	675	10
N5	200	135	625	50
N6	100	180	675	10
N7	200	225	625	50
N9	100	265	675	10
N10	100	295	675	10
L	100	0		
R	150	-	Center	80
K	100	-	Center	-

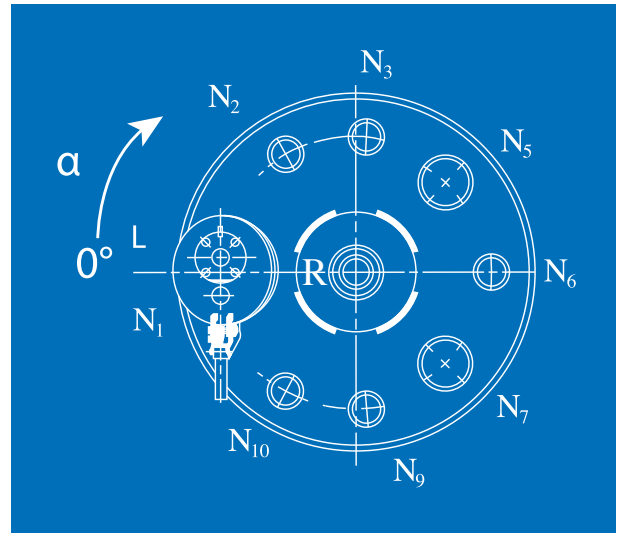
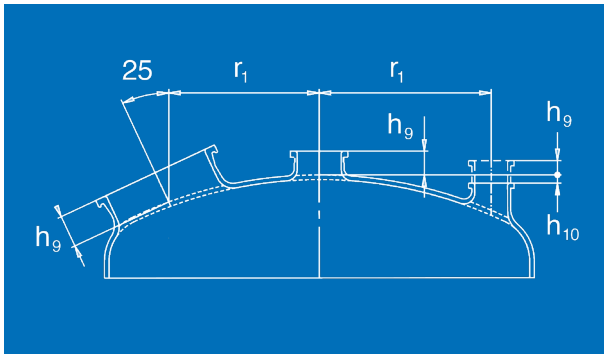
\* K is the bottom outlet nozzle

## Turbines

[mm]

Type	d <sub>3</sub>	d <sub>4</sub>
CBT	735	65
CBR	735	65
TBF	760	65
FBT	685	65
PBT	685	65
RCI	960	65
MSG	750	65
GST	600	65
MXT	600	65

Protection of honed area made of FEP



# BE 4000

## Reactor specifications

Nominal Volume	4000l
Overall Capacity	5390l
Overall Jacket Capacity	605l
Heat Exchange Surface	13,23m <sup>2</sup>
Total Weight	approx. 5910 kg

## Baffles/Quatro Pipe

Quatro-Pipe for nozzle	DN250
Immersion depth (ET):	2100mm
Width of baffle (a <sub>2</sub> ):	180mm
Volume below Quatro Pipe/baffle:	730l

## Insulation

[mm]

Design	d <sub>5</sub>	d <sub>6</sub>	d <sub>7</sub>
Upper insulating ring	1900	2100	-
Upper insulating collar	1900	2100	-
Central insulating ring	1900	2100	-
Lower insulating ring	-	-	500

## Main dimensions

[mm]

h <sub>1</sub>	h <sub>2</sub>	h <sub>3</sub>	h <sub>4</sub>	h <sub>5</sub>
2700	130	2500	1418	590

h <sub>6</sub>	h <sub>7</sub>	h <sub>8</sub>	d <sub>1</sub>	d <sub>2</sub>
299	70	1760	1800	1900

## Agitator shafts

[mm]

Number of honed areas	d <sub>4</sub> [mm]	a <sub>1</sub> [mm]	l <sub>1</sub> [mm]	l <sub>2</sub> [mm]	l <sub>3</sub> [mm]	l <sub>4</sub> [mm]	V <sub>y</sub> [l]	V <sub>1</sub> [l]	V <sub>2</sub> [l]	V <sub>3</sub> [l]
1	114,3	200	2950	280	-	-	218	604	-	-
2	114,3	200	2950	280	1010	-	218	604	2380	-
3	114,3	200	2950	280	770	1260	218	604	1796	2988
1	114,3	60	3090	280	-	-	20*	271	-	-

\* for turbine type CBR and anchor type agitators

## Nozzle arrangement

[mm]

	DN	α°	r <sub>1</sub>	h <sub>9</sub>
N1	500	0	630	150
N2	150	65	725	0
N3	150	95	725	0
N5	250	135	675	25
N6	150	180	725	0
N7	250	225	675	25
N9	150	265	725	0
N10	150	295	725	0
L	100	0		
R	200	-	Center	110
K	100	-	Center	-

\* K is the bottom outlet nozzle

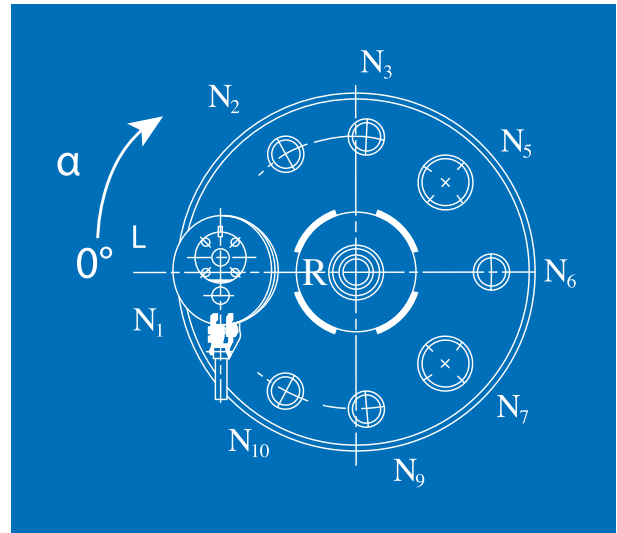
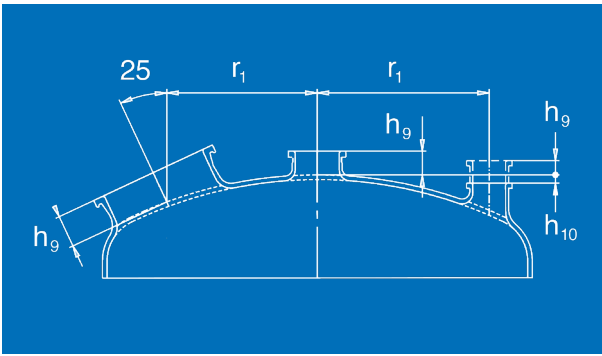
## Turbines

[mm]

Type	d <sub>3</sub>	d <sub>4</sub>
CBT	835	114,3
CBR	835	114,3
TBF	990	114,3
FBT	685	114,3
PBT	685	114,3
RCI	1100	114,3
MSG	900	114,3
GST	760	114,3
MXT	760	114,3

Protection of honed area made of FEP





# BE 6300

## Reactor specifications

Nominal Volume	6300l
Overall Capacity	8190l
Overall Jacket Capacity	795l
Heat Exchange Surface	18,02m <sup>2</sup>
Total Weight	approx. 8150 kg

## Baffles/Quatro Pipe

Quatro-Pipe for nozzle	DN250
Immersion depth (ET):	2660mm
Width of baffle (a <sub>2</sub> ):	180mm
Volume below Quatro Pipe/baffle:	788l

## Insulation

[mm]

Design	d <sub>5</sub>	d <sub>6</sub>	d <sub>7</sub>
Upper insulating ring	2100	2300	-
Upper insulating collar	2100	2300	-
Central insulating ring	2100	2300	-
Lower insulating ring	-	-	550

## Main dimensions

[mm]

h <sub>1</sub>	h <sub>2</sub>	h <sub>3</sub>	h <sub>4</sub>	h <sub>5</sub>
3218	130	3000	1418	590

h <sub>6</sub>	h <sub>7</sub>	h <sub>8</sub>	d <sub>1</sub>	d <sub>2</sub>
464	88	2385	2200	2300

## Agitator shafts

[mm]

Number of honed areas	d <sub>4</sub> [mm]	a <sub>1</sub> [mm]	l <sub>1</sub> [mm]	l <sub>2</sub> [mm]	l <sub>3</sub> [mm]	l <sub>4</sub> [mm]	V <sub>u</sub> [l]	V <sub>1</sub> [l]	V <sub>2</sub> [l]	V <sub>3</sub> [l]
1	114,3	253	3395	280	-	-	337	851	-	-
2	114,3	253	3395	280	1280	-	337	851	4482	-
3	114,3	253	3395	280	950	1620	337	851	3282	5719
1	114,3	80	3565	280	-	-	35*	316	-	-

\* for turbine type CBR and anchor type agitators

## Nozzle arrangement

[mm]

	DN	α°	r <sub>1</sub>	h <sub>9</sub>
N1	500	0	700	150
N2	150	60	800	0
N3	150	95	800	0
N5	250	135	750	25
N6	150	180	800	0
N7	250	225	750	25
N9	150	265	800	0
N10	150	300	800	0
L	100	0		
R	200	-	Center	110
K	150	-	Center	-

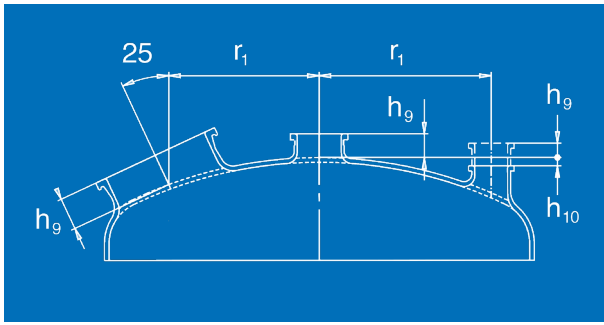
\* K is the bottom outlet nozzle

## Turbines

[mm]

Type	d <sub>3</sub>	d <sub>4</sub>
CBT	835	114,3
CBR	835	114,3
TBF	990	114,3
FBT	890	114,3
PBT	890	114,3
RCI	1100	114,3
MSG	1000	114,3
GST	760	114,3
MXT	760	114,3

Protection of honed area made of FEP



# BE 8000

diameter 2200

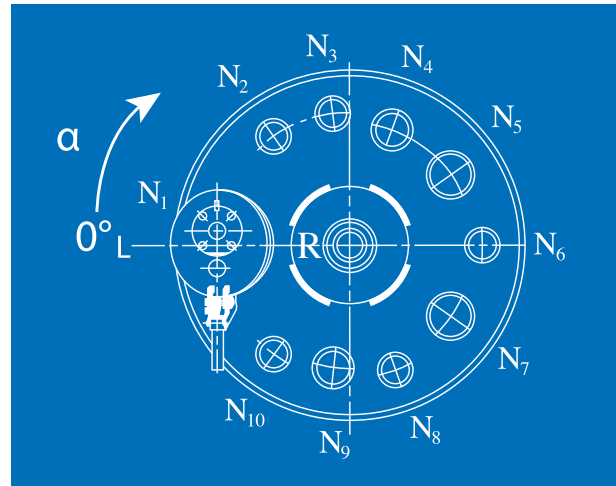
## Reactor specifications

Nominal Volume	8000 l
Overall Capacity	9367 l
Overall Jacket Capacity	800 l
Heat Exchange Surface	18,01 m <sup>2</sup>
Total Weight	8600 kg

## Insulation

[mm]

Design	d <sub>5</sub>	d <sub>6</sub>	d <sub>7</sub>
Upper insulating ring	2300	2500	-
Upper insulating collar	2300	2500	-
Central insulating ring	2300	2500	-
Lower insulating ring	-	-	550



## Baffles/Quatro Pipe

Quatro-Pipe for nozzle	DN300
Immersion depth (ET):	2600 mm
Width of baffle (α <sub>2</sub> ):	260 mm
Volume below Quatro Pipe/baffle:	783 l

## Main dimensions

[mm]

h <sub>1</sub>	h <sub>2</sub>	h <sub>3</sub>	h <sub>4</sub>	h <sub>5</sub>
3218	130	3000	1418	590

h <sub>6</sub>	h <sub>7</sub>	h <sub>8</sub>	d <sub>1</sub>	d <sub>2</sub>
464	88	2385	2200	2300

## Agitator shafts

[mm]

Number of honed areas	d <sub>4</sub> [mm]	α <sub>1</sub> [mm]	l <sub>1</sub> [mm]	l <sub>2</sub> [mm]	l <sub>3</sub> [mm]	l <sub>4</sub> [mm]	V <sub>u</sub> [l]	V <sub>1</sub> [l]	V <sub>2</sub> [l]	V <sub>3</sub> [l]
1	114,3	200	3395	280	-	-	337	851	-	-
2	114,3	200	3395	280	1280	-	337	851	4482	-
3	114,3	200	3395	280	950	1620	337	851	3282	5719
1	114,3	60	3395	280	-	-	35*	316	-	-

\* for turbine type CBR and anchor type agitators

## Nozzle arrangement

[mm]

	DN	α°	r <sub>1</sub>	h <sub>9</sub>	h <sub>10</sub>
N1	600	0	800	150	-
N2	150	50	840	-	40
N3	150	77,5	840	-	40
N4	150	110	840	-	40
N5	300	145	800	10	-
N6	150	180	840	-	40
N7	300	215	800	10	-
N8	150	250	840	-	40
N9	150	282,5	840	-	40
N10	150	310	840	-	40
L	100	0			
R	200	-	Center	110	
K	150	-	Center	-	

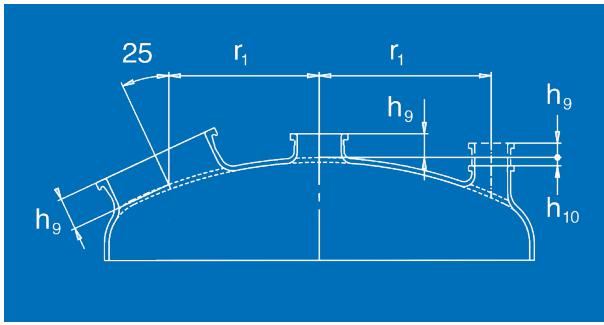
\* K is the bottom outlet nozzle

## Turbines

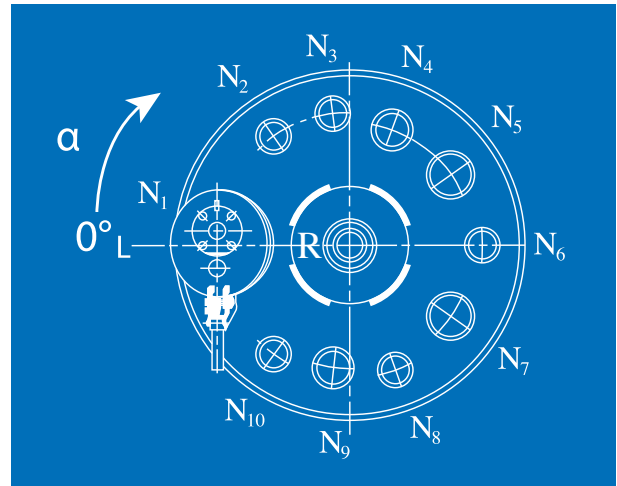
[mm]

Type	d <sub>5</sub>	d <sub>4</sub>
CBT	1040	114,3
CBR	1040	114,3
TBF	990	114,3
FBT	890	114,3
PBT	890	114,3
RCI	1100	114,3
MSG	1000	114,3
GST	960	114,3
MXT	960	114,3

Protection of honed area made of FEP



# BE 10.000



## Reactor specifications

Nominal Volume	10000l
Overall Capacity	11768l
Overall Jacket Capacity	911l
Heat Exchange Surface	20,75 m <sup>2</sup>
Total Weight	11170 kg

## Baffles/Quatro Pipe

Quatro-Pipe for nozzle	DN300
Immersion depth (ET):	2600 mm
Width of baffle (α <sub>2</sub> ):	260 mm
Volume below Quatro Pipe/baffle:	1460l

## Insulation [mm]

Design	d <sub>5</sub>	d <sub>6</sub>	d <sub>7</sub>
Upper insulating ring	2500	2700	-
Upper insulating collar	2500	2700	-
Central insulating ring	2500	2700	-
Lower insulating ring	-	-	550

## Main dimensions [mm]

h <sub>1</sub>	h <sub>2</sub>	h <sub>3</sub>	h <sub>4</sub>	h <sub>5</sub>
3401	135	3180	1723	680

h <sub>6</sub>	h <sub>7</sub>	h <sub>8</sub>	d <sub>1</sub>	d <sub>2</sub>
521	86	2510	2400	2500

## Agitator shafts [mm]

Number of honed areas	d <sub>4</sub> [mm]	α <sub>1</sub> [mm]	l <sub>1</sub> [mm]	l <sub>2</sub> [mm]	l <sub>3</sub> [mm]	l <sub>4</sub> [mm]	V <sub>4</sub> [l]	V <sub>1</sub> [l]	V <sub>2</sub> [l]	V <sub>3</sub> [l]
1	114,3	251	3670	280	-	-	363	944	-	-
2	114,3	251	3670	280	1350	-	363	944	5557	-
3	114,3	251	3670	280	990	1700	363	944	3998	7073
1	114,3	80	3840	280	-	-	38*	347	-	-

\* for turbine type CBR and anchor type agitators

## Nozzle arrangement [mm]

	DN	α°	r <sub>1</sub>	h <sub>9</sub>	h <sub>10</sub>
N1	600	0	850	150	-
N2	200	55	925	-	40
N3	200	82,5	925	-	40
N4	300	110	900	-	15
N5	300	145	900	-	15
N6	200	180	925	-	40
N7	300	215	900	-	15
N8	200	250	925	-	40
N9	300	277,5	900	-	15
N10	200	305	925	-	40
L	100	0			
R	250	-	Center	111	
K	150	-	Center	-	

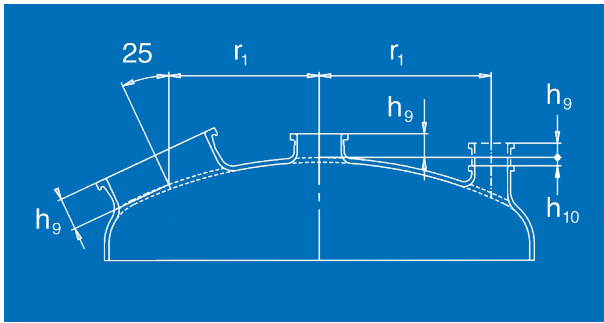
\* K is the bottom outlet nozzle

## Turbines [mm]

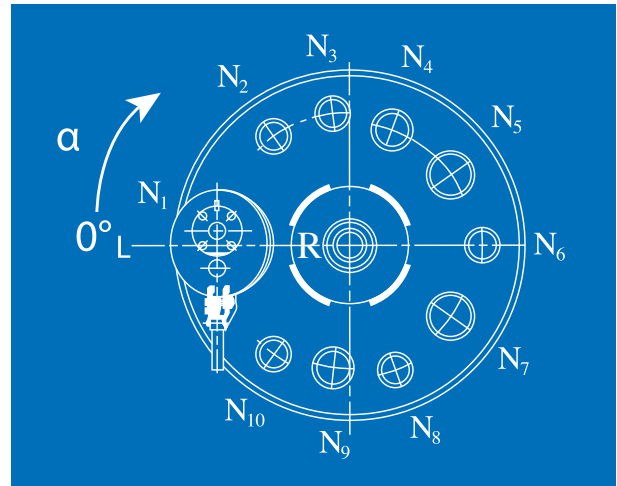
Type	d <sub>5</sub>	d <sub>4</sub>
CBT	1040	114,3
CBR	1040	114,3
TBF	1220	114,3
FBT	1090	114,3
PBT	1090	114,3
RCI	1300	114,3
MSG	1200	114,3
GST	960	114,3
MXT	960	114,3

Protection of honed area made of FEP





# BE 12.500



## Reactor specifications

Nominal Volume	12500l
Overall Capacity	14360l
Overall Jacket Capacity	1199l
Heat Exchange Surface	25,27 m <sup>2</sup>
Total Weight	12690 kg

## Baffles/Quatro Pipe

Quatro-Pipe for nozzle	DN300
Immersion depth (ET):	3300 mm
Width of baffle (α <sub>2</sub> ):	260 mm
Volume below Quatro Pipe/baffle:	1043l

## Insulation [mm]

Design	d <sub>5</sub>	d <sub>6</sub>	d <sub>7</sub>
Upper insulating ring	2500	2700	-
Upper insulating collar	2500	2700	-
Central insulating ring	2500	2700	-
Lower insulating ring	-	-	550

## Main dimensions [mm]

h <sub>1</sub>	h <sub>2</sub>	h <sub>3</sub>	h <sub>4</sub>	h <sub>5</sub>
4001	135	3780	1723	680

h <sub>6</sub>	h <sub>7</sub>	h <sub>8</sub>	d <sub>1</sub>	d <sub>2</sub>
521	86	3090	2400	2500

## Agitator shafts [mm]

Number of honed areas	d <sub>4</sub> [mm]	α <sub>1</sub> [mm]	l <sub>1</sub> [mm]	l <sub>2</sub> [mm]	l <sub>3</sub> [mm]	l <sub>4</sub> [mm]	V <sub>4</sub> [l]	V <sub>1</sub> [l]	V <sub>2</sub> [l]	V <sub>3</sub> [l]
1	114,3	251	4270	280	-	-	363	944	-	-
2	114,3	251	4270	280	1640	-	363	944	6813	-
3	114,3	251	4270	280	1180	2080	363	944	4821	8718
1	114,3	80	4440	280	-	-	38*	347	-	-

\* for turbine type CBR and anchor type agitators

## Nozzle arrangement [mm]

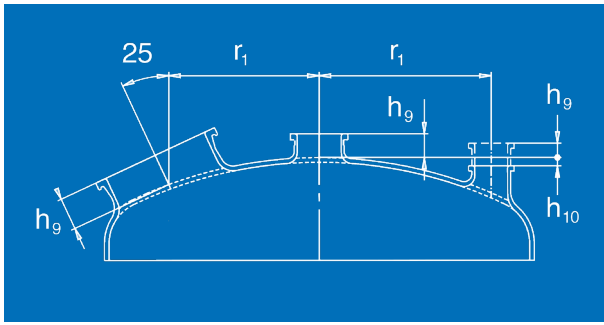
	DN	α°	r <sub>1</sub>	h <sub>9</sub>	h <sub>10</sub>
N1	600	0	850	150	-
N2	200	55	925	-	40
N3	200	82,5	925	-	40
N4	300	110	900	-	15
N5	300	145	900	-	15
N6	200	180	925	-	40
N7	300	215	900	-	15
N8	200	250	925	-	40
N9	300	277,5	900	-	15
N10	200	305	925	-	40
L	100	0			
R	250	-	Center	110	
K	150	-	Center	-	

\* K is the bottom outlet nozzle

## Turbines [mm]

Type	d <sub>5</sub>	d <sub>4</sub>
CBT	1040	114,3
CBR	1040	114,3
TBF	1220	114,3
FBT	1090	114,3
PBT	1090	114,3
RCI	1300	114,3
MSG	1200	114,3
GST	960	114,3
MXT	960	114,3

Protection of honed area made of FEP



# BE 16.000

diameter 2600

## Reactor specifications

Nominal Volume	16000l
Overall Capacity	18200l
Overall Jacket Capacity	1451l
Heat Exchange Surface	29,56 m <sup>2</sup>
Total Weight	15010 kg

## Insulation

[mm]

Design	d <sub>5</sub>	d <sub>6</sub>	d <sub>7</sub>
Upper insulating ring	2700	2900	-
Upper insulating collar	2700	2900	-
Central insulating ring	2700	2900	-
Lower insulating ring	-	-	550

## Agitator shafts

[mm]

Number of honed areas	d <sub>4</sub> [mm]	α <sub>1</sub> [mm]	l <sub>1</sub> [mm]	l <sub>2</sub> [mm]	l <sub>3</sub> [mm]	l <sub>4</sub> [mm]	V <sub>U</sub> [l]	V <sub>1</sub> [l]	V <sub>2</sub> [l]	V <sub>3</sub> [l]
1	114,3	250	4570	280	-	-	392	1036	-	-
2	114,3	250	4570	280	1770	-	392	1036	8591	-
3	114,3	250	4570	280	1280	2280	392	1036	6093	11192
1	114,3	80	4740	280	-	-	41*	377	-	-

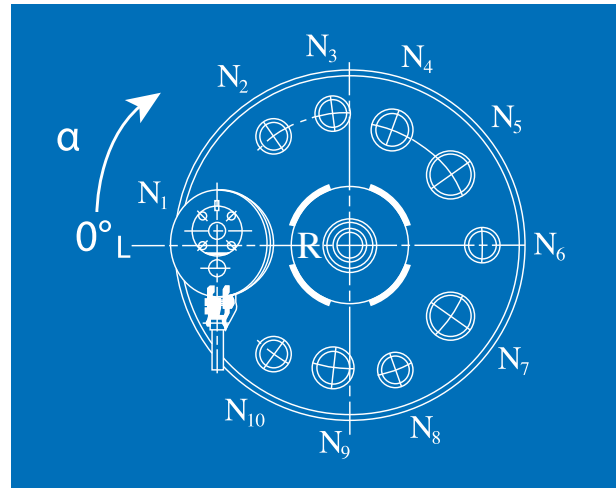
\* for turbine type CBR and anchor type agitators

## Nozzle arrangement

[mm]

	DN	α°	r <sub>1</sub>	h <sub>9</sub>	h <sub>10</sub>
N1	600	0	900	150	-
N2	200	55	1025	-	65
N3	200	82,5	1025	-	65
N4	300	110	950	-	20
N5	300	145	950	-	20
N6	200	180	1025	-	65
N7	300	215	950	-	20
N8	200	250	1025	-	65
N9	300	277,5	950	-	20
N10	200	305	1025	-	65
L	100	0			
R	250	-	Center	110	
K	150	-	Center	-	

\* K is the bottom outlet nozzle



## Baffles/Quatro Pipe

Quatro-Pipe for nozzle	DN300
Immersion depth (ET):	3600 mm
Width of baffle (α <sub>2</sub> ):	260 mm
Volume below Quatro Pipe/baffle:	1174 l

## Main dimensions

[mm]

h <sub>1</sub>	h <sub>2</sub>	h <sub>3</sub>	h <sub>4</sub>	h <sub>5</sub>
4300	135	4080	1723	680

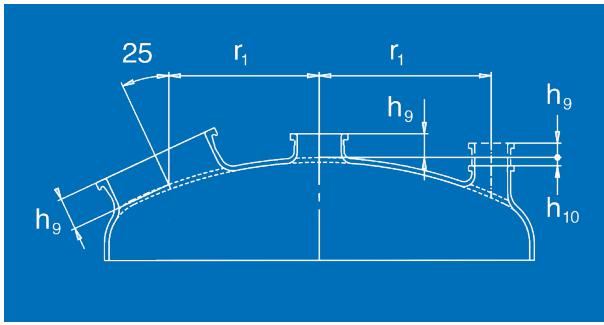
h <sub>6</sub>	h <sub>7</sub>	h <sub>8</sub>	d <sub>1</sub>	d <sub>2</sub>
573	86	3370	2600	2700

## Turbines

[mm]

Type	d <sub>3</sub>	d <sub>4</sub>
CBT	1120	114,3
CBR	1120	114,3
TBF	1220	114,3
FBT	1090	114,3
PBT	1090	114,3
RCI	1350	114,3
MSG	1200	114,3
GST	960	114,3
MXT	960	114,3

Protection of honed area made of FEP



# BE 16.000

diameter 2800

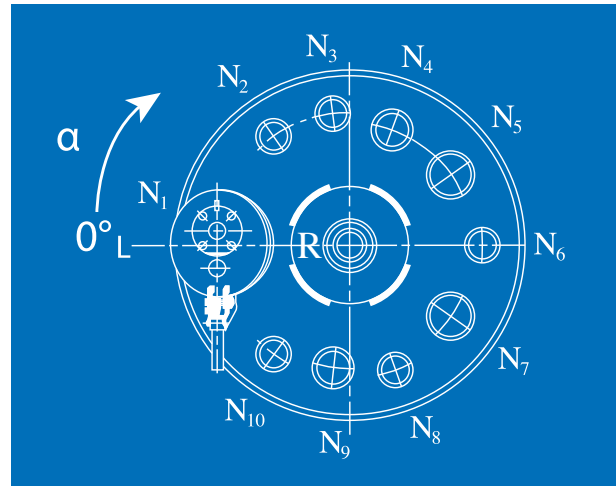
## Reactor specifications

Nominal Volume	16000l
Overall Capacity	18699l
Overall Jacket Capacity	1362l
Heat Exchange Surface	28,24 m <sup>2</sup>
Total Weight	16925 kg

## Insulation

[mm]

Design	d <sub>5</sub>	d <sub>6</sub>	d <sub>7</sub>
Upper insulating ring	2900	3100	-
Upper insulating collar	2900	3100	-
Central insulating ring	2900	3100	-
Lower insulating ring	-	-	550



## Baffles/Quatro Pipe

Quatro-Pipe for nozzle	DN300
Immersion depth (ET):	3100 mm
Width of baffle (α <sub>2</sub> ):	280 mm
Volume below Quatro Pipe/baffle:	1999l

## Main dimensions

[mm]

h <sub>1</sub>	h <sub>2</sub>	h <sub>3</sub>	h <sub>4</sub>	h <sub>5</sub>
3924	135	3705	1848	680

h <sub>6</sub>	h <sub>7</sub>	h <sub>8</sub>	d <sub>1</sub>	d <sub>2</sub>
634	84	2945	2800	2900

## Agitator shafts

[mm]

Number of honed areas	d <sub>4</sub> [mm]	α <sub>1</sub> [mm]	l <sub>1</sub> [mm]	l <sub>2</sub> [mm]	l <sub>3</sub> [mm]	l <sub>4</sub> [mm]	V <sub>4</sub> [l]	V <sub>1</sub> [l]	V <sub>2</sub> [l]	V <sub>3</sub> [l]
1	139,7	252	4190	330	-	-	430	1295	-	-
2	139,7	252	4190	330	1600	-	430	1295	8752	-
3	139,7	252	4190	330	1180	2030	430	1295	6268	11295
1	139,7	80	4360	330	-	-	45*	510	-	-

\* for turbine type CBR and anchor type agitators

## Nozzle arrangement

[mm]

	DN	α°	r <sub>1</sub>	h <sub>9</sub>	h <sub>10</sub>
N1	600	0	1000	150	-
N2	200	55	1100	-	75
N3	200	77,5	1100	-	75
N4	300	110	1000	-	5
N5	400	145	1000	-	5
N6	200	180	1100	-	75
N7	400	215	1000	-	5
N8	200	250	1100	-	75
N9	300	282,5	1000	-	5
N10	200	310	1100	-	75
L	100	0			
R	250	-	Center	111	
K	150	-	Center	-	

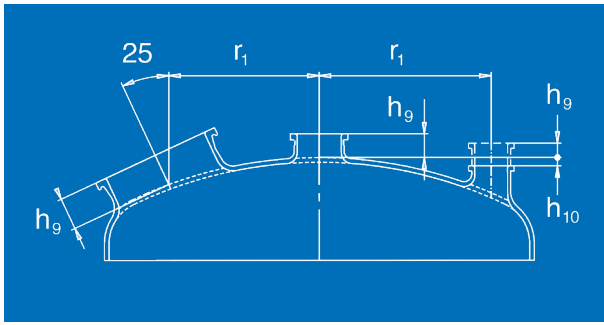
\* K is the bottom outlet nozzle

## Turbines

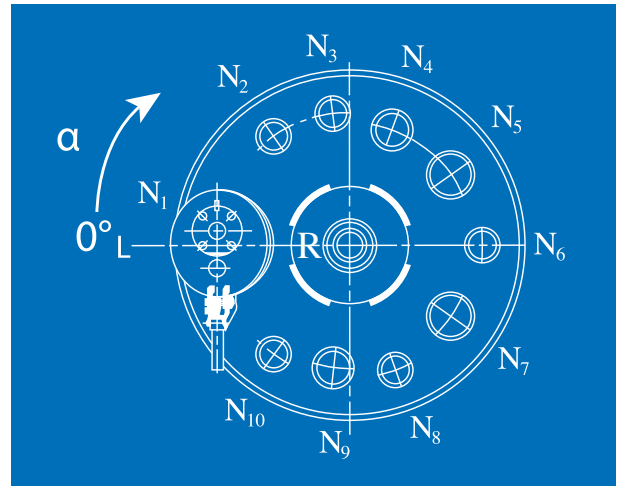
[mm]

Type	d <sub>3</sub>	d <sub>4</sub>
CBT	1220	139,7
CBR	1220	139,7
TBF	1420	139,7
FBT	1220	139,7
PBT	1220	139,7
RCI	1500	139,7
MSG	1200	139,7
GST	1120	139,7
MXT	1120	139,7

Protection of honed area made of FEP



# BE 20.000



## Reactor specifications

Nominal Volume	20000l
Overall Capacity	22706l
Overall Jacket Capacity	1574l
Heat Exchange Surface	34,22m <sup>2</sup>
Total Weight	19230 kg

## Baffles/Quatro Pipe

Quatro-Pipe for nozzle	DN300
Immersion depth (ET):	3700 mm
Width of baffle (α <sub>2</sub> ):	280 mm
Volume below Quatro Pipe/baffle:	2452l

## Insulation [mm]

Design	d <sub>5</sub>	d <sub>6</sub>	d <sub>7</sub>
Upper insulating ring	2900	3100	-
Upper insulating collar	2900	3100	-
Central insulating ring	2900	3100	-
Lower insulating ring	-	-	550

## Main dimensions [mm]

h <sub>1</sub>	h <sub>2</sub>	h <sub>3</sub>	h <sub>4</sub>	h <sub>5</sub>
4604	135	4385	1848	680

h <sub>6</sub>	h <sub>7</sub>	h <sub>8</sub>	d <sub>1</sub>	d <sub>2</sub>
634	84	3625	2800	2900

## Agitator shafts [mm]

Number of honed areas	d <sub>4</sub> [mm]	α <sub>1</sub> [mm]	l <sub>1</sub> [mm]	l <sub>2</sub> [mm]	l <sub>3</sub> [mm]	l <sub>4</sub> [mm]	V <sub>4</sub> [l]	V <sub>1</sub> [l]	V <sub>2</sub> [l]	V <sub>3</sub> [l]
1	139,7	252	4870	330	-	-	430	1295	-	-
2	139,7	252	4870	330	1940	-	430	1295	10749	-
3	139,7	252	4870	330	1400	2470	430	1295	7560	13879
1	139,7	80	5040	330	-	-	45*	510	-	-

\* for turbine type CBR and anchor type agitators

## Nozzle arrangement [mm]

	DN	α°	r <sub>1</sub>	h <sub>9</sub>	h <sub>10</sub>
N1	600	0	1000	150	-
N2	200	55	1100	-	75
N3	200	77,5	1100	-	75
N4	300	110	1000	-	5
N5	400	145	1000	-	5
N6	200	180	1100	-	75
N7	400	215	1000	-	5
N8	200	250	1100	-	75
N9	300	282,5	1000	-	5
N10	200	310	1100	-	75
L	100	0			
R	250	-	Center	111	
K	150	-	Center	-	

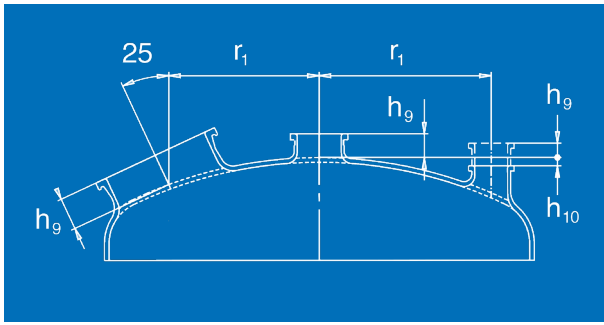
\* K is the bottom outlet nozzle

## Turbines [mm]

Type	d <sub>5</sub>	d <sub>4</sub>
CBT	1220	139,7
CBR	1220	139,7
TBF	1420	139,7
FBT	1220	139,7
PBT	1220	139,7
RCI	1500	139,7
MSG	1200	139,7
GST	1120	139,7
MXT	1120	139,7

Protection of honed area made of FEP





# BE 25.000

diameter 2800

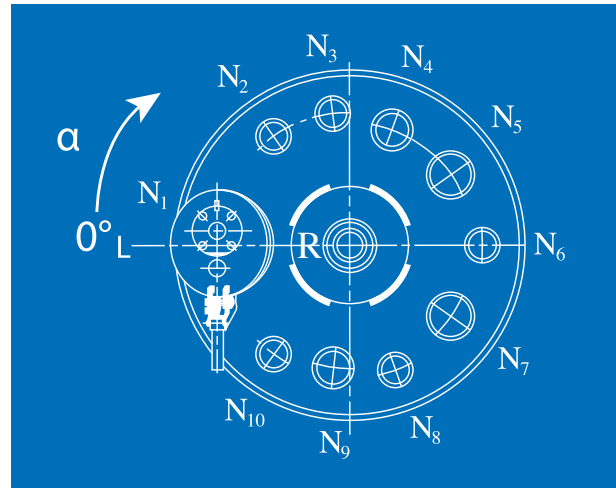
## Reactor specifications

Nominal Volume	25000l
Overall Capacity	27714l
Overall Jacket Capacity	1839l
Heat Exchange Surface	41,69m <sup>2</sup>
Total Weight	approx. 21930 kg

## Insulation

[mm]

Design	d <sub>5</sub>	d <sub>6</sub>	d <sub>7</sub>
Upper insulating ring	2900	3100	-
Upper insulating collar	2900	3100	-
Central insulating ring	2900	3100	-
Lower insulating ring	-	-	550



## Baffles/Quatro Pipe

Quatro-Pipe for nozzle	DN300
Immersion depth (ET):	4550 mm
Width of baffle (α <sub>2</sub> ):	280 mm
Volume below Quatro Pipe/baffle:	2715l

## Main dimensions

[mm]

h <sub>1</sub>	h <sub>2</sub>	h <sub>3</sub>	h <sub>4</sub>	h <sub>5</sub>
5452	135	5235	1848	680

h <sub>6</sub>	h <sub>7</sub>	h <sub>8</sub>	d <sub>1</sub>	d <sub>2</sub>
634	84	4470	2800	2900

## Agitator shafts

[mm]

Number of honed areas	d <sub>4</sub> [mm]	α <sub>1</sub> [mm]	l <sub>1</sub> [mm]	l <sub>2</sub> [mm]	l <sub>3</sub> [mm]	l <sub>4</sub> [mm]	V <sub>4</sub> [l]	V <sub>1</sub> [l]	V <sub>2</sub> [l]	V <sub>3</sub> [l]
1	139,7	252	5720	330	-	-	430	1295	-	-
2	139,7	252	5720	330	2360	-	430	1295	13245	-
3	139,7	252	5720	330	1645	2960	430	1295	9018	16795
1	139,7	80	5890	330	-	-	45*	510	-	-

\* for turbine type CBR and anchor type agitators

## Nozzle arrangement

[mm]

	DN	α°	r <sub>1</sub>	h <sub>9</sub>	h <sub>10</sub>
N1	600	0	1000	150	-
N2	200	55	1100	-	75
N3	200	77,5	1100	-	75
N4	300	110	1000	-	5
N5	400	145	1000	-	5
N6	200	180	1100	-	75
N7	400	215	1000	-	5
N8	200	250	1100	-	75
N9	300	282,5	1000	-	5
N10	200	310	1100	-	75
L	100	0			
R	250	-	Center	111	
K	150	-	Center	-	

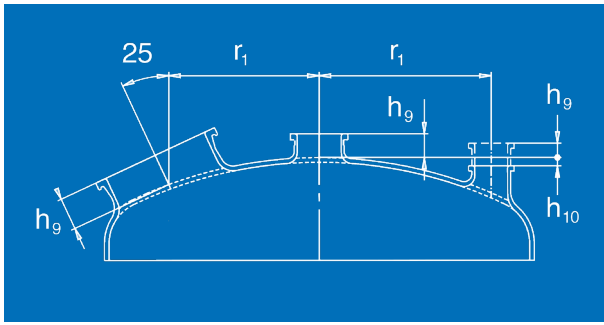
\* K is the bottom outlet nozzle

## Turbines

[mm]

Type	d <sub>3</sub>	d <sub>4</sub>
CBT	1220	139,7
CBR	1220	139,7
TBF	1420	139,7
FBT	1220	139,7
PBT	1220	139,7
RCI	1500	139,7
MSG	1200	139,7
GST	1120	139,7
MXT	1120	139,7

Protection of honed area made of FEP



# BE 25.000

diameter 3000

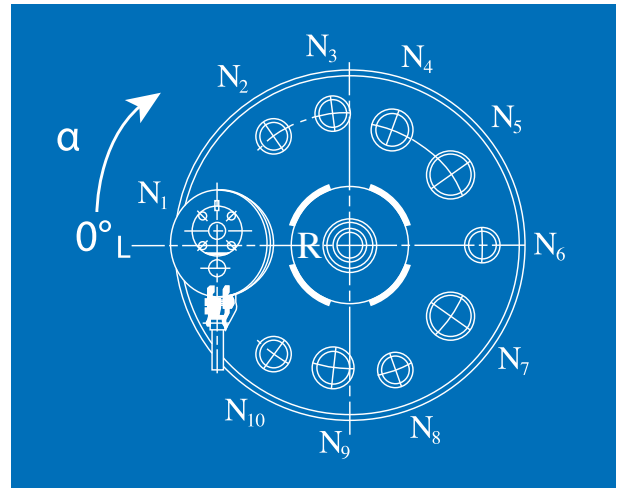
## Reactor specifications

Nominal Volume	20000l
Overall Capacity	28400l
Overall Jacket Capacity	1778l
Heat Exchange Surface	39,80 m <sup>2</sup>
Total Weight	approx. 21980 kg

## Insulation

[mm]

Design	d <sub>5</sub>	d <sub>6</sub>	d <sub>7</sub>
Upper insulating ring	3100	3300	-
Upper insulating collar	3100	3300	-
Central insulating ring	3100	3300	-
Lower insulating ring	-	-	550



## Baffles/Quatro Pipe

Quatro-Pipe for nozzle	DN300
Immersion depth (ET):	4000 mm
Width of baffle (α <sub>2</sub> ):	280 mm
Volume below Quatro Pipe/baffle:	3383l

## Main dimensions

[mm]

h <sub>1</sub>	h <sub>2</sub>	h <sub>3</sub>	h <sub>4</sub>	h <sub>5</sub>
4973	135	4755	1848	680

h <sub>6</sub>	h <sub>7</sub>	h <sub>8</sub>	d <sub>1</sub>	d <sub>2</sub>
702	83	3935	3000	3100

## Agitator shafts

[mm]

Number of honed areas	d <sub>4</sub> [mm]	α <sub>1</sub> [mm]	l <sub>1</sub> [mm]	l <sub>2</sub> [mm]	l <sub>3</sub> [mm]	l <sub>4</sub> [mm]	V <sub>4</sub> [l]	V <sub>1</sub> [l]	V <sub>2</sub> [l]	V <sub>3</sub> [l]
1	139,7	252	5240	330	-	-	455	1421	-	-
2	139,7	252	5240	330	2100	-	455	1421	13333	-
3	139,7	252	5240	330	1510	2690	455	1421	9321	17345
1	139,7	80	5410	330	-	-	48*	548	-	-

\* for turbine type CBR and anchor type agitators

## Nozzle arrangement

[mm]

	DN	α°	r <sub>1</sub>	h <sub>9</sub>	h <sub>10</sub>
N1	600	0	1100	150	-
N2	200	55	1175	-	90
N3	200	77,5	1175	-	90
N4	300	110	1075	-	30
N5	400	145	1075	-	30
N6	200	180	1175	-	90
N7	400	215	1075	-	30
N8	200	250	1175	-	90
N9	300	282,5	1075	-	30
N10	200	310	1175	-	90
L	100	0			
R	250	-	Center	111	
K	150	-	Center	-	

\* K is the bottom outlet nozzle

## Turbines

[mm]

Type	d <sub>5</sub>	d <sub>4</sub>
CBT	1220	139,7
CBR	1220	139,7
TBF	1420	139,7
FBT	1220	139,7
PBT	1220	139,7
RCI	1500	139,7
MSG	1200	139,7
GST	1120	139,7
MXT	1120	139,7

Protection of honed area made of FEP

# Worldwide Presence



GMM Pfaudler is a global leader in corrosion-resistant technologies, systems, and services for the chemical, pharmaceutical, food and energy industry.

Our Branded Product Lines that include PFAUDLER, NORMAG, MAVAG, MIXION, INTERSEAL, EQUILLOY and EDLON, showcase our strength as a group, our capabilities, and our pursuit for constant innovation. With an end-to-end solutions-oriented approach, a global footprint, and a perfectly integrated offering system we are able to meet complex industry demands worldwide.

GMM Pfaudler is driven by 1500+ individuals across 4 continents and 14 global manufacturing facilities around the world. The Group's targeted investments in strategic markets, innovation and competitiveness paves the way forward for GMM Pfaudler's continued legacy.

**100**  
Countries

**1500 +**  
Employees

**04**  
Continents

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