DE DIETRICH®

PRODUCTS PORTFOLIO

Glass-lined Technology & other materials

De Dietrich PROCESS SYSTEMS

De Dietrich

GENERAL INFORMATION

DE DIETRICH ENAMEL

REACTORS

MIXING TECHNOLOGY - GLASLOCK® SYSTEM

EQUIPMENT

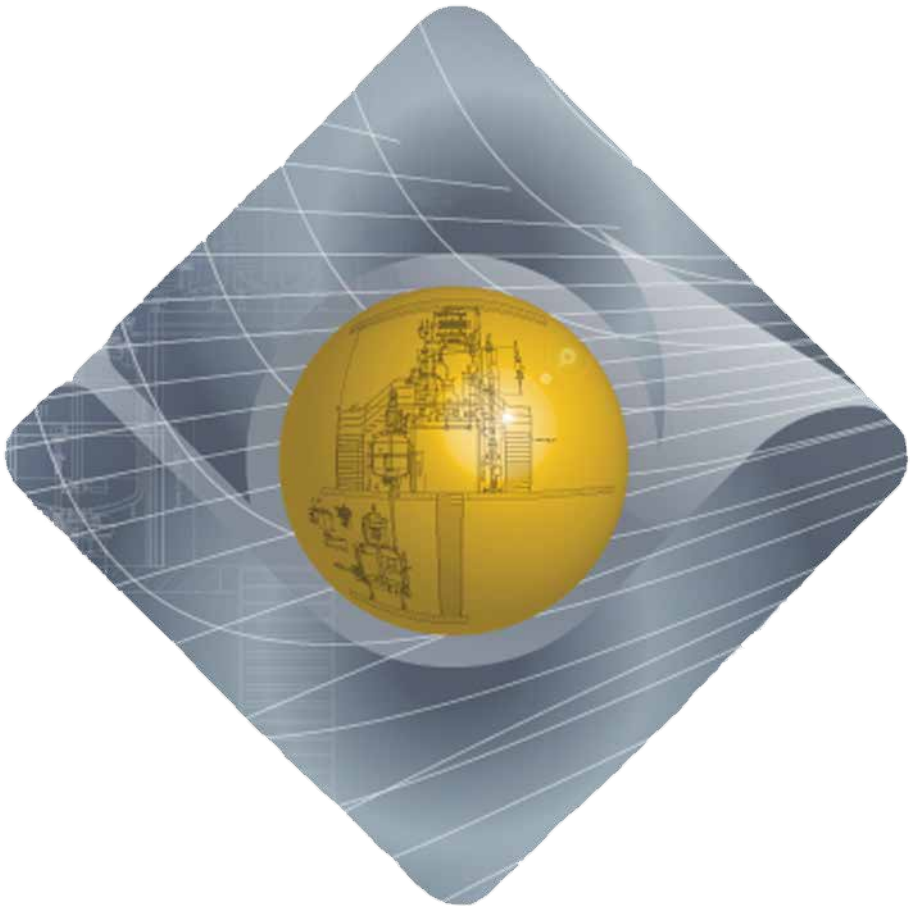
BOTTOM OUTLET VALVE

PIPES & FITTINGS

INTRUMENTATION

CLEANABILITY

De Dietrich



GENERAL INFORMATION

DE DIETRICH® HISTORY

The history of the de Dietrich family has been linked to that of France and of Europe for over three centuries. To this day, the company that bears the family name continues to play a major role in the economic life of Alsace.

De Dietrich® is one of the oldest manufacturing companies in France. It is located in the Vosges Mountains in North-Eastern France, where, as early as in the 17th century the rich natural resources of Alsace were beginning to be tapped.
The presence of iron-ore, forests and water power led to the building of blast-furnaces and forges.

In 1684, Jean Dietrich purchased the iron works of Jaegerthal.
His grandson Jean de Dietrich, ennobled by King Louis XV in 1761 for services rendered to the Crown, expanded the business by purchasing and enlarging the iron foundries and steel-mills of Zinswiller and around.

In 1778, King Louis XVI granted Jean de Dietrich the exclusive use of a trade mark (in the shape of an hunting horn) to protect his production from infringement.

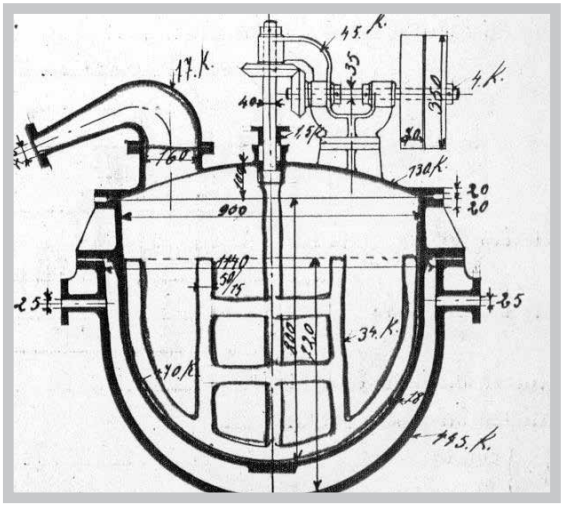
This symbol of quality is still the logo of the De Dietrich Group.

As early as in the middle of the 19th century, the Zinswiller plant was supplying all big chemical plants in Europe with glass-lined cast-iron reactors.

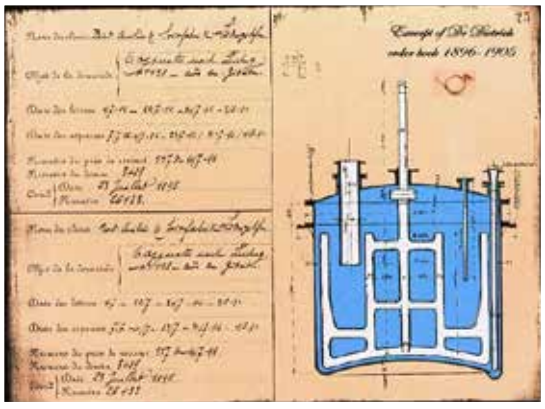
Ever since the development of this manufacturing technique has kept up with the great boom of the chemical industry.

The range of the products made in Zinswiller experienced a tremendous expansion and especially glass-lined steel replaced the initial cast-iron.

Thanks to its investments in labour force and equipment, De Dietrich® has never ceased to improve the quality of its products and especially that of enamels which has enabled the firm to retain a leading position int this particular field.



Distillation vessel of 150 l.
for the Strasbourg Exhibition in 1895



De Dietrich

THE COMPANY

De Dietrich© is the worldwide leader in the manufacture of glass-lined equipment, systems and accessories for the pharmaceutical and chemical industry.

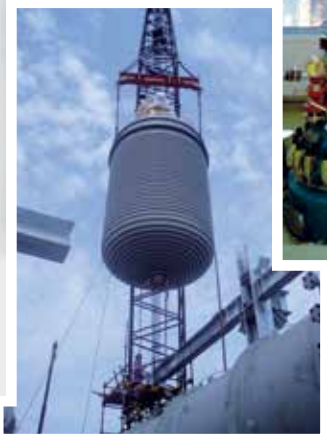
The De Dietrich® competence center has expertise in:

- Glass-lined reactors
- Avanced Mixing Technology with OptiMix® design and GlasLock® system / Heat Transfer – Simulation capabilities
- Glass-lining technology
- Instrumentation
- Process solutions
- Engineered Systems
- Cleaning solutions (CIP)
- Range of solutions for Polyaluminium Chloride production units
- Powder transfer solutions: Powder Pump

Strongly based on our core activities:

- Our specialized and experienced process engineering teams are capable of developing conceptual studies and solutions to meet your requirements
- Feasibility studies and/or performance guarantees can be provided through our broad range of available technologies, process simulations and tests facilities
- We are a leading specialist for highly-corrosive media and high-pure materials
- Our technical expertise on the design and manufacture of key process equipment provides the optimum solution for specialty processes
- Our worldwide service, maintenance and support teams ensure your operations run efficiently

Our goal is to be your one stop shop for your complete processing needs.



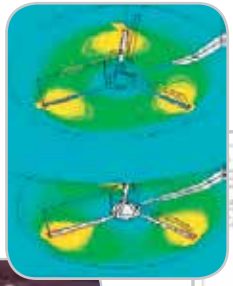
OUR SERVICES

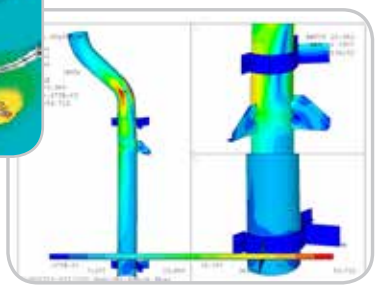
SPARE PARTS
- Delivery to order, picking on shelf, shipment D+1
- Assembly to order
- Design & manufacturing to order
- Wide range of piping

FIELD SERVICE
- A team of technicians
- DDPS Network
- Commissioning
- Preventive Maintenance / Maintenance
- General Assistance

STOCK
- Equipment lifecycle management
- Optimized stock
- Spare parts list

REVAMPING / REGLASSING
- Refurbishment
- Process optimization
- Integration of all regulatory aspects





DESIGN
- Expertise in Codes and Legislations: DESP, ATEX, International Pressure Equipment
- Risks analysis
- EC Certification / U-Stamp
- Engineering - 3D - Simulations
- Optimized mixing technology
- Design of columns
- Heat transfer
- Finite element analysis

GLOBAL NETWORK & LOCAL EXPERTS

Phone: +33 3 (0)3 88 53 23 00
aftersales@dedietrich.com

Dear valued customer,

Aware that our customers from the chemical and pharmaceutical industries are global players who require suppliers capable of meeting their expectations on the world stage, De Dietrich Process Systems has been broadening its field of activity for a number of years and has developed its global presence to satisfy them and develop relations with the users of our products.
We now wish to be recognized in our markets as the leading supplier of the equipment, systems and services that we offer.

We are determined to develop customer satisfaction through irreproachable quality suited to growing needs, particularly in terms of performance, safety and pro-activeness in finding solutions suited to such needs. To achieve this, we involve the entire company at each level in the process.

Over and above the quality of our products and service provisions, industrial safety, health and working conditions, and respect for the environment must be present at all times in our day-to-day actions and taken into account as an essential factor to our development.

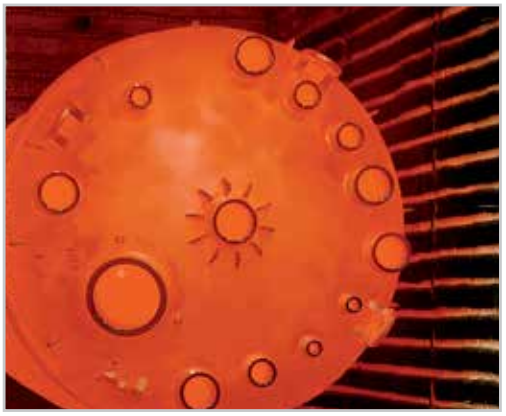
To achieve our ambition, we rely on:

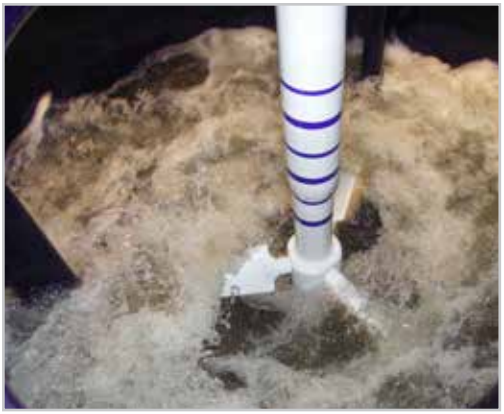
- *Our company project*
- *Our know-how improved year on year in the specialized technologies which are glass lined steel, stainless steel and special alloys, mixing, instrumentation, the construction of equipment in borosilicate glass, and, more recently, our competence in process engineering and installing complete installations in materials resistant to corrosion, cleanable...*
- *Our integrated management system.*

As our products and service provisions are subject to the prevailing directives including, among others, the European Directives on Machinery, Pressure Equipment, Explosive Atmospheres, etc., quite some time ago we implemented manufacturing design, control and installation procedures in compliance with prevailing standards in the various countries where we have customers.

Our Service Center is available for any questions concerning our products and services.

Quality Management Direction





DE DIETRICH ENAMEL

MECHANICAL PROPERTIES

Enamel is a glass with its qualities but also its main weaknesses which are brittleness and low tensile strength.
Since the resistance of glass to compression is well above its tensile strength, one of the solutions to improve the mechanical resistance is to put the glazed layer under compressive pre-stress. This is achieved during controlled cooling after each firing.
During mechanical work (deformation, mechanical or thermal shock) the compressive stress must first be offset by an equivalent tensile before the glass could be put under dangerous tensile stress.

ONE GLASS
WITH OPTIMUM QUALITY

DD3009, one glass with optimum quality for all products all over the world:

- Highly corrosive processes
- Abrasive product
- Multipurpose material / variety of uses
- Adapted to cGMP requirements, cleaning, cleanliness, sterilization
- Impervious: no catalytic effect, no contamination
- According to food contact (EC regulation n° 1935/2004)
- Anti-adhesive: polymerization processes

COLOR

- Blue (DD3009)
- White (DD3009 U)
- Light blue (DD3009 LB)
- Conductiglass (DD 3009 Conductiglass)

ABRASION

The abrasion test (ISO 6370-2: 2011) is far from the actual working conditions of a glass-lined reactor where the effects of the chemical attack enhance those of abrasion. Nevertheless, it allows a comparison between glasses, showing DD 3009 advantageously. Statistically, it has been shown that in practice the cases of destruction by abrasion are negligible. However, should any doubt arise when an abrasive substance is being used, only a comparative test performed with that product could lead to a conclusion.

MECHANICAL SHOCKS

The different experimental arrangements used for measuring the mechanical shock resistance produce results which cannot be compared to each other. Therefore, there is little use trying to give intrinsic values of the mechanical shock resistance. The only way to compare different glasses is to use the same method and the same criteria.

In our method, a 1 kg mass equipped with a 15 mm ball is dropped onto a glass-lined plate (glass thickness: 1.5 mm). This plate is locked onto a magnetic base, thereby making it thicker and increasing the shock efficiency (no energy absorption through steel vibrations). The plate is electrically grounded, and the electric current going through an electrolyte deposited at the shock location is used as assessment criteria. When tested to this procedure, which is close to the real service conditions, the mechanical shock resistance of the DD 3009 glass is about 80 % greater than that of the former glass.

THERMAL PROPERTIES

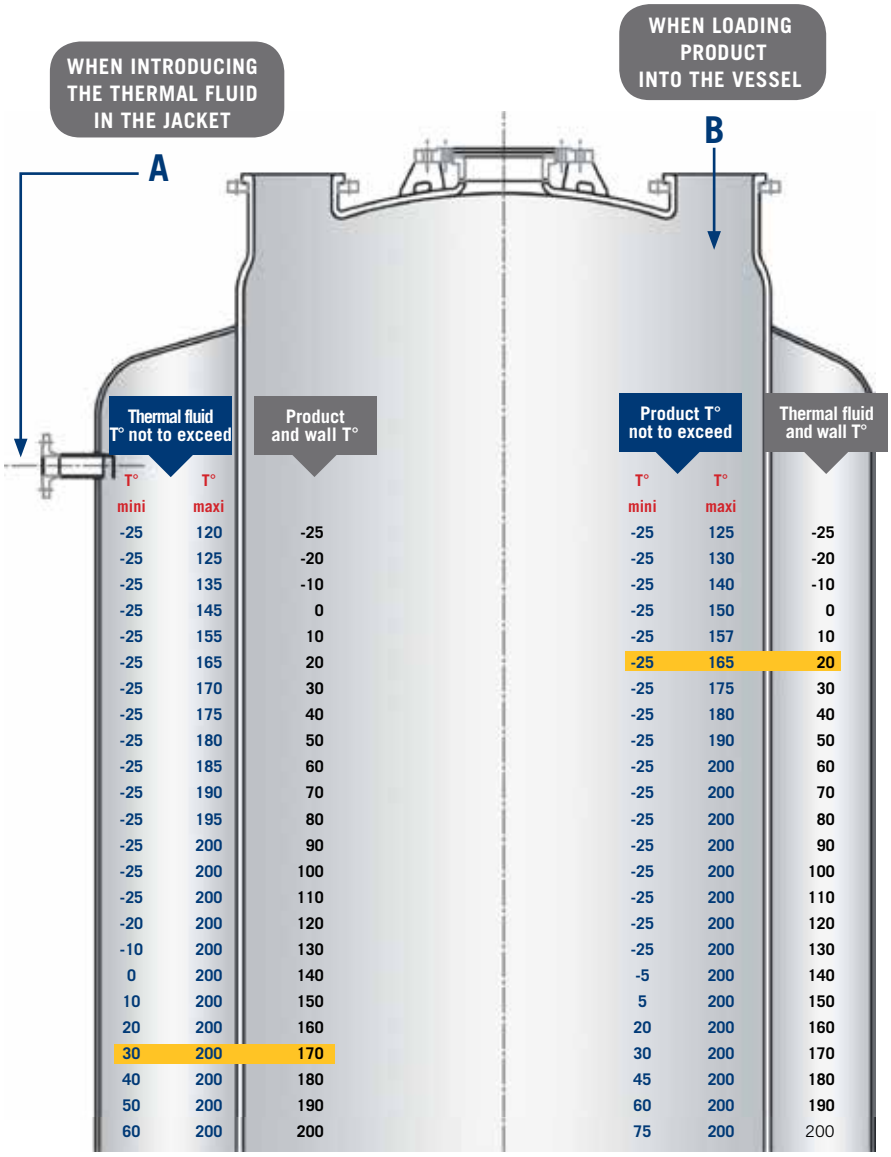
The large majority of equipment that we manufacture is designed with a system that enables the heating and cooling of their contents. As heat transfers may cause serious damage to the enamelled coating, the user should respect the limits described in this chapter, which take account both of the data in the ISO 28721-3: 2008 norm and our experience as a constructor of glass-lined equipment.

NOTE

Instructions devoted entirely to the thermal properties of the enamel are attached to the Maintenance Manual of our equipment and enamel leaflet to enable their installation and use in complete safety, as far as both your operators and the equipment are concerned.

HIGH THERMAL SHOCK RESISTANCE

GENERAL CASE OF STANDARD VESSELS CALCULATED FROM -25°C TO +200°C ISO 28721-3 NORM



Thermal fluid T° not to exceed		Product and wall T°
T° mini	T° maxi	
-25	120	-25
-25	125	-20
-25	135	-10
-25	145	0
-25	155	10
-25	165	20
-25	170	30
-25	175	40
-25	180	50
-25	185	60
-25	190	70
-25	195	80
-25	200	90
-25	200	100
-25	200	110
-20	200	120
-10	200	130
0	200	140
10	200	150
20	200	160
30	200	170
40	200	180
50	200	190
60	200	200

Product T° not to exceed		Thermal fluid and wall T°
T° mini	T° maxi	
-25	125	-25
-25	130	-20
-25	140	-10
-25	150	0
-25	157	10
-25	165	20
-25	175	30
-25	180	40
-25	190	50
-25	200	60
-25	200	70
-25	200	80
-25	200	90
-25	200	100
-25	200	110
-25	200	120
-25	200	130
-5	200	140
5	200	150
20	200	160
30	200	170
45	200	180
60	200	190
75	200	200

Example A
If the product and the glass-lined wall are at 170°C, the fluid temperature should be between +30°C and +200°C.

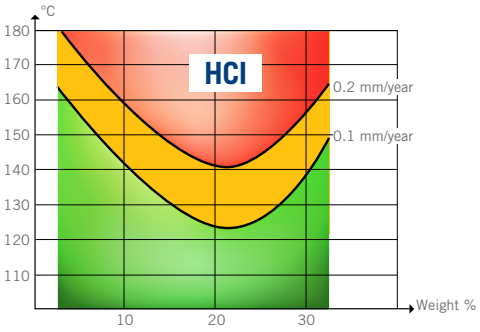
Example B
If the glass-lined wall and the thermal fluid are at 20°C, products between -25°C and +165°C may be safely introduced.

CHEMICAL PROPERTIES

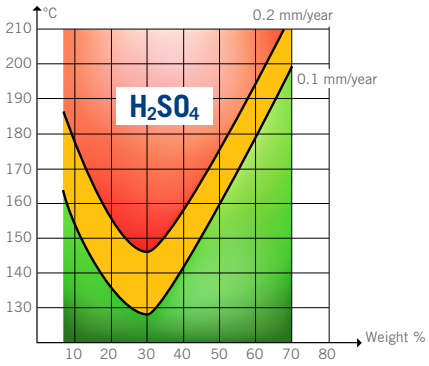
RESISTANCE TO ACIDS

Generally, DD 3009 glass has a high degree of resistance to acids whatever their concentration, up to relatively high temperatures. For most of the inorganic acids, the resistance of the glass passes through a minimum for a concentration of 20-30% weight, then increases with the acid concentration. For example, the 0.1 mm/year rate is found at 128°C in H_2SO_4 30% and at 180°C in H_2SO_4 60%. Exceptionally, in the case of phosphoric acid, the speed of attack increases with the concentration: 0.1 mm/year at 163°C for 10% concentration and at 112°C for 70% concentration.

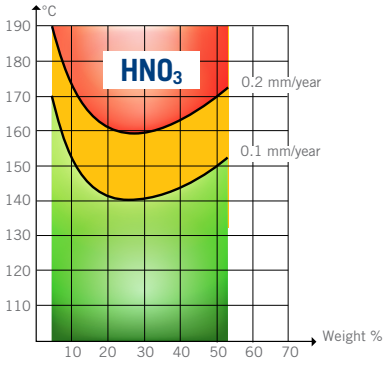
Hydrofluoric acid completely and quickly dissolves the glass whatever the temperature is. Its concentration in the product must not exceed 0.002% (20 ppm).



Hydrochloric acid



Sulfuric acid



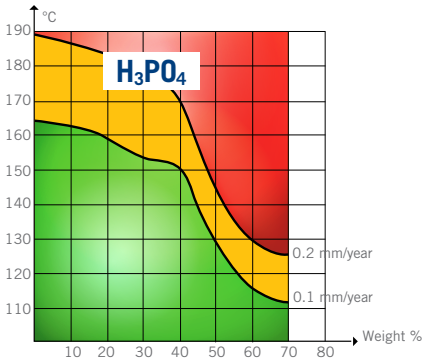
Nitric acid

ISOCORROSION CURVES

OUR ISOCORROSION CURVES ARE ESTABLISHED FOR MOST CURRENT PRODUCTS. THEY SHOW AS A FUNCTION OF PRODUCT CONCENTRATION THE TEMPERATURES AT WHICH THE WEIGHT LOSSES CORRESPOND TO 0.1 AND 0.2 MM/YEAR.

- **THE USE OF GLASS IS NOT ADVISABLE**
- **CARE MUST BE TAKEN OF THE ADVANCE OF THE CORROSION**
- **GLASS CAN BE USED WITHOUT PROBLEMS**

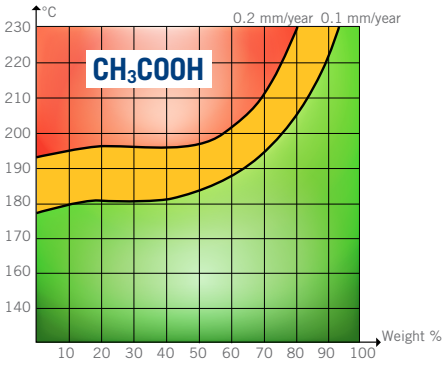
ALL THE TEST HAVE BEEN PERFORMED IN TANTALUM LINED REACTORS AND USING A RATIO VOLUME OF PRODUCT / SURFACE OF ENAMEL (V/S) > 20 TO AVOID THE INHIBITION OF THE ATTACK BY DISSOLVED SILICA.



Phosphoric acid

RESISTANCE TO ORGANIC SUBSTANCES

Chemical attack is very low in organic substances. If water is given off during the reaction, the rate of attack will depend on the amount of water in the solution. In the case of 0.1N sodium hydroxide in anhydrous alcohol at 80°C, the rate of attack is virtually nil. In methanol, there has to be more than 10% water before the loss of weight can be measured, whereas in ethanol with 5% water, the weight loss is already half of what it is in aqueous solution.

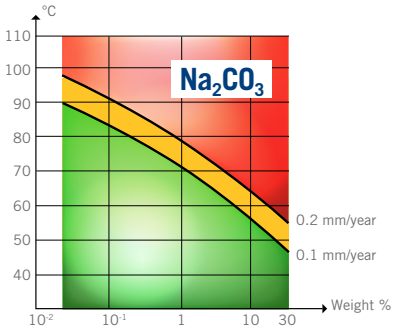


Acetic acid

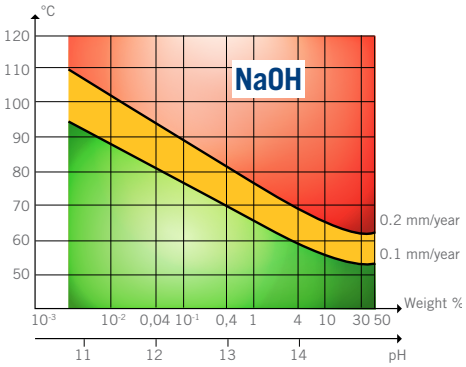
RESISTANCE TO ALKALIS

Here the permissible temperature limits are lower than for acids. At pH = 13 (NaOH 0.1N) this maximum is 70°C. Therefore, it is important to be cautious when using hot alkalis. Temperature must be controlled, as an increase of 10°C doubles the rate of attack of the glass. Care must be taken for the introduction of alkalis into a vessel. Avoid the flow of alkalis along the warm vessel wall by using a dip pipe.

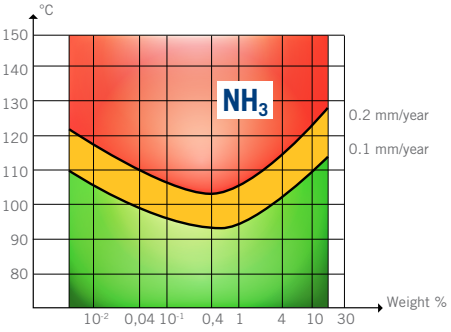
Corrosion values	Reference norm	Units	DD 3009 Glass
HCl 20% – Vapor 108°C	ISO 28706-2 : 2008	mm/year	0.036
HCl 20 % - 140 °C – V/S = 20	ISO 28706-2 : 2008	mm/year	0.2
NaOH 1N 80 °C – V/S = 20	ISO 28706-4 : 2008	mm/year	0.35
NaOH 0.1 N 80 °C – V/S = 20	ISO 28706-4 : 2008	mm/year	0.18
H_2O – Vapor	ISO 28706-2 : 2008	mm/year	0.017
Thermal shocks – Statiflux surface cracks	ISO 13807 : 1999	°C	220
Abrasion	ISO 6370-2 : 2011	mg/cm²/h	2.35
Mechanical shocks	Improvement against former glass: 80 %		



Sodium carbonate



Sodium hydroxide



Ammonium hydroxide

RESISTANCE TO WATER VAPOR

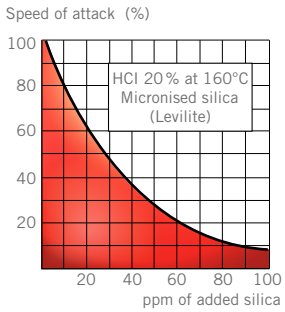
Resistance to water is excellent. The behavior of glass in neutral solutions depends on each individual case but in general is very satisfactory.

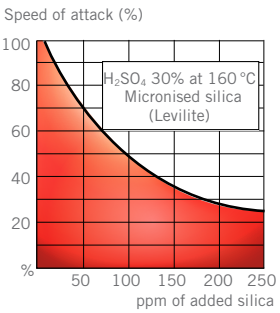
CORROSION INHIBITION

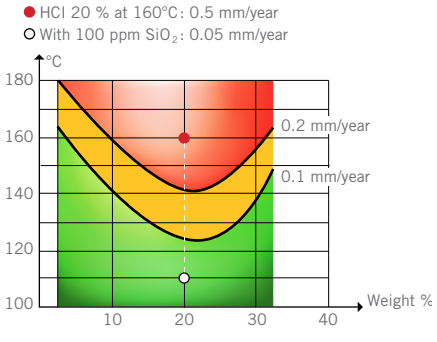
Chemical reactions are sometimes so severe they cause a rapid wear on the enamel surface. The use of additives to the reacting substance can inhibit this corrosion permitting the use of glass-lined equipment. When using acids, several tens or several hundreds ppm of silica protect the enamel and considerably reduce the rate of corrosion during the liquid phase.

The same result can be obtained at the vapor stage by adding silicon oils. Generally speaking, the higher the temperature, the greater the quantity of silica required, and more the acid is concentrated, the more the amount of silica can be reduced. In presence of fluorine, silica also has a favorable influence. We always recommend a pre-test as each reaction is different. An attack inhibitor can be useful in one case and yet non-effective in another.

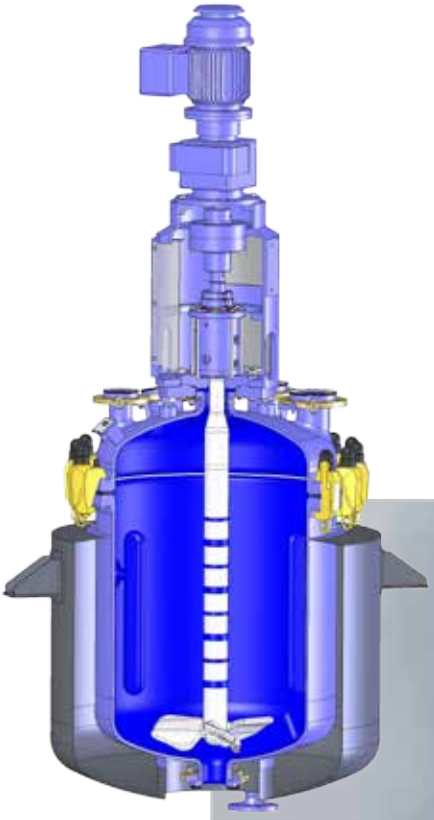
Corrosion values	Pure Product	500 ppm $CaCO_3$	300 ppm SiO_2	Silicon Oil 2 ml/l
NaOH 1N 80 °C	0.18 mm/year	0.09 mm/year		
Buffer pH= 1 ; 100°C + HF 430 ppm	1.5 mm/year		0.42 mm/year	
HCl 20 % vapor 110 °C	0.036 mm/year			< 0.005 mm/year

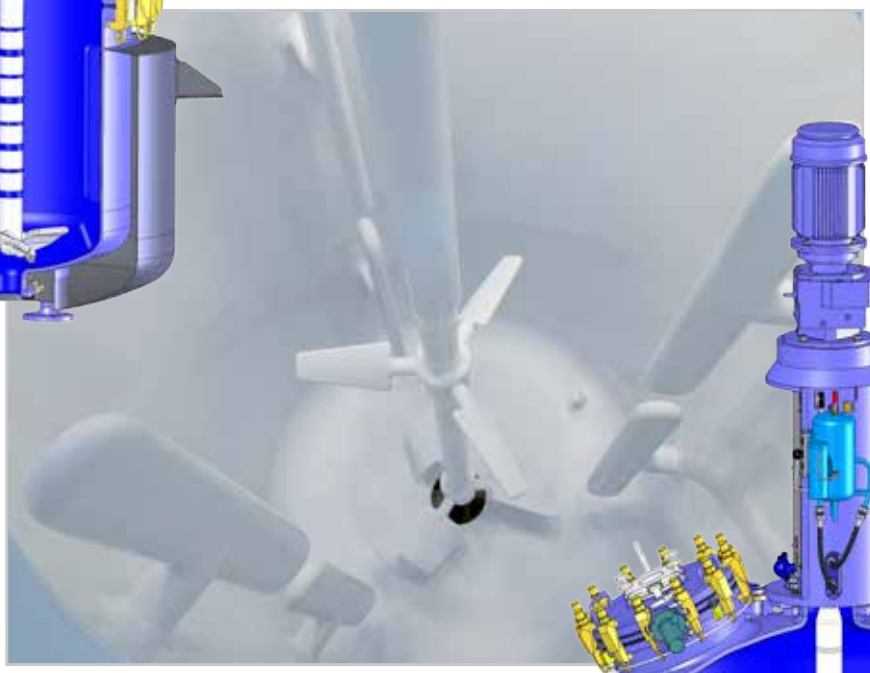


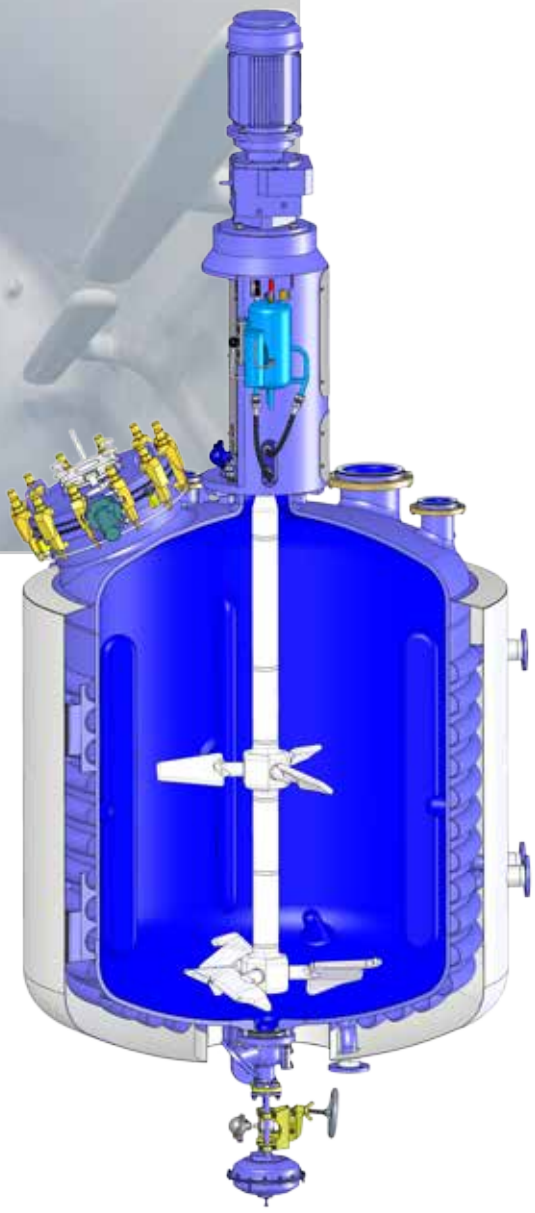




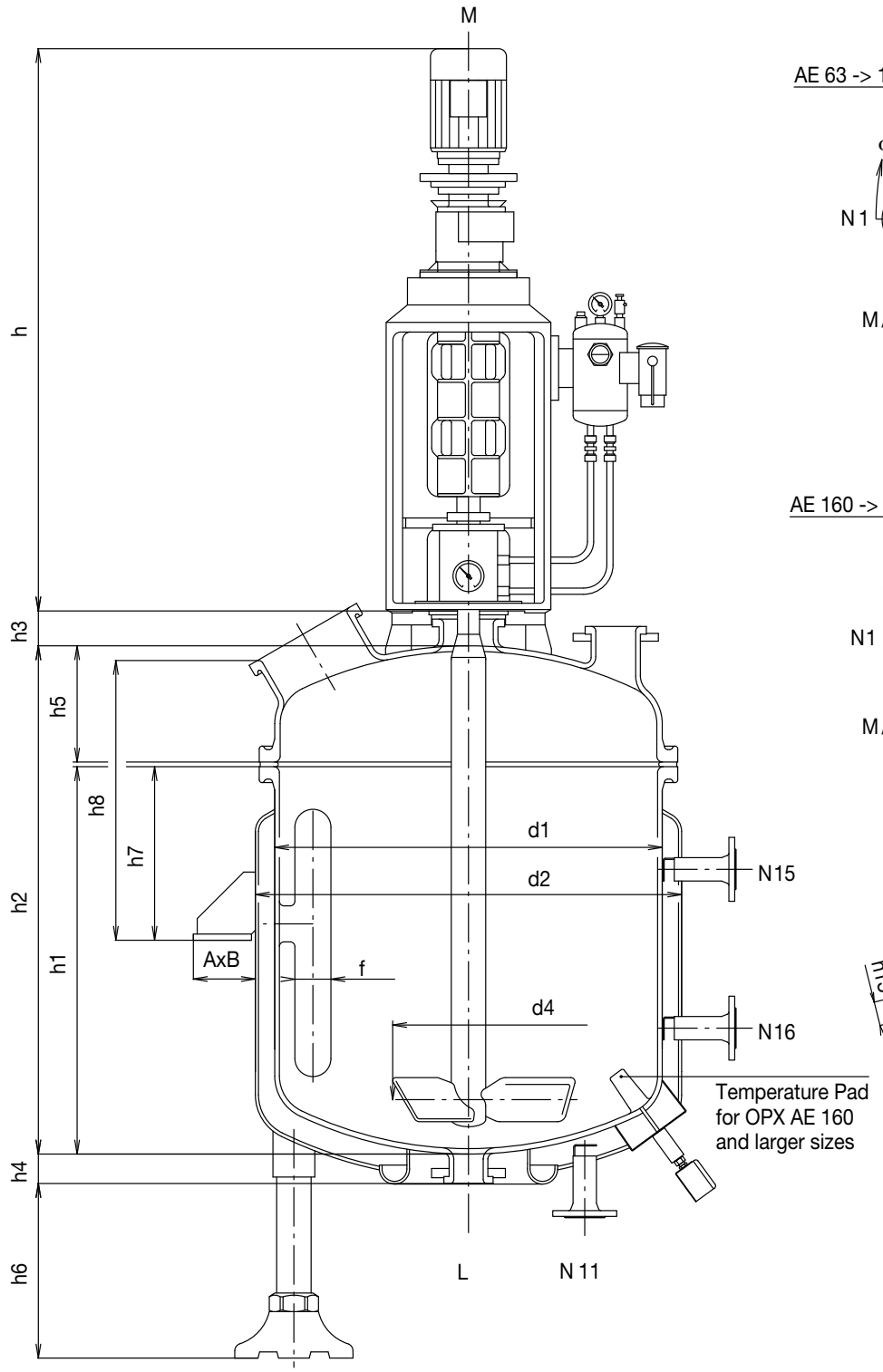
De Dietrich

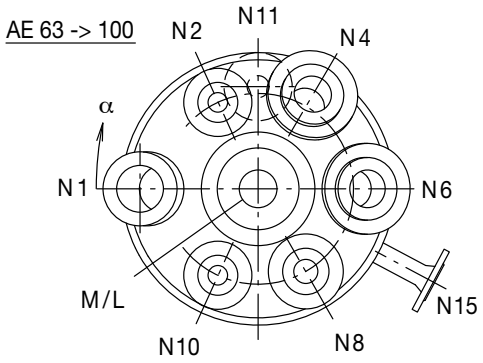


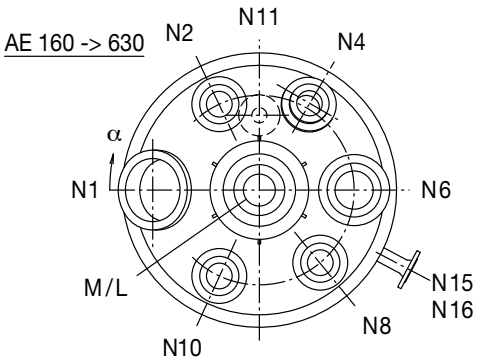


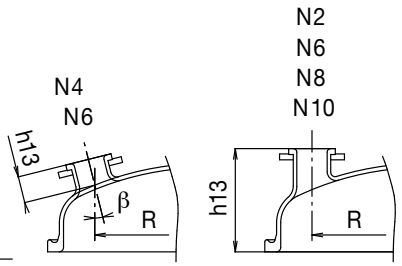


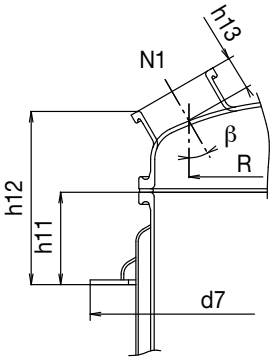
REACTORS











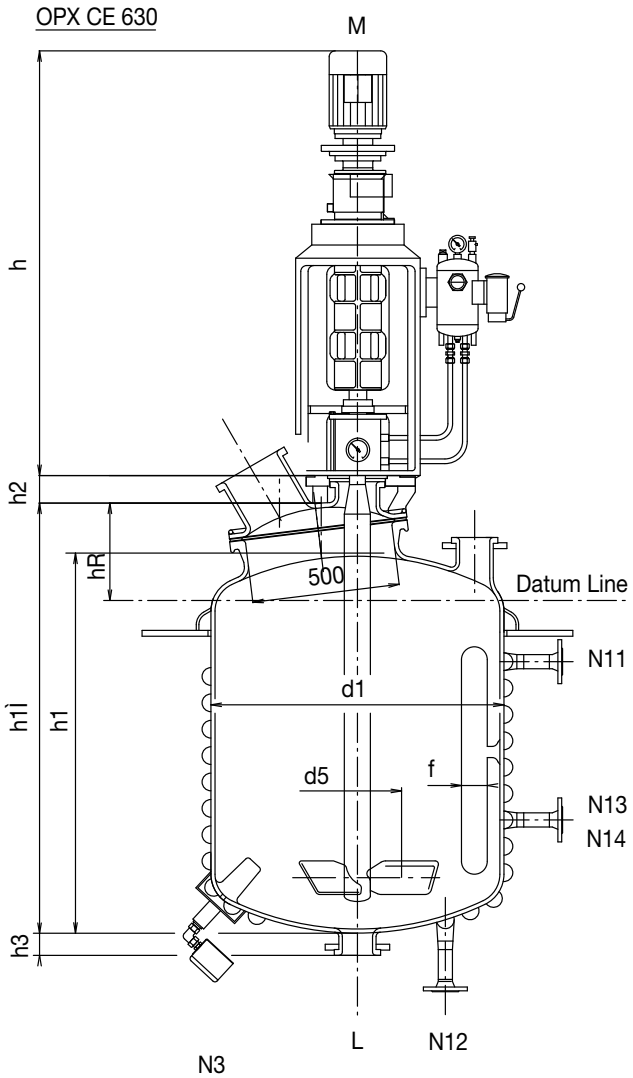
	Design pressure	Design temperature
Inside	-1/+6 bar	-25/+200° C
Jacket	-1/+6 bar	-25/+200° C
Half Coil	-1/+30 bar	-25/+235° C

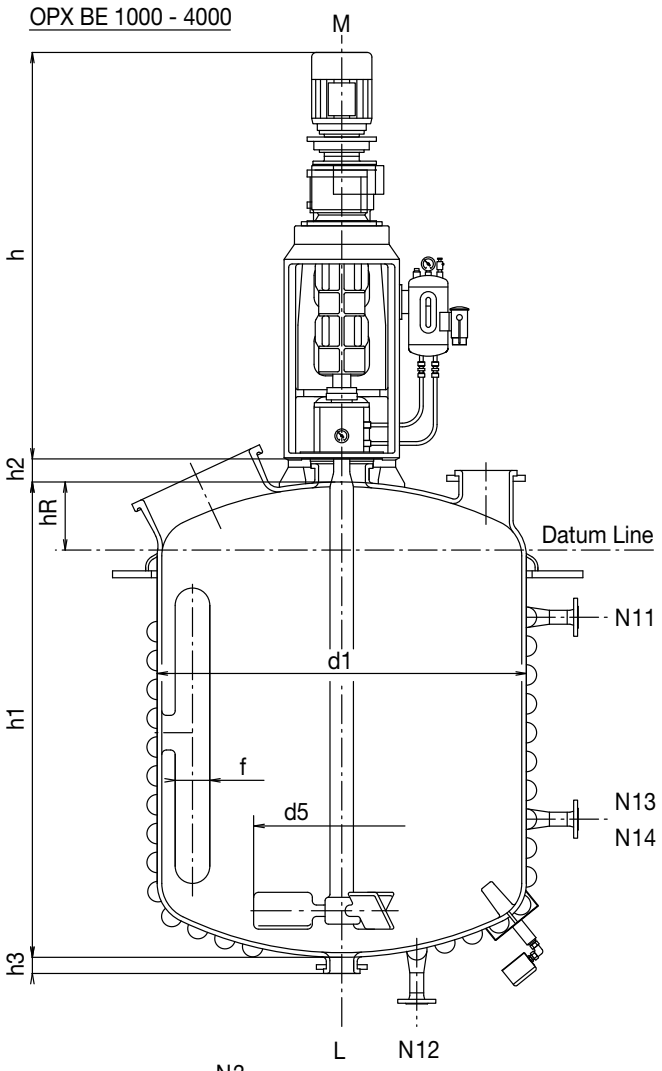
	Allocation of Nozzles
N1	Handhole with sight glass
N4	Light glass
N2/N6 N8/N10	Free

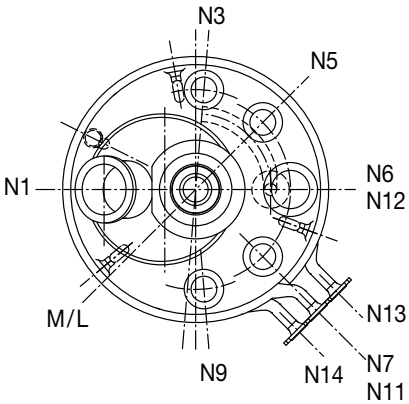
			OPX AE 63	OPX AE 100	OPX AE 160	OPX AE 250	OPX AE 400	OPX AE 630
Nominal capacity		**Litres**	63	100	160	250	400	630
Total capacity		**Litres**	90	127	210	327	533	847
Jacket capacity		**Litres**	24	38	55	77	120	152
Heating area (with half coil)		**m²**	0,56	0,88	1,25	1,7	2,5	3,1
Approx. weight without motor and supporting		**daN**	480	530	640	850	1040	1500
Main dimensions		**d1**	508	508	600	700	800	1000
		h1	400	600	700	800	1000	1000
		d2	600	600	700	800	900	1100
		d4	250	250	300	380	420	550
		h2	590	790	910	1030	1260	1310
		h3	70	70	70	80	80	90
		h4	70	70	70	70	80	75
		h5	180	180	200	220	250	300
		f	44	44	63	63	88	88
Support System	**Support legs**	**Quantity h6 min.**	4 500	4 500	4 500	4 500	4 500	4 500
	Support lugs	**A x B h7 min. h8 min.**	100 x 140 370 570	100 x 140 370 570	100 x 140 370 590	100 x 140 380 600	100 x 140 380 630	160 x 160 405 680
	Support ring	**d7 h11 min. h12 min.**	- - -	- - -	- - -	1170 290 510	1270 290 540	1470 320 595
Nozzles on Vessel	**M**	**DN**	50	50	50	80	80	125
	L		80	80	80	80	100	100
	N2	**DN / h13 R / α**	40 / 230 210 / 65°	40 / 230 210 / 65°	50 / 250 240 / 65°	50 / 270 280 / 65°	80 / 300 310 / 65°	100 / 350 380 / 65°
	N8		50 / 230 210 / 240°	50 / 230 210 / 240°	80 / 250 240 / 240°	80 / 270 280 / 240°	80 / 300 310 / 240°	100 / 350 380 / 240°
	N10		40 / 230 210 / 295°	40 / 230 210 / 295°	50 / 250 240 / 295°	50 / 270 280 / 295°	80 / 300 310 / 295°	100 / 350 380 / 295°
	N1	**DN / h13 R / α β**	100 / 100 210 / 0° 30°	100 / 100 210 / 0° 30°	100 / 100 240 / 0° 30°	150 / 100 280 / 0° 30°	200 / 115 300 / 0° 30°	250 / 115 370 / 0° 30°
	N4		80 / 90 210 / 120° 20°	80 / 90 210 / 120° 20°	80 / 90 240 / 120° 12°	80 / 90 280 / 120° 12°	80 / 90 310 / 120° 12°	100 / 90 380 / 120° 14°
	N6		80 / 90 210 / 180° 20°	80 / 90 210 / 180° 20°	80 / 250 240 / 180° -	80 / 270 280 / 180° -	100 / 300 310 / 180° -	150 / 350 380 / 180° -
Jacket Nozzles	**N11**	**DN / α**	40 / 90°	40 / 90°	40 / 90°	40 / 90°	40 / 90°	50 / 90°
	N15		40 / 208°	40 / 208°	40 / 208°	40 / 208°	40 / 208°	50 / 208°
	N16		-	-	-	40 / 208°	40 / 208°	50 / 208°
Drive		**MDL Type**	40	40	40	50	50	60
		h *	1040	1040	1040	1115	1115	1505

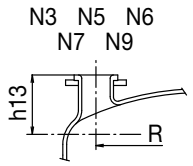
α : Orientation angle β : Tilt angle * with a standard motor

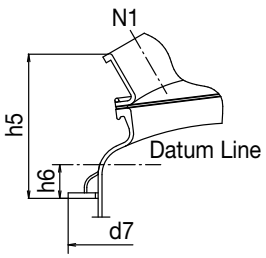
Main dimensions and nozzle layout according to DIN 28136

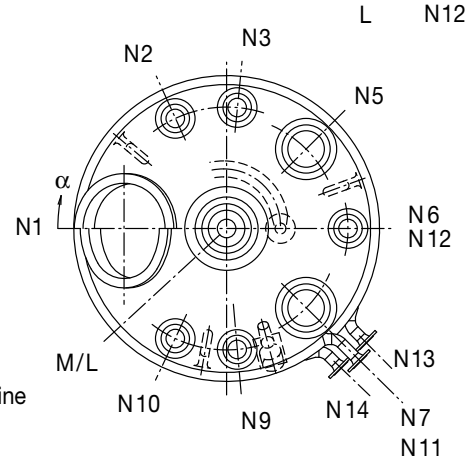


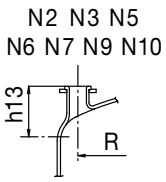


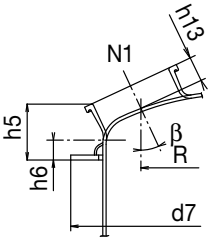












	Design pressure	Design temperature
Inside	-1/+6 bar	-25/+200° C
Jacket	-1/+6 bar	-25/+200° C
Half Coil	-1/+30 bar	-25/+235° C

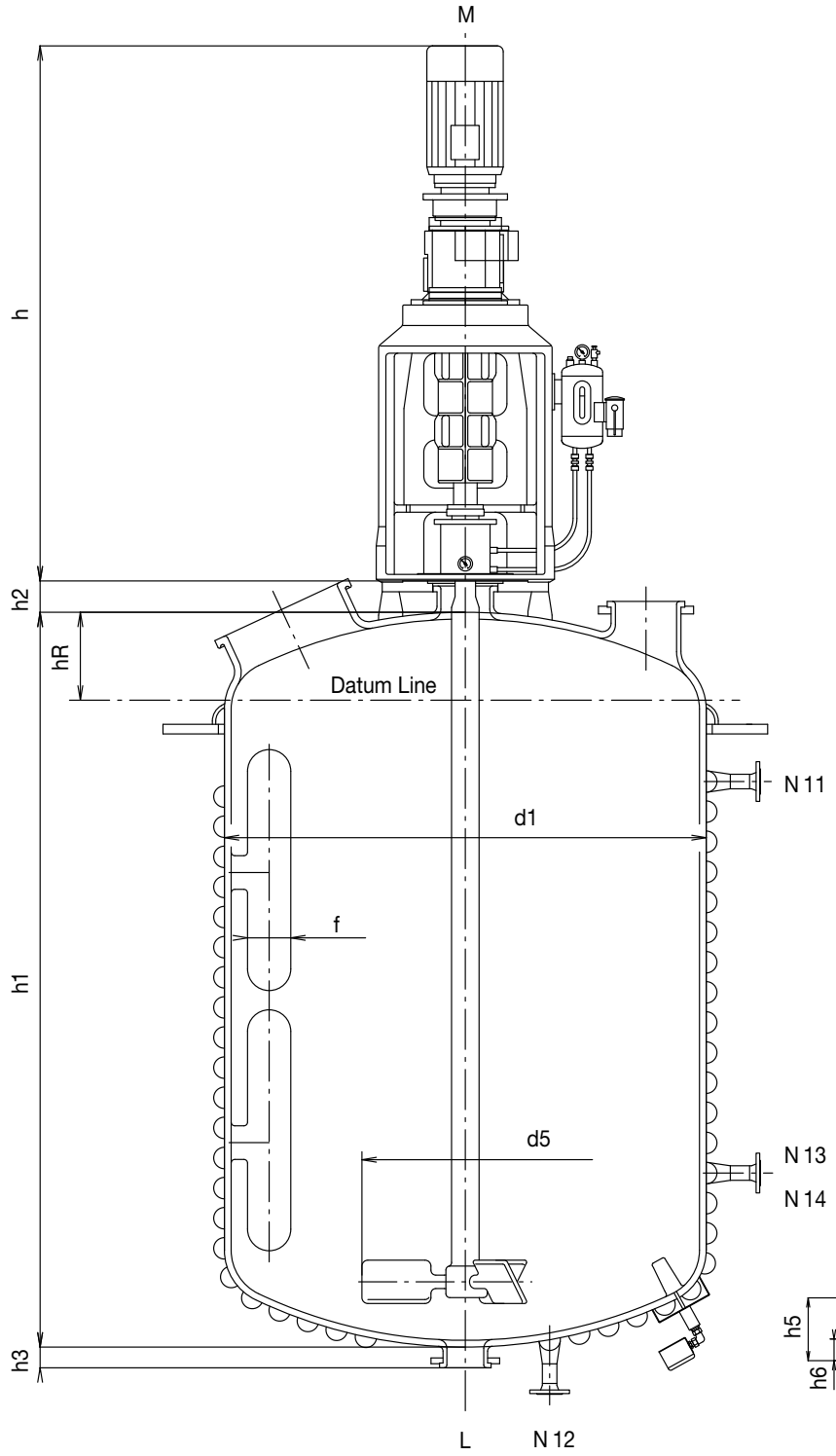
Allocation of Nozzles	
N1	Manhole with sight glass
N6*	Light glass
N2/N3/N5/N7 N9/N10	Free

* N5 or N7 on OPX 630

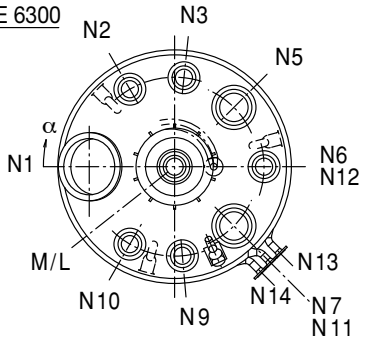
			OPX CE 630	OPX BE 1000	OPX BE 1600	OPX BE 2500	OPX BE 4000
Nominal capacity		**Litres**	630	1000	1600	2500	4000
Total capacity		**Litres**	847	1458	2310	3463	5381
Half Coil capacity		**Litres**	33	45	65	157	228
Heating area (with half coil)		**m²**	3,0	4,1	5,9	8,0	11,6
Approx. weight without motor and supporting		**daN**	2000	2400	3200	4200	6200
Main dimensions		**d1**	1000	1200	1400	1600	1800
		d2	1100	1300	1500	1700	1900
		d5	450	660	660	750	750
		h1 / h1'	1300 / 1455	1550 / -	1800 / -	2060 / -	2500 / -
		h2	100	100	95	95	125
		h3	75	70	70	70	70
		hR	165	225	255	295	330
		f	88	131	131	148	148
Support System	**Support ring**	**d7**	1470	1670	1890	2090	2290
		h5 min.	325	300	305	335	375
		h6 min.	120	110	110	120	135
Nozzles on Vessel	**M**	**DN**	125	200	200	200	200
	L		100	100	100	100	100
	N1	**DN**	200	-	-	-	-
		DN / h13 R / β	-	350x450 / 150 450 / 30°	350x450 / 125 500 / 25°	500 / 150 570 / 25°	500 / 150 630 / 25°
	N2	**DN / h13 R / α**	-	100 / 280 500 / 67,5°	100 / 280 575 / 60°	100 / 305 675 / 65°	150 / 330 725 / 65°
	N3		100 / 215 400 / 95°	100 / 280 500 / 95°	100 / 280 575 / 95°	100 / 305 675 / 95°	150 / 330 725 / 95°
	N5		100 / 215 380 / 135°	200 / 310 450 / 137,5°	200 / 305 550 / 135°	200 / 345 625 / 135°	250 /355 675 / 135°
	N6		150 / 215 380 / 180°	100 / 280 500 / 180°	100 / 280 575 / 180°	100 / 305 675 / 180°	150 / 330 725 / 180°
	N7		100 / 215 380 / 225°	200 / 310 450 / 222,5°	200 / 305 550 / 225°	200 / 345 625 / 225°	250 / 355 675 / 225°
	N9		100 / 215 400 / 265°	100 / 280 500 / 265°	100 / 280 575 / 265°	100 / 305 675 / 265°	150 / 330 725 / 265°
	N10		-	100 / 280 500 / 292,5°	100 / 280 575 / 300°	100 / 305 675 / 295°	150 / 330 725 / 295°
Half Coil Nozzles	**N12**	**DN / α**	40 / 180°	40 / 180°	40 / 180°	50 / 180°	50 / 180°
	N11		40 / 225°	40 / 225°	40 / 225°	50 / 225°	50 / 225°
	N13		40 / 225°	40 / 225°	40 / 225°	50 / 225°	50 / 225°
	N14		40 / 225°	40 / 225°	40 / 225°	50 / 225°	50 / 225°
Drive		**MDL Type**	60	80	80	80	100
		h *	1505	1940	1940	1940	2155

α : Orientation angle β : Tilt angle * with a standard motor

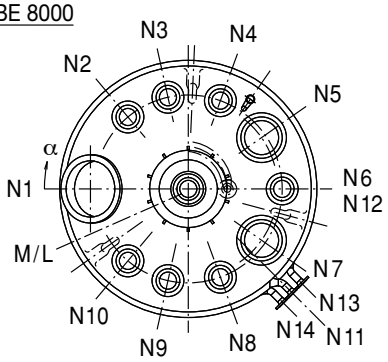
Main dimensions and nozzle layout according to DIN 28136



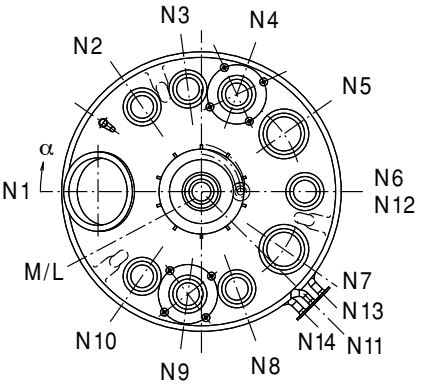
OPX BE 6300

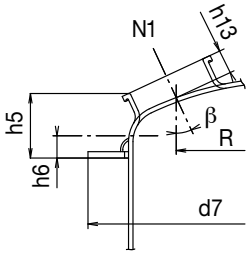


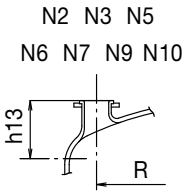
OPX BE 8000



OPX BE 10000 - 40000







	Design pressure	Design temperature
Inside	-1/+6 bar	-25/+200° C
Jacket	-1/+6 bar	-25/+200° C
Half Coil	-1/+30 bar	-25/+235° C

	Allocation of Nozzles
N1	Manhole with sight glass
N6	Light glass
N2/N3/N4/N5/ N7/N8/N9/N10	Free

			OPX BE 6300	OPX BE 8000	OPX BE 10000	OPX BE 12500	OPX BE 16000	OPX BE 20000	OPX BE 25000	OPX BE 32000	OPX BE 40000
Nominal capacity		Litres	6300	8000	10000	12500	16000	20000	25000	32000	40000
Total capacity		Litres	8204	9353	11749	14340	18169	22649	28309	36690	44700
Half Coil capacity		Litres	311	322	363	455	763	922	942	1100	1522
Heating area (with half coil)		m²	15,9	16,4	18,6	23,3	26,8	32,4	33,1	38,6	53,4
Approx. weight without motor and supporting		daN	7700	8600	11600	13100	16100	18900	22000	30100	34500
Main dimensions		d1	2000	2200	2400	2400	2600	2800	3000	3400	3400
		d2	2100	2300	2500	2500	2700	2900	3100	3550	3550
		d5	850	850	1050	1050	1050	1200	1200	1372	1372
		h1	3050	3000	3180	3780	4080	4385	4755	4875	5795
		h2	125	130	135	130	130	135	135	135	135
		h3	85	85	85	85	80	80	80	70	80
		hR	365	520	570	570	620	670	720	835	835
		f	180	180	185	185	185	210	210	265	265
Support System	Support ring	d7	2510	2710	2910	2910	3120	3350	3550	4000	4000
		h5 min.	405	475	500	500	575	535	560	715	725
		h6 min.	140	145	145	145	165	175	180	205	215
Nozzles on Vessel	M	DN	200	200	250	250	250	300	300	300	300
	L		150	150	150	150	150	150	150	150	150
	N1	DN / h13 R / β	500 / 150 700 / 25°	600 / 150 800 / 30°	600 / 150 850 / 30°	600 / 150 850 / 30°	600 / 150 900 / 30°	600 / 150 1000 / 30°	600 / 150 1100 / 30°	600 / 150 1250 / 30°	600 / 150 1250 / 30°
	N2	DN / h13 R / α	150 / 365 800 / 60°	150 / 480 840 / 50°	200 / 480 925 / 50°	200 / 480 925 / 50°	200 / 555 1025 / 55°	200 / 595 1100 / 50°	200 / 630 1175 / 50°	200 / 745 1300 / 50°	200 / 745 1300 / 50°
	N3		150 / 365 800 / 95°	150 / 480 840 / 77,5°	200 / 480 925 / 77,5°	200 / 480 925 / 77,5°	200 / 555 1025 / 82,5°	200 / 595 1100 / 77,5°	200 / 630 1175 / 77,5°	200 / 745 1300 / 77,5°	200 / 745 1300 / 77,5°
	N4		-	150 / 480 840 / 110°	250 / 555 900 / 110°	250 / 555 900 / 110°	250 / 600 950 / 110°	300 / 665 1000 /110°	300 / 690 1075 / 110°	400 / 805 1200 / 110°	400 / 805 1200 / 110°
	N5		250 / 390 750 / 135°	300 / 530 800 / 145°	300 / 555 900 / 145°	300 / 555 900 / 145°	300 / 600 950 / 145°	400 / 665 1000 / 145°	400 / 690 1075 / 145°	400 / 805 1200 / 145°	400 / 805 1200 / 145°
	N6		150 / 365 800 / 180°	150 / 480 840 / 180°	200 / 480 925 / 180°	200 / 480 925 / 180°	200 / 555 1025 / 180°	200 / 595 1100 / 180°	200 / 630 1175 / 180°	200 / 745 1300 / 180°	200 / 745 1300 / 180°
	N7		250 / 390 750 / 225°	300 / 530 800 / 215°	300 / 555 900 / 215°	300 / 555 900 / 215°	300 / 600 950 / 215°	400 / 665 1000 / 215°	400 / 690 1075 / 215°	400 / 805 1200 / 215°	400 / 805 1200 / 215°
	N8		-	150 / 480 840 / 250°	200 / 480 925 / 250°	200 / 480 925 / 250°	200 / 555 1025 / 250°	200 / 595 1100 / 250°	200 / 630 1175 / 250°	200 / 745 1300 / 250°	200 / 745 1300 / 250°
	N9		150 / 365 800 / 265°	150 / 480 840 / 282,5°	250 / 555 900 / 282,5°	250 / 555 900 / 282,5°	250 / 600 950 / 277,5°	300 / 665 1000 / 282,5°	300 / 690 1075 / 282,5°	400 / 805 1200 / 282,5°	400 / 805 1200 / 282,5°
	N10		150 / 365 800 / 300°	150 / 480 840 / 310°	200 / 480 925 / 310°	200 / 480 925 / 310°	200 / 555 1025 / 305°	200 / 595 1100 / 310°	200 / 630 1175 / 310°	200 / 745 1300 / 310°	200 / 745 1300 / 310°
Half Coil Nozzles	N12	DN / α	50 / 180°	50 / 180°	50 / 180°	50 / 180°	80 / 180°	80 / 180°	80 / 180°	80 / 180°	80 / 180°
	N11		50 / 225°	50 / 225°	50 / 225°	50 / 225°	80 / 225°	80 / 225°	80 / 225°	80 / 225°	80 / 225°
	N13		50 / 225°	50 / 225°	50 / 225°	50 / 225°	80 / 225°	80 / 225°	80 / 225°	80 / 225°	80 / 225°
	N14		50 / 225°	50 / 225°	50 / 225°	50 / 225°	80 / 225°	80 / 225°	80 / 225°	80 / 225°	80 / 225°
Drive		MDL Type	100	100	125	125	125	140	140	160	160
		h *	2200	2200	2 500	2 500	2 500	2680	2680	3100	3100

α : Orientation angle β : Tilt angle * with a standard motor

Main dimensions and nozzle layout according to DIN 28136

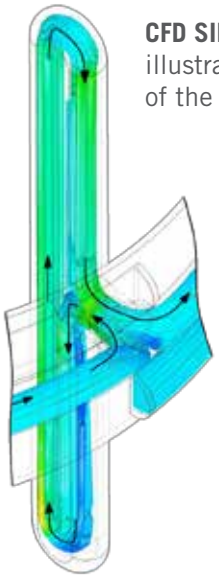
A NEW GENERATION OF OPTIMIX® REACTORS

In the continuity of the highly experienced OptiMix® design with hundreds of reactors in operation since 2003 and to meet the market requirements, De Dietrich® has extended the range of the OptiMix® reactors to provide improved heat transfer and reduce processing times.

This new design uses the thermal fluid contained in the half-coil in order to create a circulation through the baffles.
This results in an increased heat transfer area up to 25% enabling a more homogeneous, faster thermal management and therefore cycle times shortened.

KEY ADVANTAGES

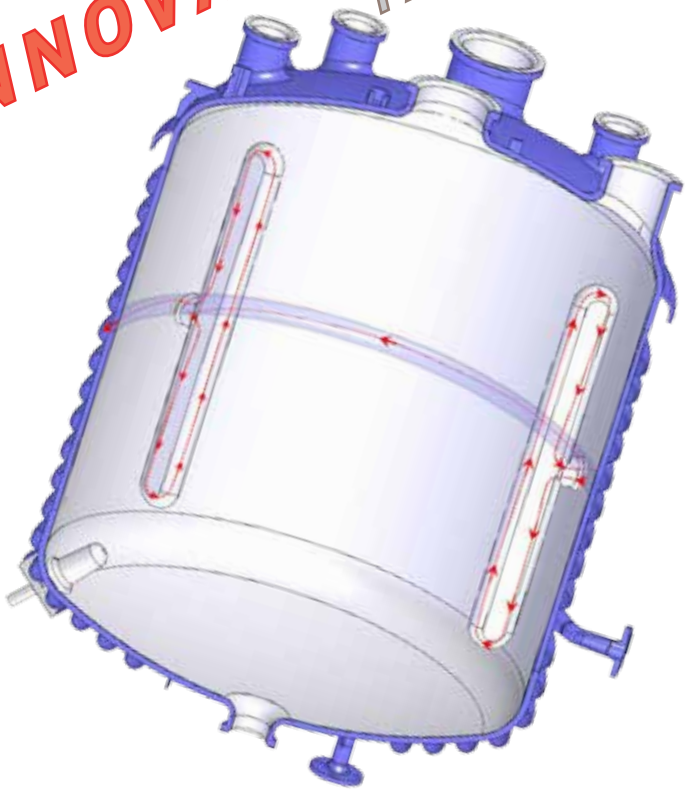
- **HEATED / COOLED BAFFLES**
- **HEAT EXCHANGE AREA INCREASED UP TO 25%**
- **REDUCED REACTION TIME**
- **CLEARANCE OF ALL THE NOZZLES**
- **IMPROVED CLEANING FACILITIES:**
  - No dead zone
  - Less vortex means reduced splashing on wall and upper head



CFD SIMULATION
illustrating the turbulent flow of the fluid through the baffles

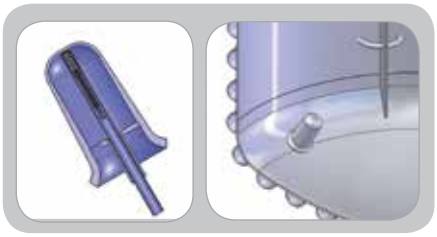
INNOVATION!

PATENTED



MASTER YOUR FUTURE:
OptiMix® 2nd generation with heated / cooled baffles

A complete range from 100 l. up to 16.000 l. in half-coils with thermal fluid
Geometry according to **DIN 28136**
Inside: -25/+200°C, -1/6 bar / Outside: -25/+200°C, -1/6 bar



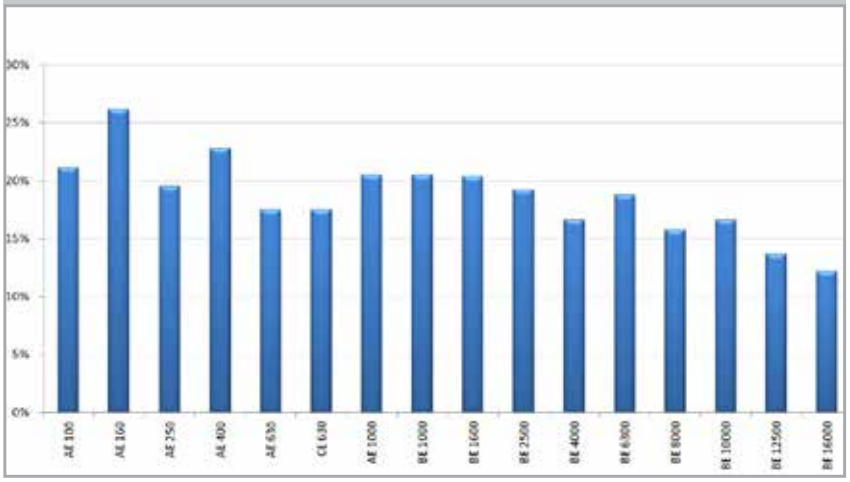
TEMPERATURE PROBE INTEGRATED IN THE WALL

THE OPTIMIX® - HE RANGE

	(*)	AE100	AE160	AE250	AE400	AE630	CE630	AE1000	BE1000	BE1600	BE2500	BE4000	BE6300	BE8000	BE10000	BE12500	BE16000
Nominal capacity	L.	100	160	250	400	630	630	1000	1000	1600	2500	4000	6300	8000	10000	12500	16000
Total capacity	L.	127	210	327	533	847	847	1447	1458	2310	3463	5381	8204	9353	11749	14340	18169
Nominal half-coil capacity	L.	5	11	17	30	33	42	58	62	87	190	243	298	337	385	440	521
Nominal heating area	m^2	1.1	1.6	2.0	2.8	3.5	3.5	4.8	4.9	7.0	9.4	13.3	18.6	19.1	21.7	26.5	30.1

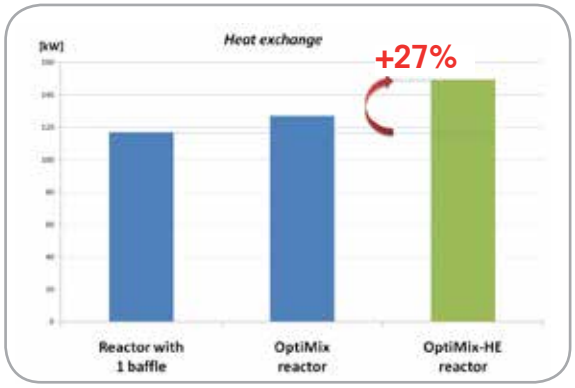
* For other dimensions and nozzle layout, see the OptiMix® range - larger sizes on request

ACCELERATE YOUR HEAT TRANSFER UP TO 27%



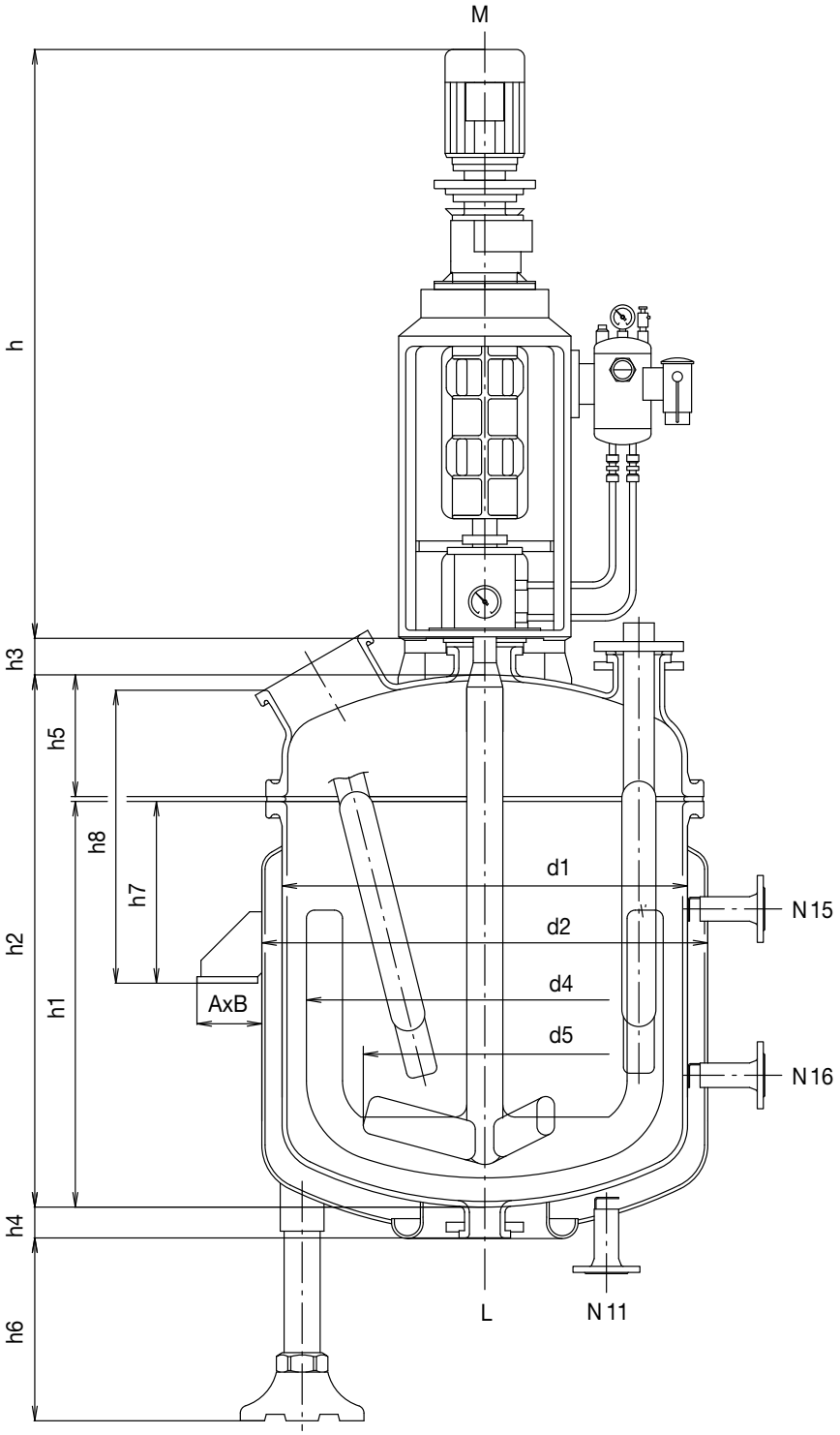
HEATING AREA INCREASED DRASTICALLY
between standard reactors and OPX-HE reactors

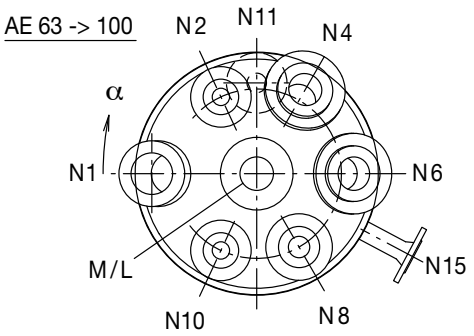
THERMAL COMPARISON

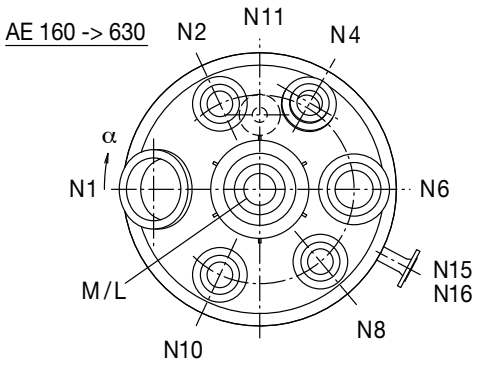


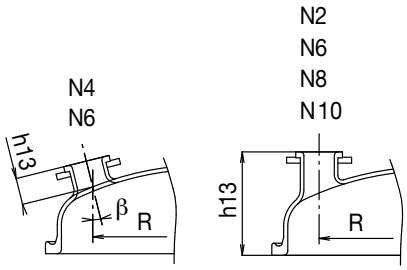
REDUCED BATCH TIME WITH OPTIMIX® - HE

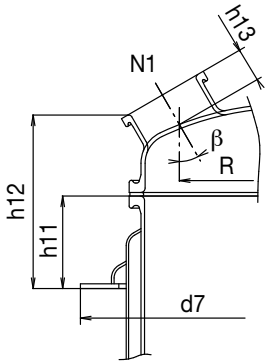
Reactor DIN 1000 l. with half-coil, agitation 110 rpm, sulfuric acid, thermal fluid 150°C











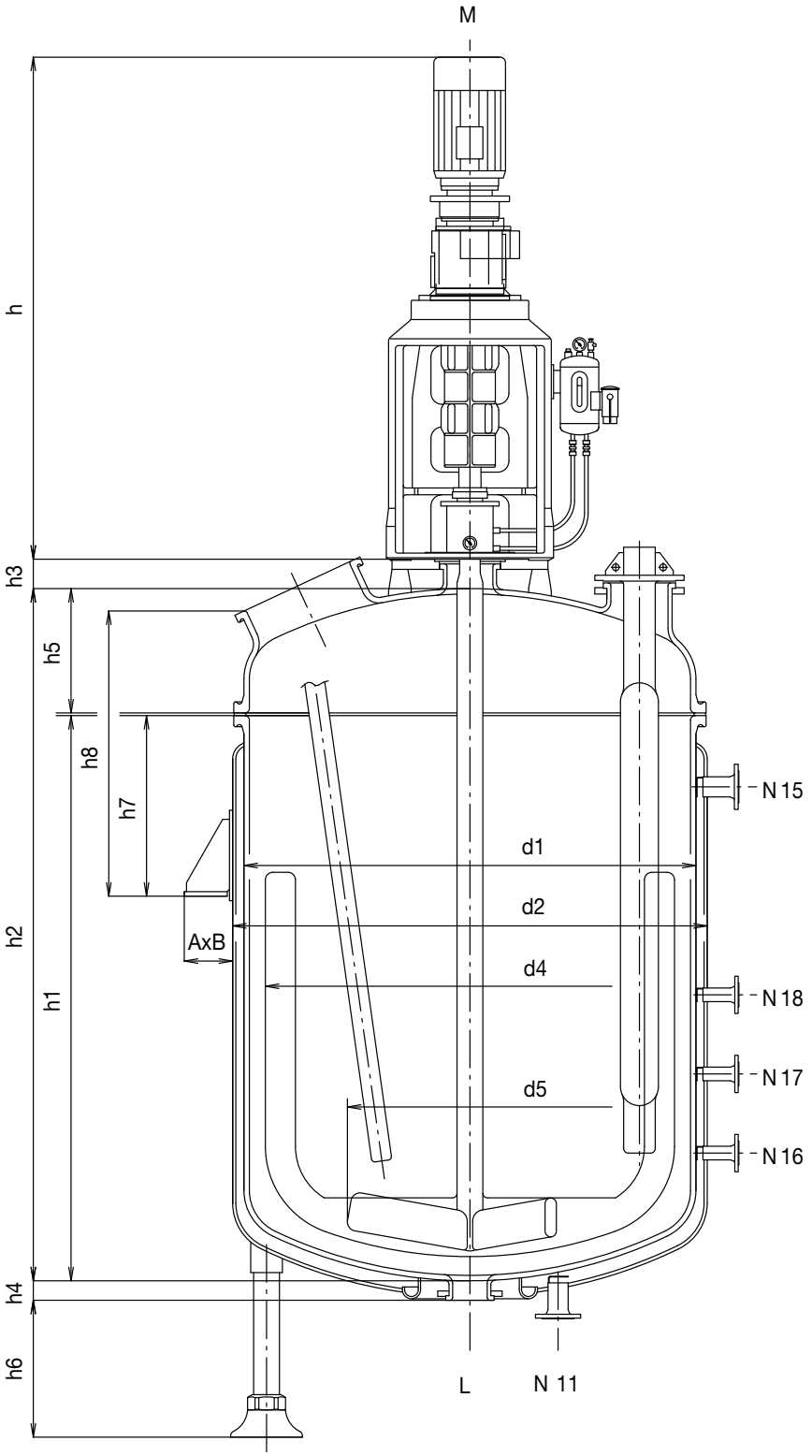
	Design pressure	Design temperature
Inside	-1/+6 bar	-25/+200° C
Jacket	-1/+6 bar	-25/+200° C
Half Coil	-1/+30 bar	-25/+235° C

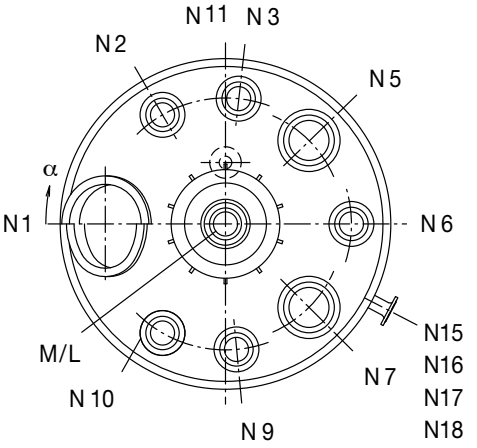
	Allocation of Nozzles	
	Anchor	**Impeller**
N1	Handhole with sight glass	
N4	Thermowell	Light glass
N8	Light glass	Beavertail baffle
N2/N6/N10	Free	

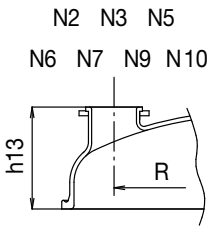
		(*)	AE 63	AE 100	AE 160	AE 250	AE 400	AE 630
Nominal capacity		Litres	63	100	160	250	400	630
Total capacity		Litres	90	127	210	327	533	847
Jacket capacity		Litres	24	38	55	77	120	152
Heating area (with jacket)		m²	0,56	0,88	1,25	1,7	2,5	3,1
Approx. weight without motor and supporting		daN	480	530	640	850	1040	1500
Main dimensions		d1	508	508	600	700	800	1000
		h1	400	600	700	800	1000	1000
		d2	600	600	700	800	900	1100
		d4	420	420	500	600	700	880
		d5	300	300	360	420	480	600
		h2	590	790	910	1030	1260	1310
		h3	70	70	70	80	80	90
		h4	70	70	70	70	80	75
		h5	180	180	200	220	250	300
Support System	Support legs	Quantity h6 min.	4 500	4 500	4 500	4 500	4 500	4 500
	Support lugs	A x B h7 min. h8 min.	100 x 140 370 570	100 x 140 370 570	100 x 140 370 590	100 x 140 380 600	100 x 140 380 630	160 x 160 405 680
	Support ring	d7 h11 min. h12 min.	- - -	- - -	- - -	1170 290 510	1270 290 540	1470 320 595
Nozzles on Vessel	M	DN	50	50	50	80	80	125
	L		80	80	80	80	100	100
	N2	DN / h13 R / α	40 / 230 210 / 65°	40 / 230 210 / 65°	50 / 250 240 / 65°	50 / 270 280 / 65°	80 / 300 310 / 65°	100 / 350 380 / 65°
	N8		50 / 230 210 / 240°	50 / 230 210 / 240°	80 / 250 240 / 240°	80 / 270 280 / 240°	80 / 300 310 / 240°	100 / 350 380 / 240°
	N10		40 / 230 210 / 295°	40 / 230 210 / 295°	50 / 250 240 / 295°	50 / 270 280 / 295°	80 / 300 310 / 295°	100 / 350 380 / 295°
	N1	DN / h13 R / β	100 / 100 210 / 0° 30°	100 / 100 210 / 0° 30°	100 / 100 240 / 0° 30°	150 / 100 280 / 0° 30°	200 / 115 300 / 0° 30°	250 / 115 370 / 0° 30°
	N4		80 / 90 210 / 120° 20°	80 / 90 210 / 120° 20°	80 / 90 240 / 120° 12°	80 / 90 280 / 120° 12°	80 / 90 310 / 120° 12°	100 / 90 380 / 120° 14°
	N6		80 / 90 210 / 180° 20°	80 / 90 210 / 180° 20°	80 / 250 240 / 180° -	80 / 270 280 / 180° -	100 / 300 310 / 180° -	150 / 350 380 / 180° -
Jacket Nozzles	N11	DN / α	40 / 90°	40 / 90°	40 / 90°	40 / 90°	40 / 90°	50 / 90°
	N15		40 / 208°	40 / 208°	40 / 208°	40 / 208°	40 / 208°	50 / 208°
	N16		-	-	-	40 / 208°	40 / 208°	50 / 208°
Drive		MDL Type	40	40	40	50	50	60
		h *	1040	1040	1040	1115	1115	1505

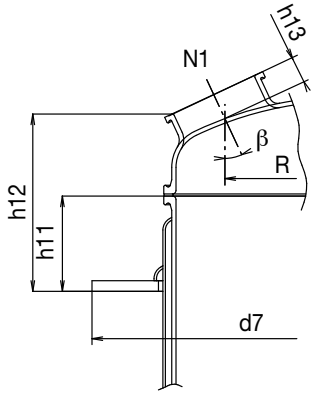
α : Orientation angle β : Tilt angle * with a standard motor

* AE 25: available on request









	Design pressure	Design temperature
Inside	-1/+6 bar	-25/+200° C
Jacket	-1/+6 bar	-25/+200° C
Half Coil	-1/+30 bar	-25/+235° C

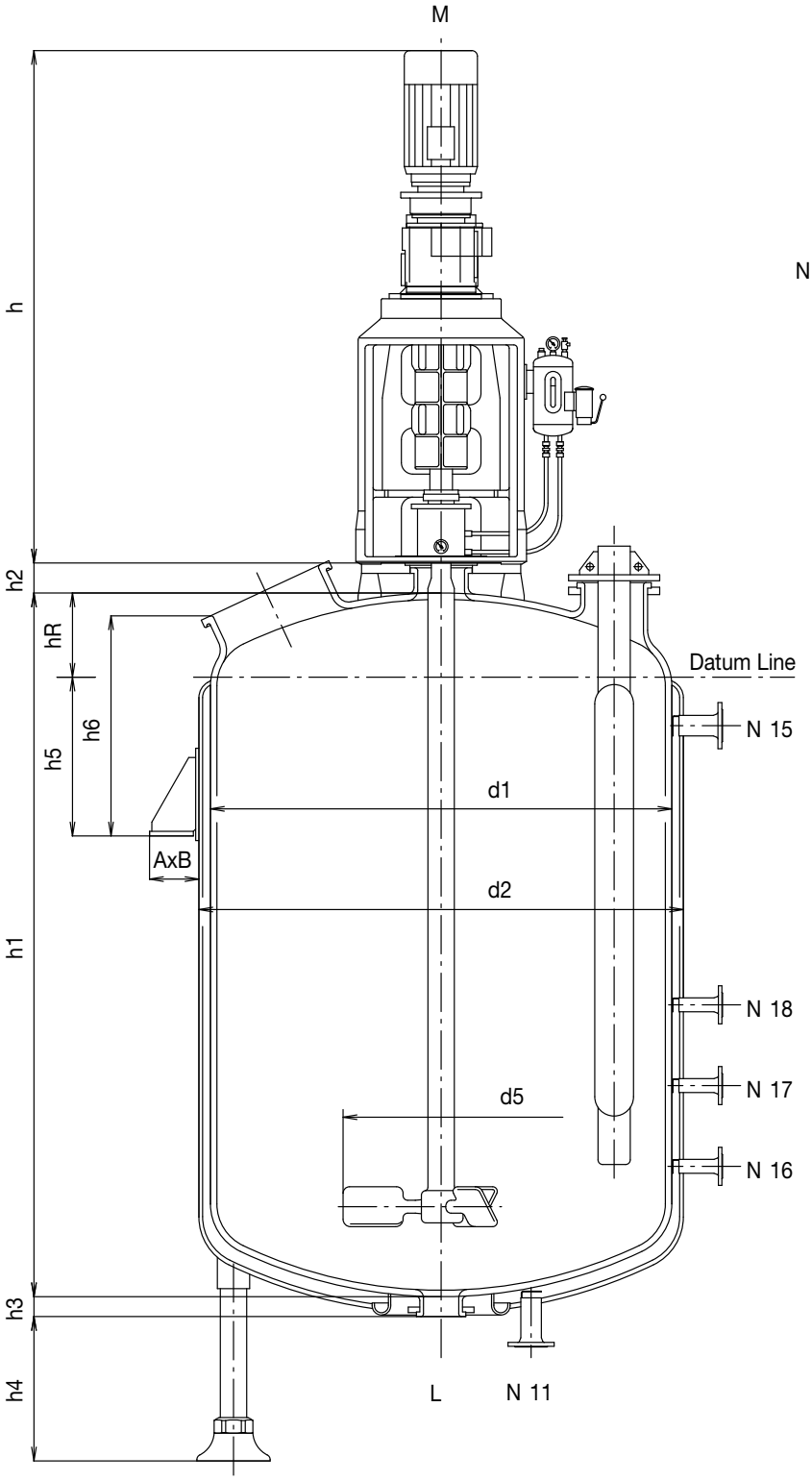
	Allocation of Nozzles	
	Anchor	**Impeller**
N1	Manhole with sight glass	
N5 or N7	Thermowell	
N6	Light glass	
N2/N3/N9/N10	Free	

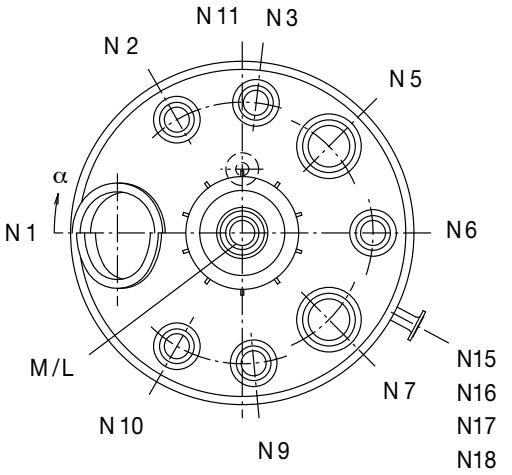
			AE 1000	AE 1600	AE 2500	AE 4000	AE 6300
Nominal capacity		Litres	1000	1600	2500	4000	6300
Total capacity		Litres	1447	2309	3464	5374	8203
Jacket capacity		Litres	216	288	368	499	677
Heating area (with jacket)		m²	4,6	6,3	8,3	11,7	15,6
Approx. weight without motor and supporting		daN	2230	3240	4150	6000	8070
Main dimensions		d1	1200	1400	1600	1800	2000
		h1	1200	1400	1600	2000	2500
		d2	1300	1500	1700	1900	2100
		d4	1060	1250	1440	1630	1810
		d5	720	840	960	1100	1100
		h2	1550	1810	2070	2510	3060
		h3	100	100	100	130	130
		h4	75	70	70	70	85
		h5	340	400	460	500	550
Support System	Support legs	Quantity h6 min.	4 500	4 500	4 500	4 500	4 700
	Support lugs	A x B h7 min. h8 min.	160 x 160 405 710	180 x 220 475 830	180 x 220 485 885	200 x 320 630 1055	200 x 320 640 1105
	Support ring	d7 h11 min. h12 min.	1670 325 630	1890 345 700	2090 345 745	2290 370 795	2510 375 840
Nozzles on Vessel	M	DN	125	150	150	200	200
	L		100	100	100	100	150
	N1	DN / h13 R / β	350x450/125 440 / 25°	350x450/125 500 / 25°	350x450/125 580 / 25°	500 / 150 630 / 25°	500 / 700 700 / 25°
	N2	DN / h13 R / α	100 / 380 500 / 67,5°	100 / 425 575 / 60°	100 / 470 675 / 65°	150 / 500 725 / 65°	150 / 550 800 / 60°
	N3		100 / 380 500 / 95°	100 / 425 575 / 95°	100 / 470 675 / 95°	150 / 500 725 / 95°	150 / 550 800 / 95°
	N5		200 / 410 450 / 137,5°	200 / 450 550 / 135°	200 / 510 625 / 135°	250 / 525 675 / 135°	250 / 575 750 / 135°
	N6		100 / 380 500 / 180°	100 / 425 575 / 180°	100 / 470 675 / 180°	150 / 500 725 / 180°	150 / 550 800 / 180°
	N7		200 / 410 450 / 222,5°	200 / 450 550 / 225°	200 / 510 625 / 225°	250 / 525 675 / 225°	250 / 575 750 / 225°
	N9		100 / 380 500 / 265°	100 / 425 575 / 265°	100 / 470 675 / 265°	150 / 500 725 / 265°	150 / 550 800 / 265°
	N10		100 / 380 500 / 292,5°	100 / 425 575 / 300°	100 / 470 675 / 295°	150 / 500 725 / 295°	150 / 550 800 / 300°
Jacket Nozzles	N11	DN / α	50 / 90°	50 / 90°	50 / 90°	50 / 90°	80 / 90°
	N15		50 / 208°	50 / 208°	50 / 208°	50 / 208°	80 / 208°
	N16		50 / 208°	50 / 208°	50 / 208°	50 / 208°	50 / 208°
	N17		-	-	-	50 / 208°	50 / 208°
	N18		-	-	-	-	50 / 208°
Drive		MDL	60	80	80	100	100
		h *	1505	1940	1940	2155	2155

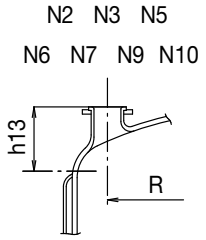
α : Orientation angle

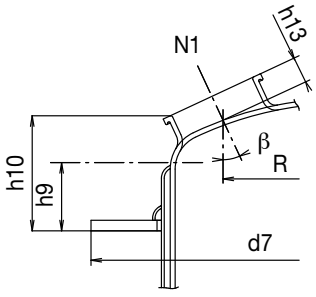
β : Tilt angle

* with a standard motor









	Design pressure	Design temperature
Inside	-1/+6 bar	-25/+200° C
Jacket	-1/+6 bar	-25/+200° C
Half Coil	-1/+30 bar	-25/+235° C

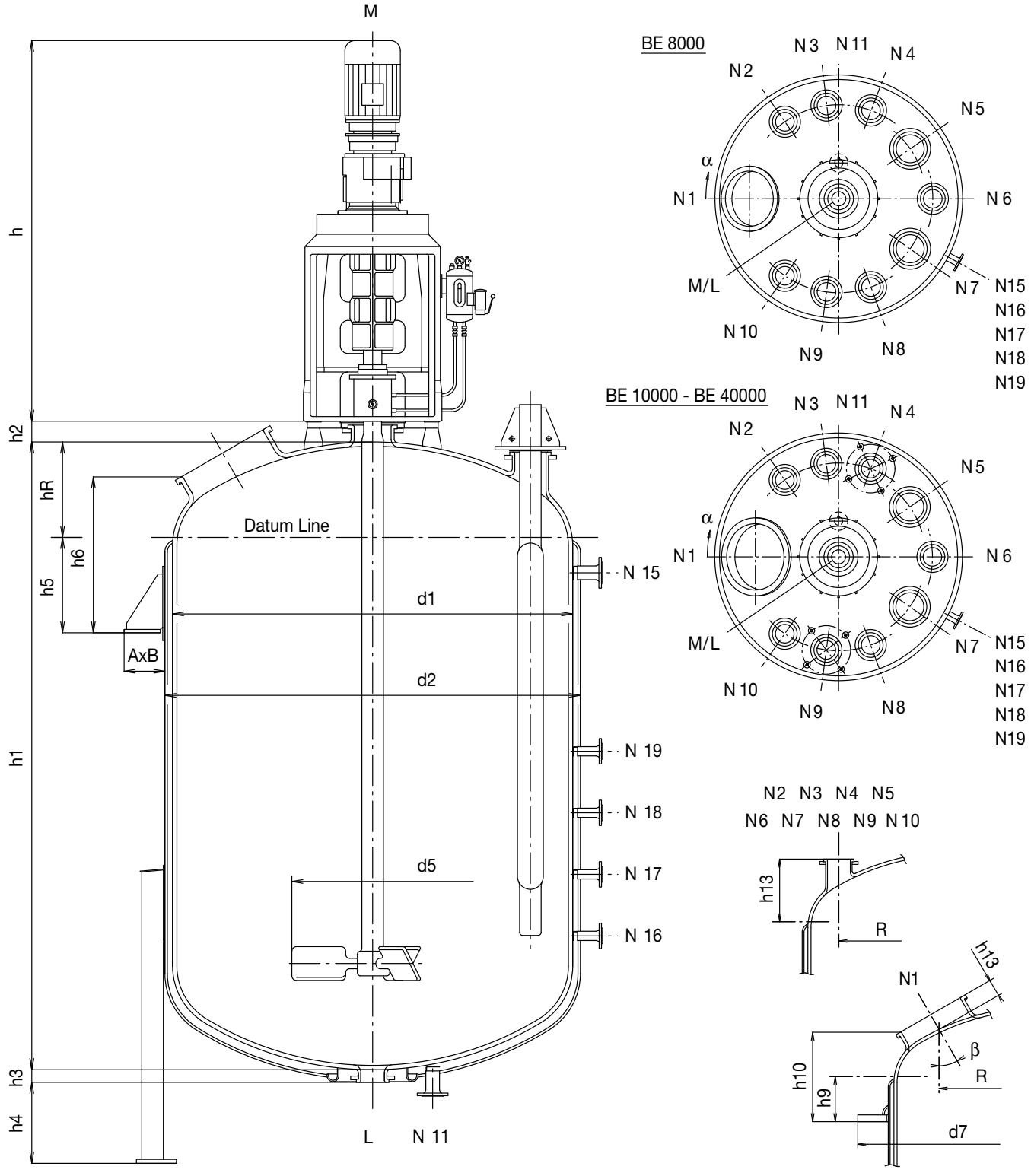
	Allocation of Nozzles
N1	Manhole with sight glass
N5 or N7	Beavertail baffle
N6	Light glass
N2/N3/N9/N10	Free

			BE 1000	BE 1600	BE 2500	BE 4000	BE 6300
Nominal capacity		Litres	1000	1600	2500	4000	6300
Total capacity		Litres	1458	2310	3463	5381	8204
Jacket capacity		Litres	249	333	422	560	712
Heating area (with jacket)		m²	5,4	7,3	9,7	13,4	18,1
Approx. weight without motor and supporting		daN	2400	3200	4200	6200	7700
Main dimensions		d1	1200	1400	1600	1800	2000
		d2	1300	1500	1700	1900	2100
		d5	660	660	750	750	850
		h1	1550	1800	2060	2500	3050
		h2	100	100	100	130	130
		h3	75	70	70	70	85
		hR	225	255	295	330	365
Support System	Support legs	Quantity h4	4 500	4 500	4 500	4 500	4 700
	Support lugs	A x B h5 min. h6 min.	160 x 160 320 510	180 x 220 380 580	180 x 220 380 600	200 x 320 545 790	200 x 320 535 800
	Support ring	d7 h9 min. h10 min.	1670 310 500	1890 240 440	2090 240 460	2290 250 495	2510 270 535
Nozzles on Vessel	M	DN	200	200	200	200	200
	L		100	100	100	100	150
	N1	DN / h13 R / β	350x450 / 150 450 / 30°	350x450 / 125 500 / 25°	500 / 150 570 / 25°	500 / 150 630 / 25°	500 / 150 700 / 25°
	N2	DN / h13 R / α	100 / 280 500 / 67,5°	100 / 280 575 / 60°	100 / 305 675 / 65°	150 / 330 725 / 65°	150 / 365 800 / 60°
	N3		100 / 280 500 / 95°	100 / 280 575 / 95°	100 / 305 675 / 95°	150 / 330 725 / 95°	150 / 365 800 / 95°
	N5		200 / 310 450 / 137,5°	200 / 305 550 / 135°	200 / 345 625 / 135°	250 /355 675 / 135°	250 / 390 750 / 135°
	N6		100 / 280 500 / 180°	100 / 280 575 / 180°	100 / 305 675 / 180°	150 / 330 725 / 180°	150 / 365 800 / 180°
	N7		200 / 310 450 / 222,5°	200 / 305 550 / 225°	200 / 345 625 / 225°	250 / 355 675 / 225°	250 / 390 750 / 225°
	N9		100 / 280 500 / 265°	100 / 280 575 / 265°	100 / 305 675 / 265°	150 / 330 725 / 265°	150 / 365 800 / 265°
	N10		100 / 280 500 / 292,5°	100 / 280 575 / 300°	100 / 305 675 / 295°	150 / 330 725 / 295°	150 / 365 800 / 300°
Jacket Nozzles	N11	DN / α	50 / 90°	50 / 90°	50 / 90°	50 / 90°	80 / 90°
	N15		50 / 208°	50 / 208°	50 / 208°	50 / 208°	80 / 208°
	N16		50 / 208°	50 / 208°	50 / 208°	50 / 208°	50 / 208°
	N17		-	-	-	50 / 208°	50 / 208°
	N18		-	-	-	-	50 / 208°
Drive		MDL Type	80	80	80	100	100
		h *	1725	1790	1940	2155	2155

α : Orientation angle

β : Tilt angle

* with a standard motor



	Design pressure	Design temperature
Inside	-1/+6 bar	-25/+200° C
Jacket	-1/+6 bar	-25/+200° C
Half Coil	-1/+30 bar	-25/+235° C

	Allocation of Nozzles
N1	Manhole with sight glass
N4 or N9*	Beavertail baffle
N6	Light glass
N2/N3/N5/N7 N8/N10	Free

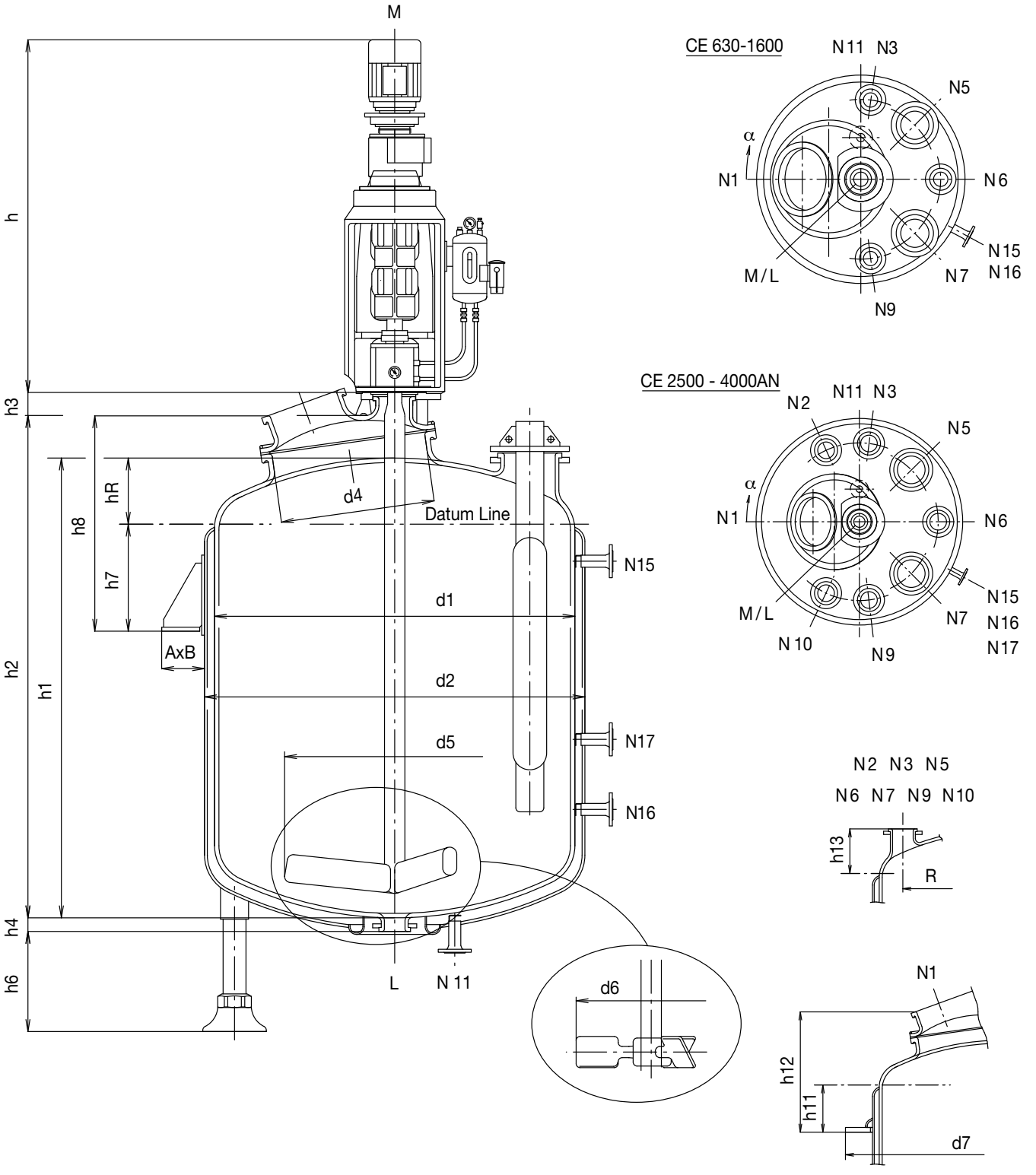
* N5 or N7 for BE 8000

			BE 8000	BE 10000	BE 12500	BE 16000	BE 20000	BE 25000	BE 32000	BE 40000
Nominal capacity		Litres	8000	10000	12500	16000	20000	25000	32000	40000
Total capacity		Litres	9353	11749	14340	18169	22649	28309	36690	44700
Jacket capacity		Litres	757	866	1031	1144	1307	1510	2750	3320
Heating area (with jacket)		m²	18	20,7	25,2	29,5	34	39,5	45,4	55,2
Approx. weight without motor and supporting		daN	8600	11600	13100	16100	18900	22000	30100	34500
Main dimensions		d1	2200	2400	2400	2600	2800	3000	3400	3400
		d2	2300	2500	2500	2700	2900	3100	3550	3550
		d5	850	1050	1050	1050	1200	1200	1372	1372
		h1	3000	3180	3780	4080	4385	4755	4875	5795
		h2	130	135	135	135	135	135	135	135
		h3	85	85	85	80	80	80	70	80
		hR	520	570	570	620	670	720	835	835
Support System	Support legs	Quantity	4	4	4	6	6	6	6	6
		h4	700	700	700	700	700	700	700	700
	Support lugs	A x B	200 x 320	250 x 360	250 x 360	250 x 360	250 x 360	320 x 450	320 x 450	320 x 450
		h5 min.	540	605	605	620	620	735	750	750
		h6 min.	870	955	955	1015	1035	1170	1285	1285
	Support ring	d7	2710	2910	2910	3120	3350	3550	4000	4000
		h9 min.	285	295	295	300	310	310	335	335
		h10 min.	615	645	645	695	725	740	870	870
Nozzles on Vessel	M	DN	200	250	250	250	300	300	300	300
	L		150	150	150	150	150	150	150	150
	N1	DN / h13 R / β	600 / 150	600 / 150	600 / 150	600 / 150	600 / 150	600 / 150	600 / 150	600 / 150
			800 / 30°	850 / 30°	850 / 30°	900 / 30°	1000 / 30°	1100 / 30°	1250 / 25°	1250 / 25°
	N2	DN / h13 R / α	150 / 480	200 / 530	200 / 530	200 / 555	200 / 595	200 / 630	200 / 745	200 / 745
			840 / 50°	925 / 55°	925 / 55°	1025 / 55°	1100 / 50°	1175 / 50°	1300 / 50°	1300 / 50°
	N3		150 / 480	200 / 530	200 / 530	200 / 555	200 / 595	200 / 630	200 / 745	200 / 745
			840 / 77,5°	925 / 82,5°	925 / 82,5°	1025 / 82,5°	1100 / 77,5°	1175 / 77,5°	1300 / 77,5°	1300 / 77,5°
	N4		150 / 480	250 / 555	250 / 555	250 / 600	300 / 665	300 / 690	400 / 805	400 / 805
			840 / 110°	900 / 110°	900 / 110°	950 / 110°	1000 / 110°	1075 / 110°	1200 / 110°	1200 / 110°
	N5		300 / 530	300 / 555	300 / 555	300 / 600	400 / 665	400 / 690	400 / 805	400 / 805
			800 / 145°	900 / 145°	900 / 145°	950 / 145°	1000 / 145°	1075 / 145°	1200 / 145°	1200 / 145°
	N6		150 / 480	200 / 530	200 / 530	200 / 555	200 / 595	200 / 630	200 / 745	200 / 745
			840 / 180°	925 / 180°	925 / 180°	1025 / 180°	1100 / 180°	1175 / 180°	1300 / 180°	1300 / 180°
	N7		300 / 530	300 / 555	300 / 555	300 / 600	400 / 665	400 / 690	400 / 805	400 / 805
			800 / 215°	900 / 215°	900 / 215°	950 / 215°	1000 / 215°	1075 / 215°	1200 / 215°	1200 / 215°
	N8		150 / 480	200 / 530	200 / 530	200 / 555	200 / 595	200 / 630	200 / 745	200 / 745
			840 / 250°	925 / 250°	925 / 250°	1025 / 250°	1100 / 250°	1175 / 250°	1300 / 250°	1300 / 250°
	N9		150 / 480	250 / 555	250 / 555	250 / 600	300 / 665	300 / 690	400 / 805	400 / 805
			840 / 282,5°	900 / 277,5°	900 / 277,5°	950 / 277,5°	1000 / 282,5°	1075 / 282,5°	1200 / 282,5°	1200 / 282,5°
	N10		150 / 480	200 / 530	200 / 530	200 / 555	200 / 595	200 / 630	200 / 745	200 / 745
			840 / 310°	925 / 305°	925 / 305°	1025 / 305°	1100 / 310°	1175 / 310°	1300 / 310°	1300 / 310°
Jacket Nozzles	N11	DN / α	80 / 90°	80 / 90°	80 / 90°	80 / 90°	80 / 90°	80 / 90°	100 / 90°	100 / 90°
	N15		80 / 208°	80 / 208°	80 / 208°	80 / 208°	80 / 208°	80 / 208°	100 / 208°	100 / 208°
	N16		50 / 208°	50 / 208°	50 / 208°	50 / 208°	50 / 208°	50 / 208°	80 / 208°	80 / 208°
	N17		50 / 208°	50 / 208°	50 / 208°	50 / 208°	50 / 208°	50 / 208°	80 / 208°	80 / 208°
	N18		50 / 208°	50 / 208°	50 / 208°	50 / 208°	50 / 208°	50 / 208°	80 / 208°	80 / 208°
	N19		-	-	-	50 / 208°	50 / 208°	50 / 208°	80 / 208°	80 / 208°
Drive		MDL Type	100	125	125	125	140	140	160	160
		h *	2155	2475	2475	2475	2680	2680	3100	3100

α : Orientation angle

β : Tilt angle

* with a standard motor



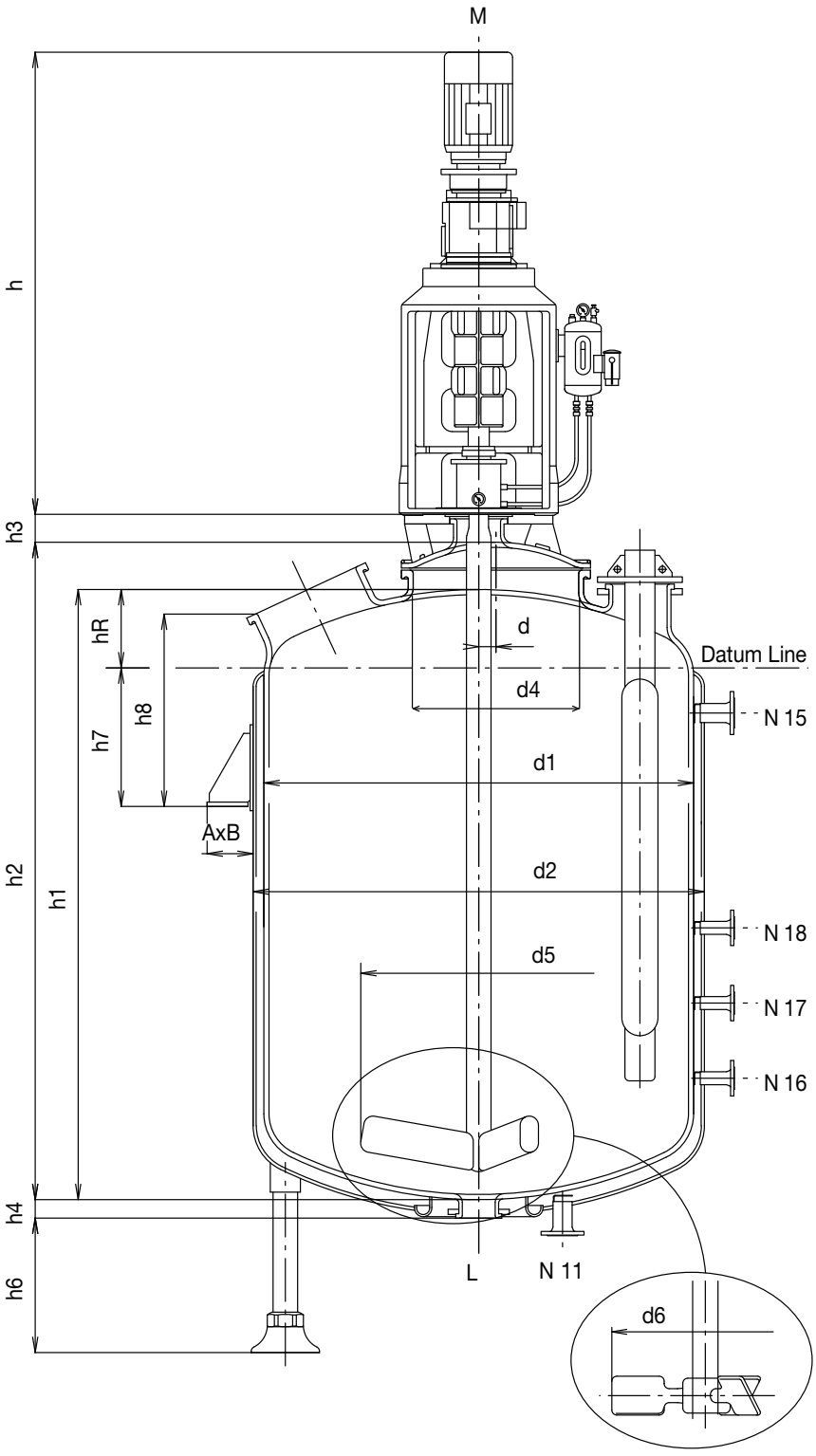
	Design pressure	Design temperature
Inside	-1/+6 bar	-25/+200° C
Jacket	-1/+6 bar	-25/+200° C
Half Coil	-1/+30 bar	-25/+235° C

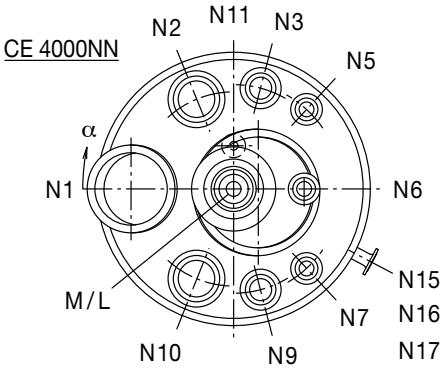
	Allocation of Nozzles
N1	Manhole with sight glass
N5 or N7	Beavertail baffle
N6	Light glass
N2/N3/N9/N10	Free

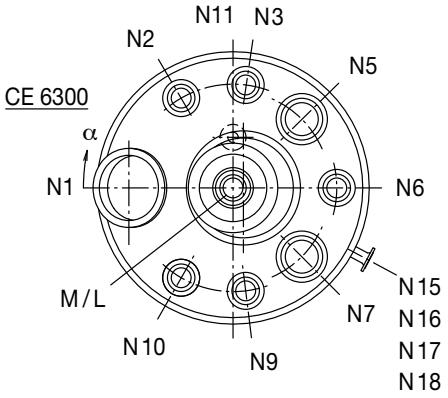
			CE 630	CE 1600	CE 2500	CE 4000AN
Nominal capacity		**Litres**	630	1600	2500	4000
Total capacity		**Litres**	847	2033	3079	4888
Jacket capacity		**Litres**	182	299	382	515
Heating area (with jacket)		**m²**	3,9	6,5	8,7	12,2
Approx. weight without motor and supporting		**daN**	2000	3050	4000	5600
Main dimensions		**d1**	1000	1400	1600	1800
		h1	1300	1611	1859	2297
		d2	1100	1500	1700	1900
		d4	500	770	770	770
		d5	600	840	960	1100
		d6	600	660	750	750
		h2	1455	1810	2070	2510
		h3	100	115	115	115
		h4	75	75	70	70
		hR	165	255	295	330
Support system	**Support legs**	**Quantity h6 min.**	4 500	4 500	4 500	4 500
	Support lugs	**A x B h7 min. h8 min.**	160 x 160 340 720	180 x 220 380 830	180 x 220 380 885	200 x 320 545 1085
	Support ring	**d7 h11 min. h12 min.**	1440 240 620	1890 240 690	2090 240 745	2290 250 795
Nozzles on vessel	**M**	**DN**	125	150	150	150
	L		100	100	100	100
	N1		200	350 / 450	350 / 450	350 / 450
	N2	**DN / h13 R / α**	-	-	100 / 305 675 / 65°	150 / 330 725 / 65°
	N3		100 / 215 400 / 95°	100 / 280 575 / 95°	100 / 305 675 / 95°	150 / 330 725 / 95°
	N5		100 / 215 380 / 135°	200 / 305 550 / 135°	200 / 345 625 / 135°	250 / 355 675 / 135°
	N6		150 / 215 380 / 180°	100 / 280 575 / 180°	100 / 305 675 / 180°	150 / 330 725 / 180°
	N7		100 / 215 380 / 225°	200 / 305 550 / 225°	200 / 345 625 / 225°	250 / 355 675 / 225°
	N9		100 / 215 400 / 265°	100 / 280 575 / 265°	100 / 305 675 / 265°	150 / 330 725 / 265°
	N10		-	-	100 / 305 675 / 295°	150/ 330 725 / 295°
Jacket Nozzles	**N11**	**DN / α**	50 / 90°	50 / 90°	50 / 90°	50 / 90°
	N15		50 / 208°	50 / 208°	50 / 208°	50 / 208°
	N16		50 / 208°	50 / 208°	50 / 208°	50 / 208°
	N17		-	-	-	50 / 208°
Drive		**MDL Type**	60	80	80	80
		h *	1505	1940	1940	1940

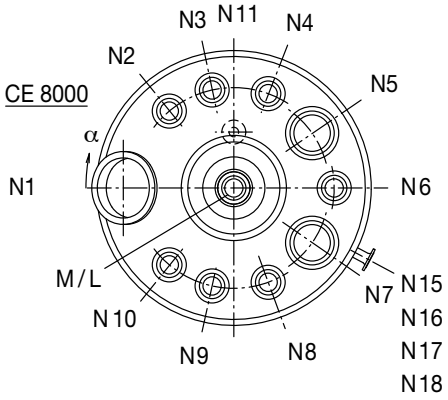
α : Orientation angle

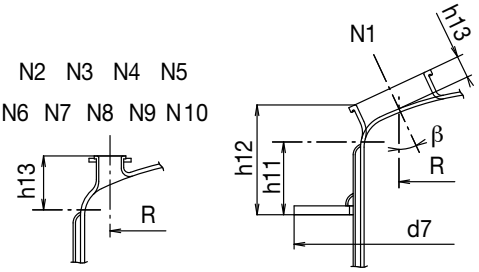
* with a standard motor











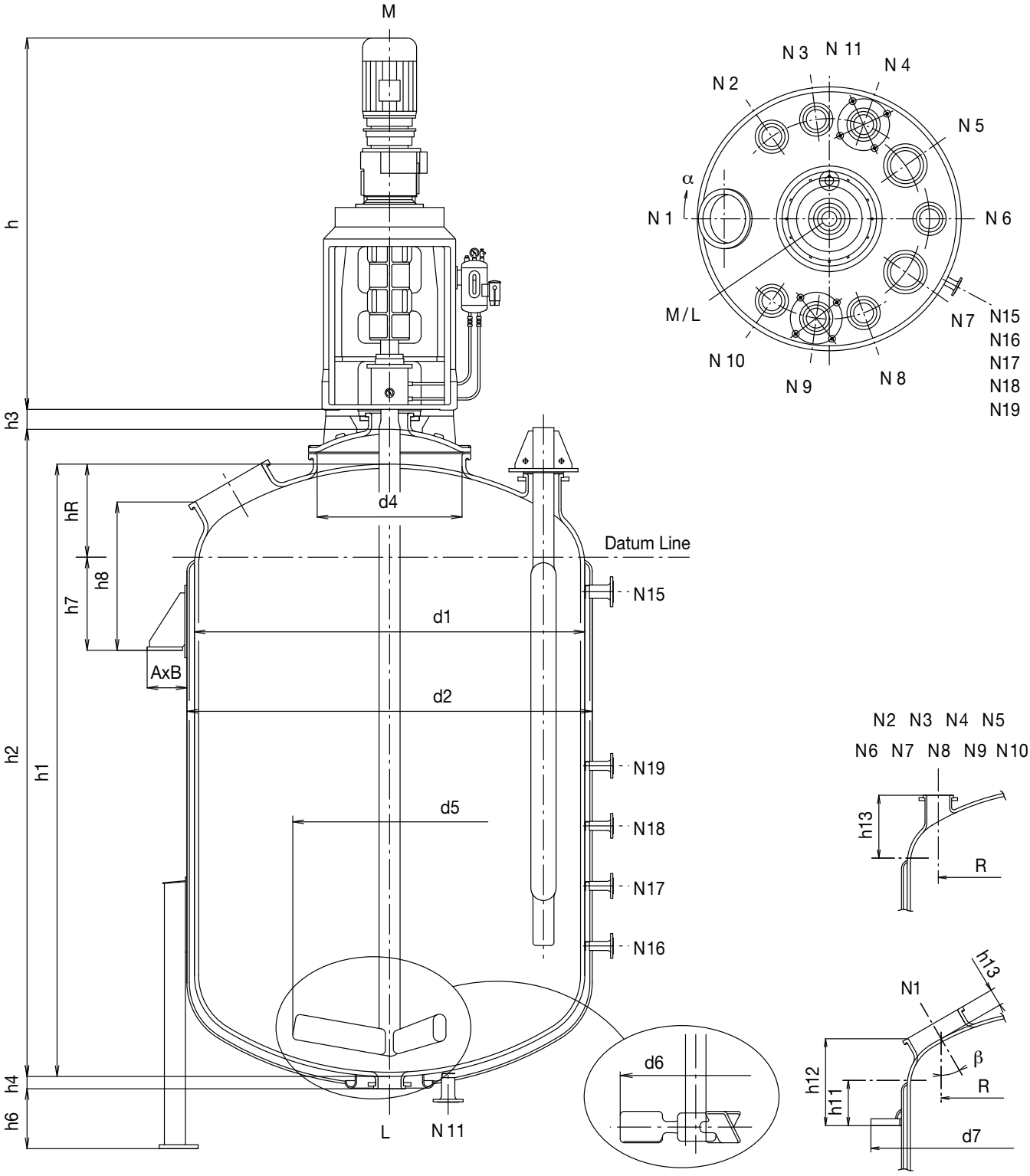
	Design pressure	Design temperature
Inside	-1/+6 bar	-25/+200° C
Jacket	-1/+6 bar	-25/+200° C
Half Coil	-1/+30 bar	-25/+235° C

Allocation of Nozzles	
N1	Manhole with sight glass
N2 or N10*	Beavertail baffle
N5 or N7**	
N6	Light glass
Other Nozzles	Free

* For CE 4000NN
** For CE 6300 and 8000

			CE 4000NN	CE 6300	CE 8000
Nominal capacity		Litres	4000	6300	8000
Total capacity		Litres	4888	7575	9353
Jacket capacity		Litres	515	712	757
Heating area (with jacket)		m²	12,2	16,8	18
Approx.weight without motor and supporting		daN	6000	7600	8750
Main Dimensions		d1	1800	2000	2200
		h1	2297	2840	3000
		d2	1900	2100	2300
		d4 / d	770 / 200	770 / 80	770 / -
		d5	1100	1100	1100
		d6	750	850	850
		h2	2510	3060	3210
		h3	130	130	130
		h4	70	85	85
		hR	330	365	520
Support system	Support legs	Quantity h6 min.	4 500	4 700	4 700
	Support lugs	A x B h7 min. h8 min.	200 x 320 545 1085	200 x 320 535 785	200 x 320 540 845
	Support ring	d7 h11 min. h12 min.	2290 250 795	2510 270 520	2710 285 590
Nozzles on Vessel	M	DN	200	200	200
	L		100	150	150
	N1	DN / h13 R / β	500 / 150 650 / 25°	500 / 150 740 / 25°	500 / 150 850 / 30°
	N2	DN / h13 R / α	250 / 355 675 / 67,5°	150 / 365 800 / 60°	150 / 480 840 / 50°
	N3		150 / 330 725 / 105°	150 / 356 800 / 95°	150 / 480 840 / 77,5°
	N4		-	-	150 / 480 840 / 110°
	N5		100 / 315 750 / 132,5°	250 / 390 750 / 135°	300 / 530 800 / 145°
	N6		-	150 / 365 800 / 180°	150 / 480 840 / 180°
	N7		100 / 315 750 / 227,5°	250 / 390 750 / 225°	300 / 530 800 / 215°
	N8		-	-	150 / 480 840 / 250°
	N9		150 / 330 725 / 255°	150 / 365 800 / 265°	150 / 480 840 / 282,5°
	N10		250 / 355 675 / 292,5°	150 / 365 800 / 300°	150 / 480 840 / 310°
Jacket Nozzles	N11	DN / α	50 / 90°	80 /90°	80 / 90°
	N15		50 / 208°	80 / 208°	80 / 208°
	N16		50 / 208°	50 / 208°	50 / 208°
	N17		50 / 208°	50 / 208°	50 / 208°
	N18		-	50 / 208°	50 / 208°
Drive		MDL	100	100	100
		h *	2155	2155	2155

α : Orientation angle β : Tilt angle * with a standard motor



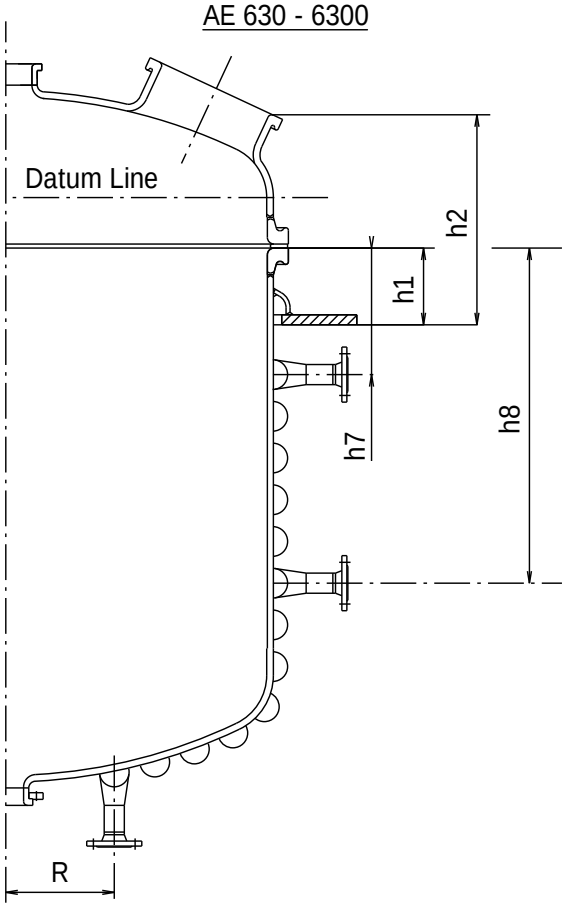
	Design pressure	Design temperature
Inside	-1/+6 bar	-25/+200° C
Jacket	-1/+6 bar	-25/+200° C
Half Coil	-1/+30 bar	-25/+235° C

	Allocation of Nozzles
N1	Manhole with sight glass
N4 or N9	Beavertail baffle
N6	Light glass
N2/N3/N5/N7 N8/N10	Free

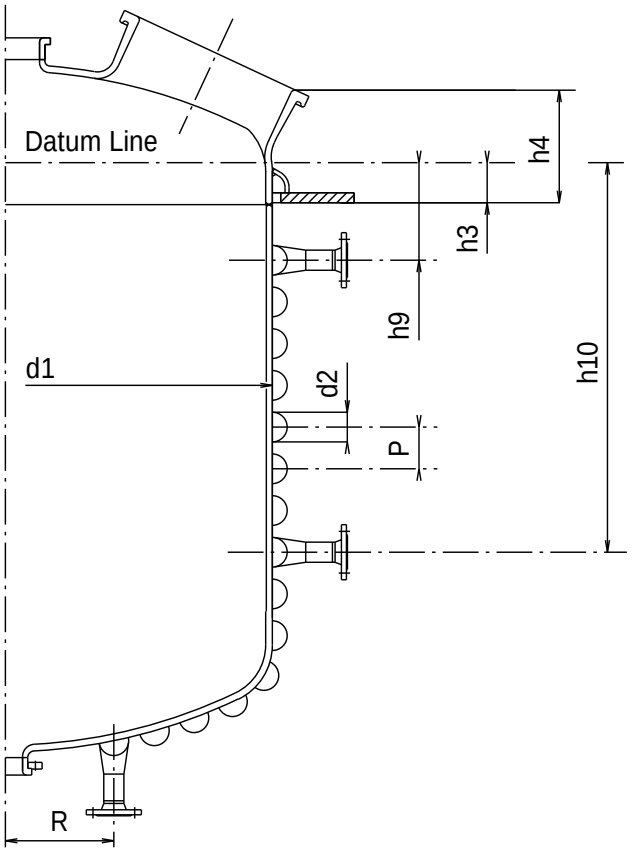
			CE 10000	CE 12500	CE 16000	CE 20000	CE 25000	CE 32000	CE 40000
Nominal capacity		Litres	10000	12500	16000	20000	25000	32000	40000
Total capacity		Litres	11749	14340	18169	22649	28309	36690	44700
Jacket capacity		Litres	866	1031	1144	1307	1510	2750	3320
Heating area (with jacket)		m²	20,7	25,2	29,5	34	39,5	45,4	55,2
Approx. weight without motor and supporting		daN	11800	13300	16300	19200	22300	30500	34800
Main dimensions		d1	2400	2400	2600	2800	3000	3400	3400
		h1	3180	3780	4080	4385	4755	4875	5795
		d2	2500	2500	2700	2900	3100	3550	3550
		d4	965	965	965	1160	1160	1350	1350
		d5	1300	1300	1350	1500	1500	1700	1700
		d6	1050	1050	1050	1200	1200	1372	1372
		h2	3410	4010	4310	4640	5010	5160	5160
		h3	135	135	135	135	135	135	135
		h4	85	85	80	80	80	80	80
		hR	570	570	620	670	720	835	835
Support system	Support legs	Quantity	4	4	6	6	6	6	6
		h6 min.	700	700	700	700	700	700	700
	Support lugs	A x B	250 x 360	250 x 360	250 x 360	250 x 360	320 x 450	320 x 450	320 x 450
		h7 min.	605	605	620	620	735	750	750
		h8 min.	930	930	990	980	1115	1260	1260
	Support ring	d7	2910	2910	3120	3350	3550	4000	4000
		h11 min.	295	295	300	310	310	335	335
		h12 min.	620	620	670	670	690	845	845
Nozzles on vessel	M	DN	250	250	250	250	250	250	250
	L		150	150	150	150	150	150	150
	N1	DN / h13 R / β	500 / 150 950 / 30°	500 / 150 950 / 30°	500 / 150 1000 / 30°	600 / 150 1150 / 30°	600 / 150 1200 / 30°	600 / 150 1250 / 30°	600 / 150 1250 / 30°
	N2	DN / h13 R / α	200 / 530 925 / 55°	200 / 530 925 / 55°	200 / 555 1025 / 55°	200 / 595 1100 / 50°	200 / 630 1175 / 50°	200 / 745 1300 / 50°	200 / 745 1300 / 50°
	N3		200 / 530 925 / 82,5°	200 / 530 925 / 82,5°	200 / 555 1025 / 82,5°	200 / 595 1100 / 77,5°	200 / 630 1175 / 77,5°	200 / 745 1300 / 77,5°	200 / 745 1300 / 77,5°
	N4		250 / 555 900 / 110°	250 / 555 900 / 110°	250 / 600 950 / 110°	300 / 665 1000 / 110°	300 / 690 1075 / 110°	400 / 805 1200 / 110°	400 / 805 1200 / 110°
	N5		300 / 555 900 / 145°	300 / 555 900 / 145°	300 / 600 950 / 145°	400 / 665 1000 / 145°	400 / 690 1075 / 145°	400 / 805 1200 / 145°	400 / 805 1200 / 145°
	N6		200 / 530 925 / 180°	200 / 530 925 / 180°	200 / 555 1025 / 180°	200 / 595 1100 / 180°	200 / 630 1175 / 180°	200 / 745 1300 / 180°	200 / 745 1300 / 180°
	N7		300 / 555 900 / 215°	300 / 555 900 / 215°	300 / 600 950 / 215°	400 / 665 1000 / 215°	400 / 690 1075 / 215°	400 / 805 1200 / 215°	400 / 805 1200 / 215°
	N8		200 / 530 925 / 250°	200 / 530 925 / 250°	200 / 555 1025 / 250°	200 / 595 1100 / 250°	200 / 630 1175 / 250°	200 / 745 1300 / 250°	200 / 745 1300 / 250°
	N9		250 / 555 900 / 277,5°	250 / 555 900 / 277,5°	250 / 600 950 / 277,5°	300 / 665 1000 / 282,5°	300 / 690 1075 / 282,5°	400 / 805 1200 / 282,5°	400 / 805 1200 / 282,5°
	N10		200 / 530 925 / 305°	200 / 530 925 / 305°	200 / 555 1025 / 305°	200 / 595 1100 / 310°	200 / 630 1175 / 310°	200 / 745 1300 / 310°	200 / 745 1300 / 310°
Jacket Nozzles	N11	DN / α	80 / 90°	80 / 90°	80 / 90°	80 / 90°	80 / 90°	100 / 90°	100 / 90°
	N15		80 / 208°	80 / 208°	80 / 208°	80 / 208°	80 / 208°	100 / 208°	100 / 208°
	N16		50 / 208°	50 / 208°	50 / 208°	50 / 208°	50 / 208°	80 / 208°	80 / 208°
	N17		50 / 208°	50 / 208°	50 / 208°	50 / 208°	50 / 208°	80 / 208°	80 / 208°
	N18		50 / 208°	50 / 208°	50 / 208°	50 / 208°	50 / 208°	80 / 208°	80 / 208°
	N19		-	-	50 / 208°	50 / 208°	50 / 208°	80 / 208°	80 / 208°
Drive		MDL Type	125	125	125	140	140	160	160
		h *	2475	2475	2475	2680	2680	3100	3100

α : Orientation angle β : Tilt angle * with a standard motor

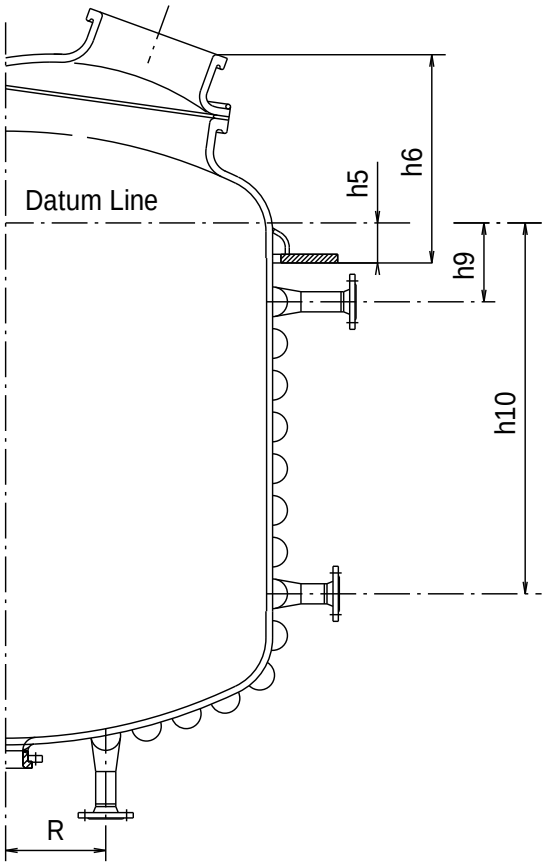
AE 630 - 6300

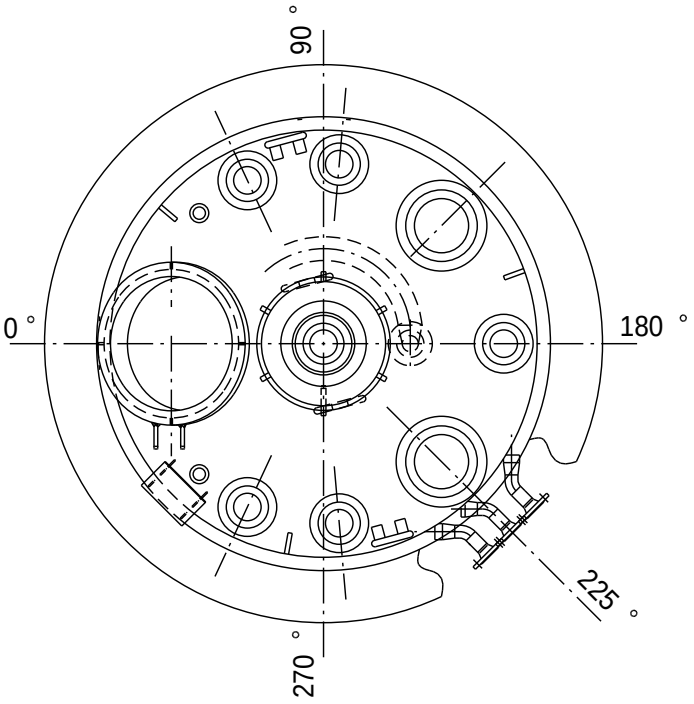


BE, OPX BE, CE 4000NN and larger

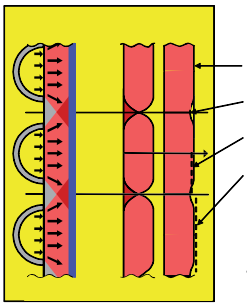


CE 630 to CE 4000AN





Nominal Capacity (Litres)	d1	Half-Coil d2	Half-Coil P	SUPPORT RING ON COLLAR: AE h1 min	AE h2 min	AE h7	AE h8	AE R	CE 630 to CE 4000AN h5 min	CE 630 to CE 4000AN h6 min	CE 630 to CE 4000AN h9	CE 630 to CE 4000AN h10	CE 630 to CE 4000AN R	BE, OPX BE, CE 4000NN and larger h3 min	BE, OPX BE, CE 4000NN and larger h4 min	BE, OPX BE, CE 4000NN and larger h9	BE, OPX BE, CE 4000NN and larger h10	BE, OPX BE, CE 4000NN and larger R
630	1000			195	455	307	565	300	325	120	209	750	300	-	-	-	-	-
1000	1200	60,3	90	200	510	314	842	300	-	-	-	-	-	110	300	299	840	300
1600	1400			215	564	320	1028	300	616	113	317	1038	325	110	305	317	1038	325
2500	1600			220	610	313	1048	325	623	120	307	1182	325	120	335	307	1182	325
4000	1800			235	650	290	1398	325	730	130	288	1538	325	135	375	288	1538	325
6300	2000	88,9	125	240	695	334	1824	350						140	405	363	1978	350
8000	2200													145	475	295	1545	350
10000	2400													145	500	370	1495	350
12500	2400													145	500	345	2095	350
16000	2600													165	575	411	2400	350
20000	2800													175	535	290	2515	400
25000	3000	114,3	150											180	560	459	2540	450
32000	3400													205	715	394	2625	450
40000	3400													215	725	346	3628	450



Example of temperature profile on Process side

Maxi: 27.4°C

Mini: 26.4°C

Average: 26.9°C

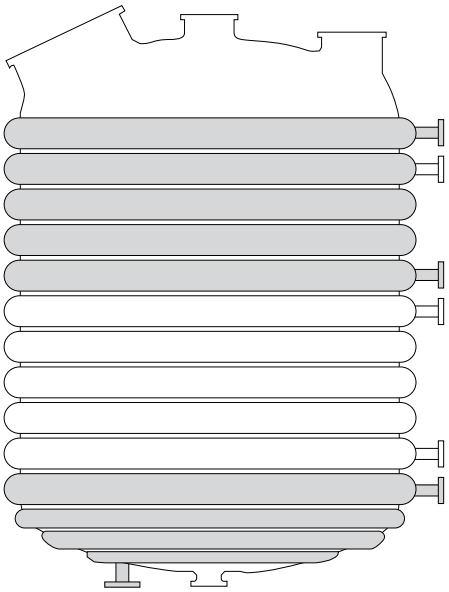
Theoretical: 27.6°C
(all the surface at 90°C)

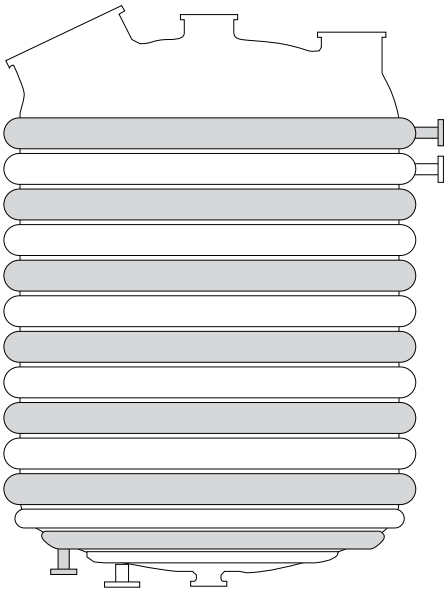
Temperature difference: -0.7°C

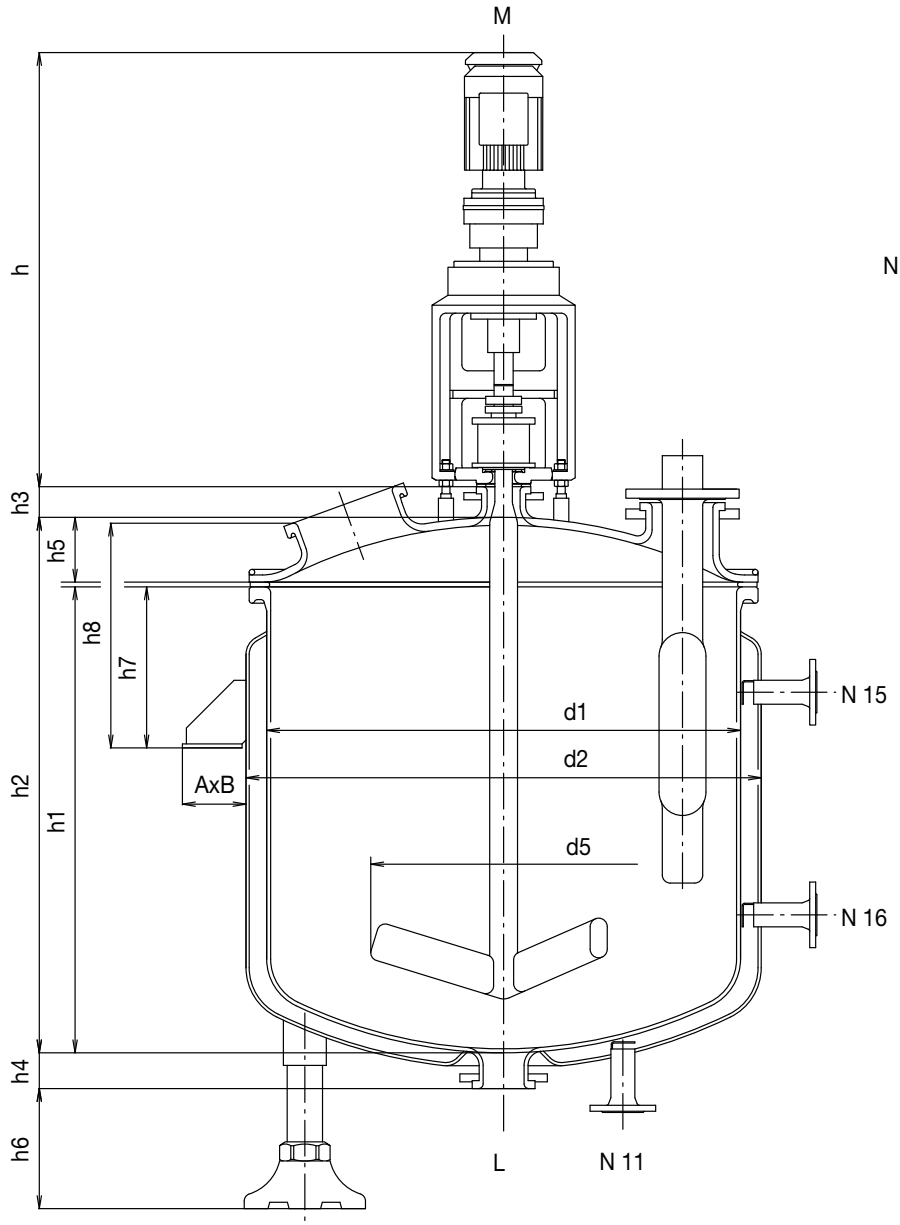
Thermal flux in the half coil

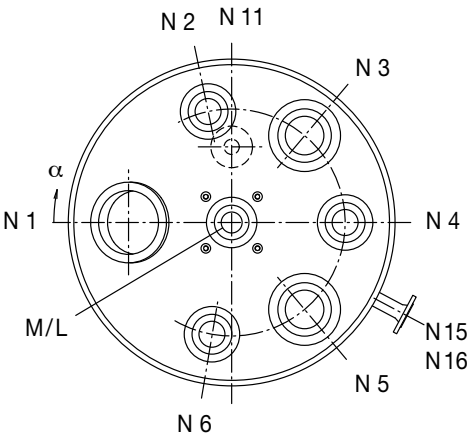
Automized welding tool

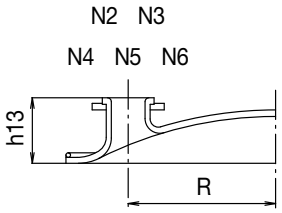
Large design flexibility

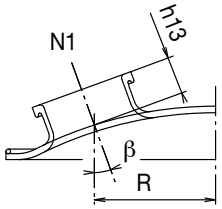










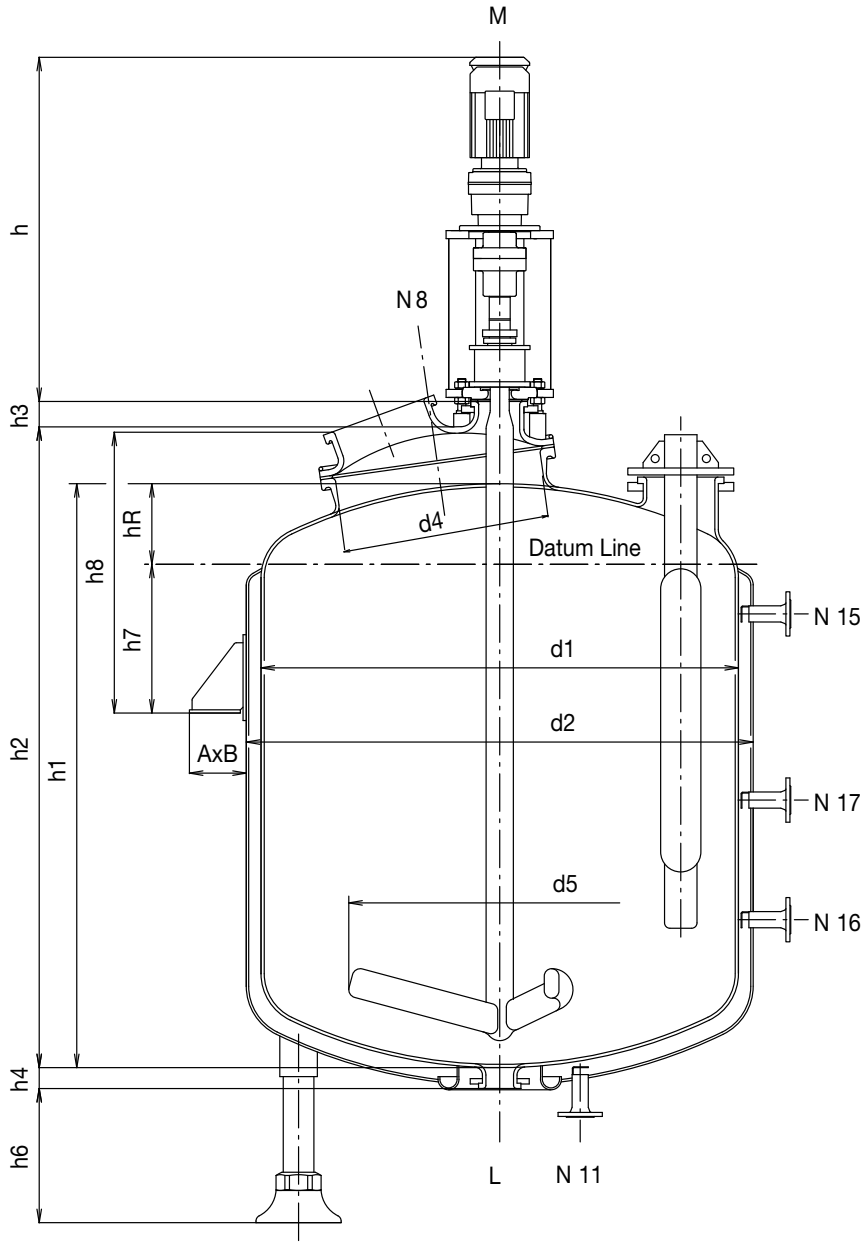


	Design pressure	Design temperature
Inside	-1/+3 bar	-10/+150° C
Jacket	0/+4 bar	-10/+150° C

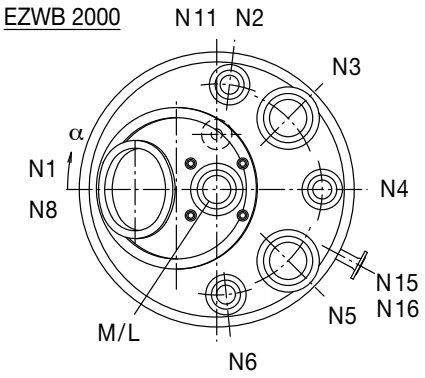
	Allocation of Nozzles
N1	Manhole with sight glass
N5 or N7	Beavertail baffle
N2/N3/N4 N5/N6	Free

			OT 500	OT 1000	OT 2000
Nominal capacity		**Litres**	500	1000	2000
Total capacity		**Litres**	588	1162	2396
Jacket capacity		**Litres**	127	272	365
Heating area		**m²**	2,9	4,5	7
Approx. weight without motor and supporting		**daN**	1000	1350	3400
Main dimensions		**d1**	900	1192	1392
		h1	1031	1172	1565
		d2	992	1300	1500
		d5	610	762	914
		h2	1178	1347	1977
		h3	65	77	79
		h4	70	90	80
		h5	135	163	400
Support System	**Support legs**	**Qty h6 min.**	3 500	3 500	4 500
	Support lugs	**A x B h7 h8**	160 x 160 450 625	160 x 160 405 585	160 x 170 500 860
Nozzles on Vessel	**M**	**DN**	50	80	150
	L		50	100	100
	N1	**DN / h13 R / β**	200 / 115 280 / 20°	250 / 115 370 / 20 °	350x450/125 500 / 25°
	N2	**DN / h13 R/ α**	100 / 180 320 / 70°	100 / 200 450 / 80°	100 / 425 575 / 95°
	N3		50 /180 320 / 125°	150 / 200 450 / 130°	200 / 450 550 / 135°
	N4		100 / 180 320 / 180°	100 / 200 450 / 180°	100 / 425 575 / 180°
	N5		50 / 180 320 / 235°	150 / 200 450 / 230°	200 / 450 550 / 225°
	N6		100 / 180 320 / 290°	100 / 200 450 / 280°	100 / 425 575 / 265°
Jacket Nozzles	**N11**	**DN / α**	50 / 90°	50 / 90°	50 / 90°
	N15		50 / 208°	50 / 208°	50 / 208°
	N16		50 / 208 °	50 / 208°	50 / 208°
Drive		**MNS Type**	40	50	60
		h *	1127	1238	1280

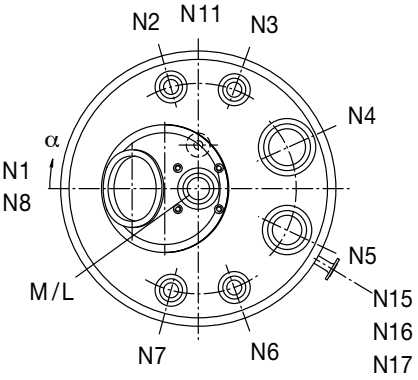
α : Orientation angle β : Tilt angle * with a standard motor

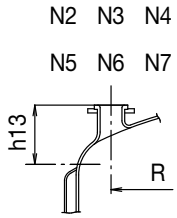


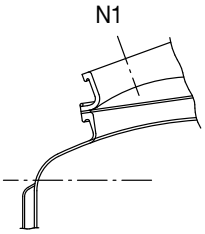
EZWB 2000



EZWB 3000 -> 6000







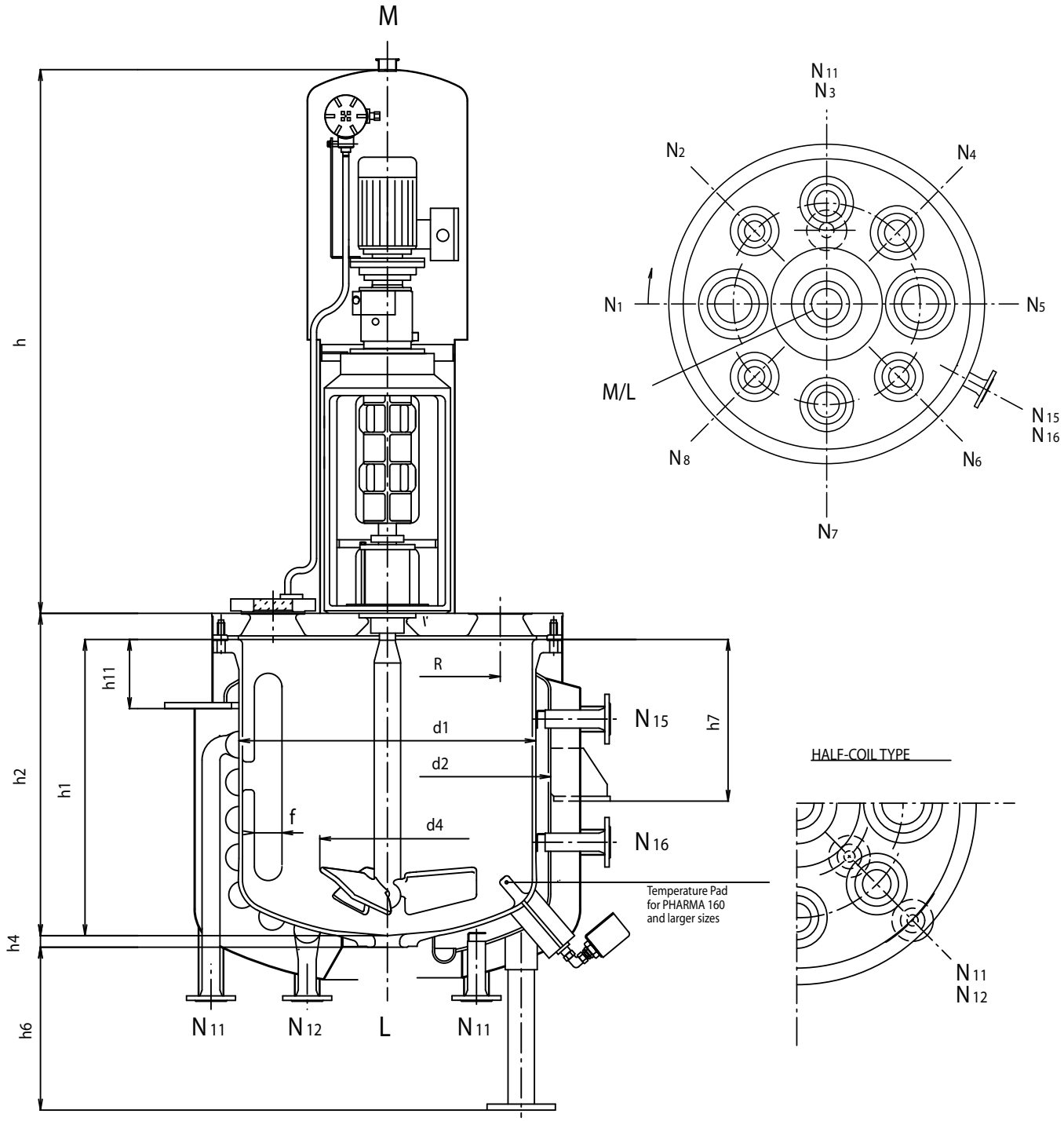
	Design pressure	Design temperature
Inside	-1/+3 bar	-10/+150° C
Jacket	0/+4 bar	-10/+150° C

	Allocation of Nozzles
N1	Manhole with sight glass
N4	Beavertail baffle
N2/N3/N4 N6/N7	Free

			WB 2000	WB 3000	WB 4000	WB 5000	WB 6000
Nominal capacity		Litres	2000	3000	4000	5000	6000
Total capacity		Litres	2273	3445	4611	5670	6937
Jacket capacity		Litres	352	464	548	653	712
Heating area		m²	7,3	9,7	11,6	14,1	15,5
Approx. weight without motor and supporting		daN	2400	2500	3540	4000	5050
Main dimensions		d1	1392	1588	1784	1784	1984
		d2	1500	1700	1896	1896	2094
		d4	770	770	770	770	770
		d5	914	914	1118	1118	1118
		h1	1764	2036	2177	2611	2620
		h2	1958	2232	2380	2814	2824
		h3	98	98	98	98	98
		h4	80	80	75	75	75
		hR	205	265	300	300	350
Support System	Support legs	Quantity h6	4 575	4 650	4 750	4 750	4 800
	Support lugs	A x B h7 h8	160 x 170 500 890	200 x 210 535 995	200 x 212 555 1065	200 x 212 555 1065	200 x 212 550 1100
Nozzles on Vessel	M	DN	150	150	150	150	150
	L		100	100	100	100	100
	N1		350 / 450	350 / 450	350 / 450	350 / 450	350 / 450
	N2	DN / h13 R / α	100 / 210 575 / 95°	100 / 260 675 / 75°	100 / 280 725 / 75°	100 / 280 725 / 75°	100 / 325 800 / 75°
	N3		200 / 260 550 / 135°	100 / 260 675 / 115°	100 / 280 725 / 110°	100 / 280 725 / 110°	100 / 325 800 / 110°
	N4		100 / 210 575 / 180°	200 / 310 625 / 155°	250 / 325 675 / 155°	250 / 325 675 / 155°	250 / 370 750 / 155°
	N5		200 / 260 550 / 225°	200 / 310 625 / 205°	200 / 325 675 / 205°	200 / 325 675 / 205°	250 / 370 750 / 205°
	N6		100 / 210 575 / 265°	100 / 260 675 / 245°	100 / 280 725 / 250°	100 / 280 725 / 250°	100 / 325 800 / 250°
	N7		-	100 / 260 675 / 285°	100 / 280 725 / 285°	100 / 280 725 / 285°	100 / 325 800 / 285°
Jacket Nozzles	N11	DN / α	50 / 90°	50 / 90°	50 / 90°	50 / 90°	50 / 90°
	N15		50 / 208°	50 / 208°	50 / 208°	50 / 208°	50 / 208°
	N16		50 / 208°	50 / 208°	50 / 208°	50 / 208°	50 / 208°
	N17		-	-	-	50 / 208°	50 / 208°
Drive		MNS Type	60	60	80	80	80
		h *	1280	1280	1511	1511	1511

α : Orientation angle

* with a standard motor



	Design pressure	Design temperature
Inside	-1/+6 bar	-25/+200° C
Jacket	-1/+6 bar	-25/+200° C
Half Coil	-1/+30 bar	-25/+235° C

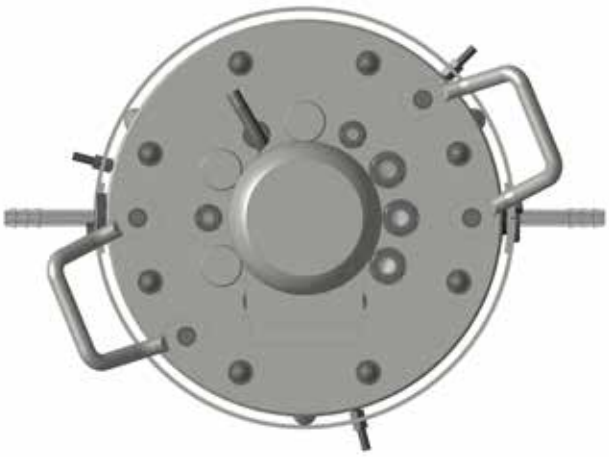
	Allocation of Openings
N1	Fused glass
N2 or N6*	Spray ball
N3 / N4 / N5 / N7 / N8	Free

* N3 / N7 for Pharma 63 and Pharma 100

			63	100	160	250	400	630
Nominal capacity		Litres	63	100	160	250	400	630
Total capacity		Litres	69	107	174	274	453	700
Jacket capacity		Litres	24	38	55	77	120	152
Heating area		m²	0,56	0,88	1,25	1,7	2,5	3,1
Approx. weight without motor and supporting		daN	505	555	665	925	1165	1660
Main dimensions		d1	508	508	600	700	800	1000
		h1	400	600	700	800	1000	1000
		h2	456	656	756	866	1071	1078
		d2	600	600	700	800	900	1100
		d4	250	250	300	380	420	550
		h4	29	29	32	34	35	38
		f	44	44	63	63	88	88
Support System	Support legs	Quantity h6 min.	4 500	4 500	4 500	4 500	4 500	4 500
	Support lugs	h7 min.	370	370	370	380	380	405
	Support ring	h11 min.	-	-	-	290	290	320
Openings on Vessel	M	DN	110	110	110	110	120	125
	L		50	50	50	50	80	80
	N1	DN / R α	50 / 215 0°	50 / 215 0°	50 / 245 0°	100 / 270 0°	100 / 315 0°	150 / 385 0°
	N2		40 / 220 45°	40 / 220 45°	50 / 245 45°	50 / 295 45°	50 / 340 45°	80 / 420 45°
	N3		50 / 215 90°	50 / 215 90°	50 / 245 90°	80 / 280 90°	80 / 325 90°	100 / 410 90°
	N4		40 / 220 135°	40 / 220 135°	50 / 245 135°	50 / 245 135°	80 / 325 135°	100 / 410 135°
	N5		50 / 215 180°	50 / 215 180°	50 / 245 180°	80 / 245 180°	100 / 315 180°	150 / 385 180°
	N6		40 / 220 225°	40 / 220 225°	50 / 245 225°	50 / 295 225°	50 / 340 225°	80 / 420 225°
	N7		50 / 215 270°	50 / 215 270°	50 / 245 270°	80 / 280 270°	80 / 325 270°	100 / 410 270°
	N8		40 / 220 315°	40 / 220 315°	50 / 245 315°	50 / 295 315°	80 / 325 315°	100 / 410 315°
Jacket Nozzles	N11	DN / α	40 / 90°	40 / 90°	40 / 90°	40 / 90°	40 / 90°	50 / 90°
	N15		40 / 208°	40 / 208°	40 / 208°	40 / 208°	40 / 208°	50 / 208°
	N16		-	-	-	40 / 208°	40 / 208°	50 / 208°
Half Coil Nozzles	N11	DN / α	25 / 225°	25 / 225°	25 / 225°	25 / 225°	40 / 225°	40 / 225°
	N12		25 / 225°	25 / 225°	25 / 225°	25 / 225°	40 / 225°	40 / 225°
Drive		MDL Type	40	40	40	40	50	60
		h *	1400	1400	1400	1400	1500	1850

α : Orientation angle

* with a standard motor



A NEW RANGE OF 5 TO 30 LITERS REACTORS FOR YOUR BIOTECHNOLOGY AND PHARMACEUTICAL PRODUCT DEVELOPMENTS

- **Ready to operate**
- **With jacket**
- **Accessories defined according to customer specification**
- **Can be equipped with a 21 CFR part11 control interface**
- **Preassembled and tested in our factory**

Material in contact with product:
- Borosilicate Glass 3.3 for the reactor
- Stainless steel 316L or Alloy as an alternative
- EPDM Gaskets (FDA 21 CFR 177 2600, USP<381>class VI 121°C, ADIF)

Finishing
For the SST parts:
- Inside: Ra ≤0,6 µm electropolished
- Outside: Ra ≤1,2 µm electropolished

With cGMP compliant documentation

Design pressure:
- Vessel: P atmo
- Double jacket: 0,5 barg

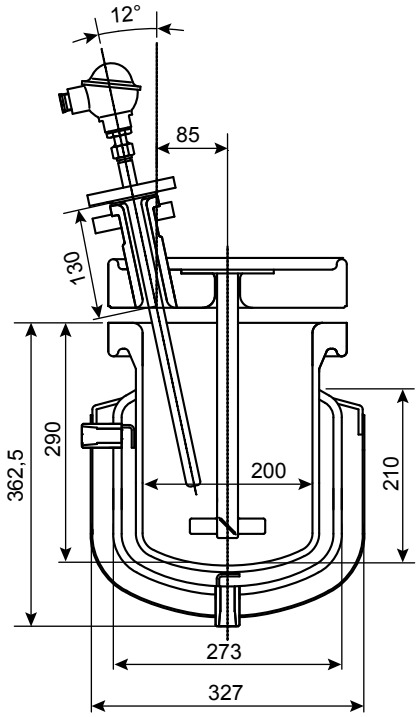
Design temperature:
- Vessel: 2 to 25°C / cleaning 90°C
- Double jacket: 0 to 50°C

Nominal capacity (l)	5 liters	7 liters	15 liters	20 liters	30 liters
Nominal diameter (mm)	160	160	240	222	222
Height (mm)	270	375	470	670	780
Total capacity (l)	5	7	17	24	28
Heating surface (cm²)	460	740	1500	-	-
Double jacket capacity (l)	1,8	2,8	6,5	-	-
Agitation power (k)	0,12 kW	0,12 kW	0,25 kW	0,25 kW	0,25 kW
Available nozzles	18 (*)				

* M18 x 1,5 (6) - Ø 6 (8) - Ø 10 (4)

SPECIAL FEATURES:
- **Agitation:** Thanks to our expertise in agitation, these reactors can be designed with different types of agitation offering high gassing, high agitation rate of high thermal transfer characteristics
- **Exhaust Cooler:** this range of reactors can be furnished with QVF® Borosilicate 3.3 glass exhaust cooler ; these coolers can be connected via flexible tubings
- **Thermal transfer:** this range of reactors can be delivered equipped with a borosilicate 3.3 double jacket or upon request with a circulation cooler

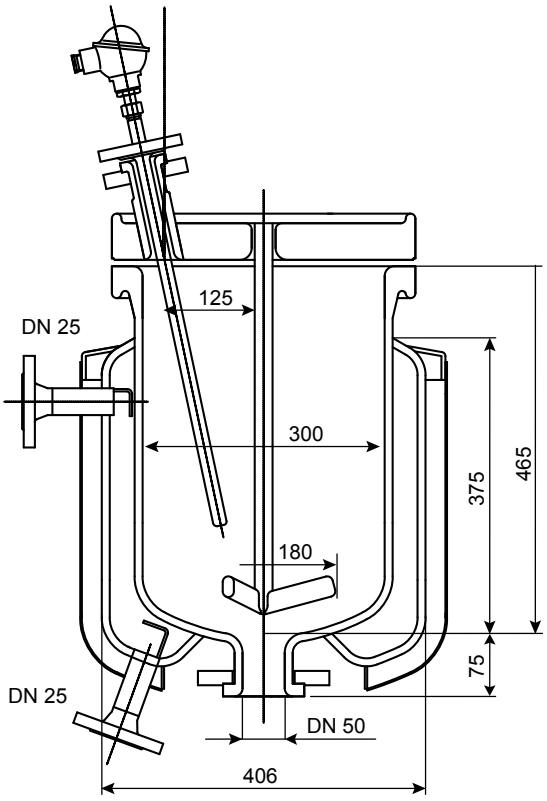
6.3 L



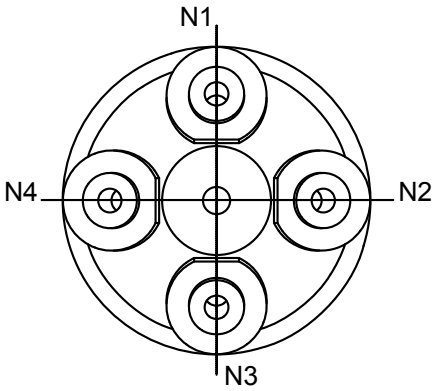
Jacket nozzles:
2 DN 1/2" NPT

	Inner vessel	Jacket
Maximum allowable working pressure	-1 / +20 bar 40 bar optional	20 bar
Maximum allowable working temperature	-25 / +200°C	-25 / +200°C
Capacity	6.3 l	3 l
Heating area	0.15 m^2	
Weight (kg)	380 (total)	85 (reactor)

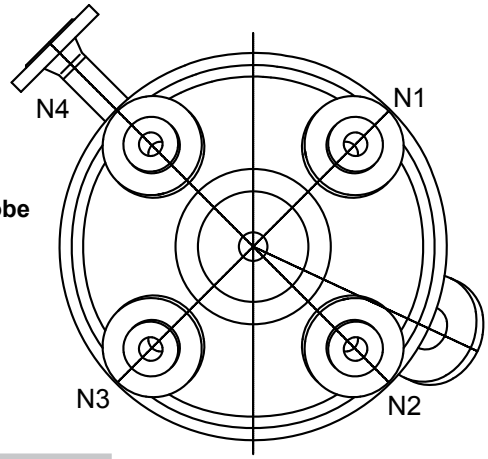
25 L



	Inner vessel	Jacket
Maximum allowable working pressure	-1 / +20 bar 25 bar optional	20 bar
Maximum allowable working temperature	-25 / +200°C	-25 / +200°C
Capacity	25 l	16 l
Heating area	0.38 m^2	
Weight (kg)	280 (total)	160 (reactor)



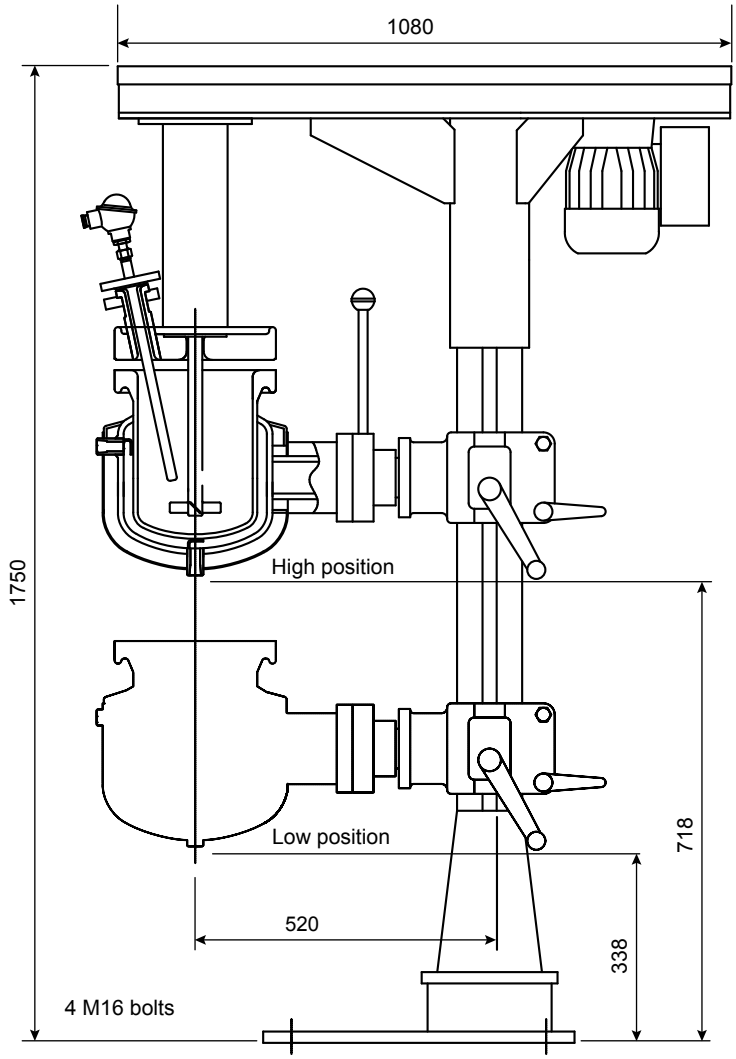
Temperature measurement : SVR probe
Assembly by clamps
Nozzles on inner vessel : 4 DN 20
(angle of inclination 12°)



Various agitators :
Impeller from 70 to 650 RPM*
Anchor from 30 to 150 RPM*
Turbine from 70 to 700 RPM*

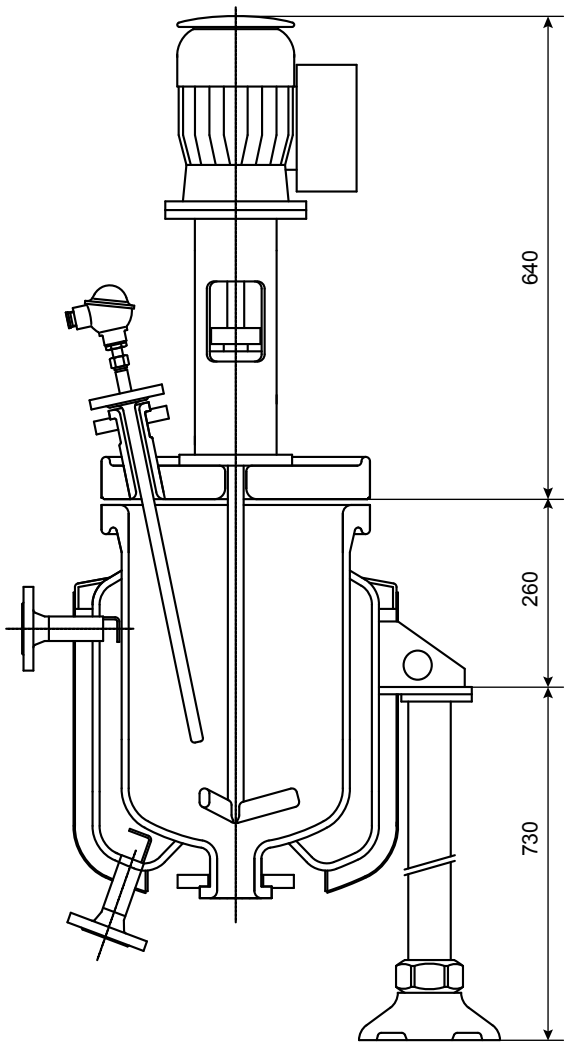
* recommended speed range

6.3 L



Support system: stand which allows to open and to tip the vessel
Also available with direct drive in line, bottom outlet nozzle and 3 legs

25 L



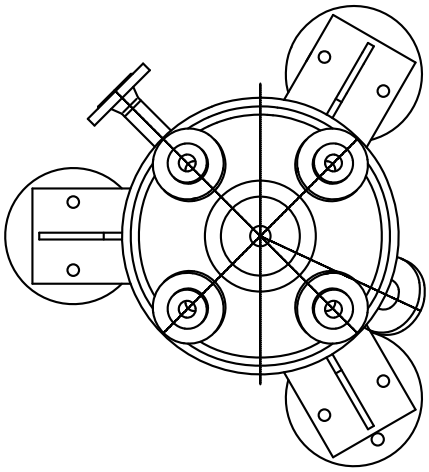
Support system: 3 legs

ARE INCLUDED IN THE SUPPLY

- Speed variation by frequency inverter
- Double lubricated mechanical seal
- 25 mm of rock wool insulation with polished stainless steel sheathing

OPTIONAL FEATURE

- High pressure
- High temperature
- Woerner circulation unit for the mechanical seal



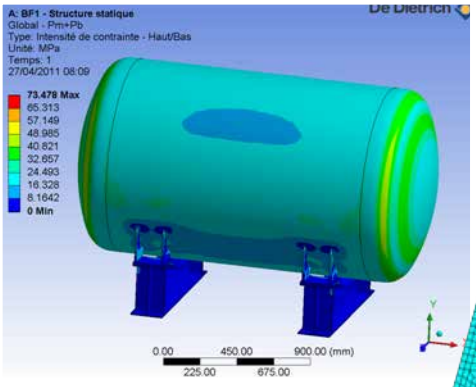
Reactor BE 80m³

Stripper 60m³
Eccentric agitation

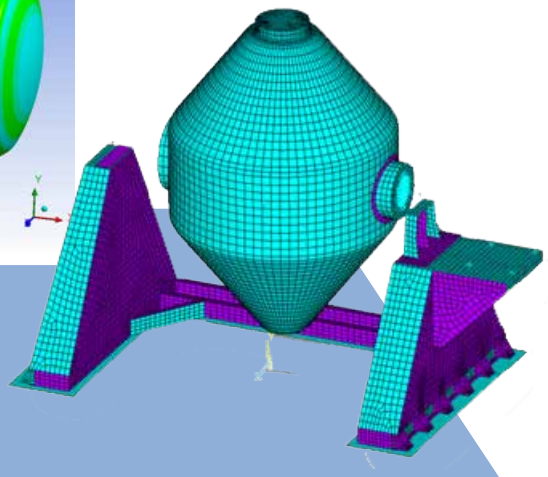
4 reactors 110 m³
3 stages of
GlasLock® agitators

King size glass-lined reactor
Handling 75 tonnes

Wide range available up to 110m³ for glass-lined reactors and up to 140m³ for glass-lined tanks.



Finite Elements Method analysis



Sulfuric Acid Flash Evaporator 33.000 L

Elbow pipe DN1400

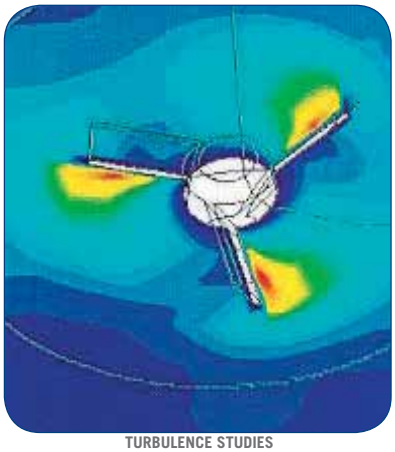
MIXING TECHNOLOGY - GLASLOCK® SYSTEM

COMPLETELY ADAPTABLE FOR YOUR PROCESS INTENSIFICATION

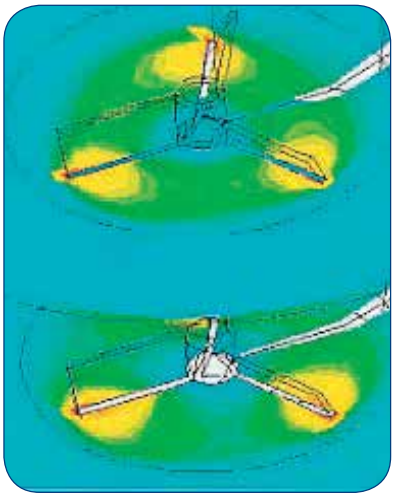
To improve process efficiency, De Dietrich® proposes a new experimental digital approach.

The programmes employed are various: pilot test stations with data acquisition in real time, study of flows generated by an agitator, establishment of the critical emulsion speed.

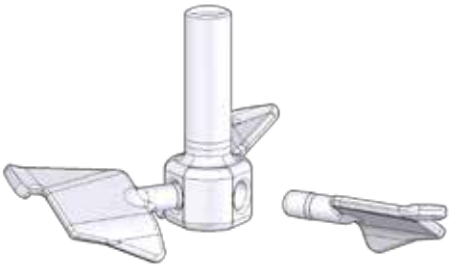
Digital simulation also finds an outlet in various applications: speed profile analysis around moving parts, primary run-off flows, turbulence studies, calculation of thermal data.

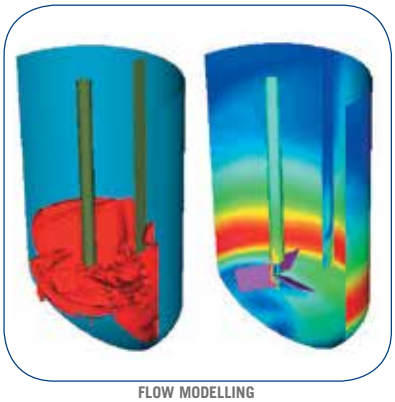


TURBULENCE STUDIES



SPEED PROFILE ANALYSIS AROUND MOVING PARTS





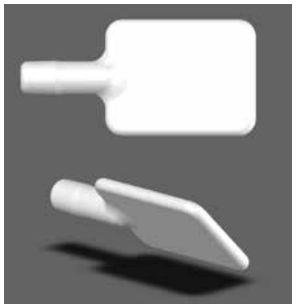
FLOW MODELLING

	GlasLock® system with removable blades									
	STANDARD PROFILES							NON STANDARD PROFILES		
Design	Flat Blade 30°	Flat Blade 45°	Flat Blade 60°	Flat Blade 90°	Trapezoidal Blade	HydroFoil	OptiFoil	ViscoFoil	Rushton Turbine	Breaker Bar
Reactor type	AE-BE-CE OPX	AE-BE-CE OPX	AE-BE-CE OPX	AE-BE-CE OPX	AE-BE-CE OPX	AE-BE-CE OPX	AE-BE-CE OPX	AE-BE-CE OPX	AE-BE-CE OPX	AE-BE-CE OPX
Generated Flow	Axial	Axial Radial	Axial Radial	Axial Radial	Axial Radial	Axial Radial	Axial Radial	Axial Radial	Radial	Axial Radial
Flow Model	Turbulent	Turbulent Laminar	Turbulent Laminar	Turbulent Laminar	Turbulent Laminar	Turbulent Laminar	Turbulent Laminar	Laminar	Turbulent	Turbulent Laminar
Tip Speed (m/s)	3 to 8	3 to 8	3 to 8	3 to 8	3 to 8	3 to 8	1 to 5	1 to 5	3 to 10	1 to 5
Viscosity Range (cP = mPa.s)	3 000	4 000	6 000	6 000	6 000	6 000	8 000	120 000	3 000	70 000
d / D	0,41 to 0,44	0,41 to 0,44	0,41 to 0,44	0,41 to 0,44	0,35 to 0,40	0,43 to 0,45	0,45 to 0,55	0,60 to 0,85	0,30 to 0,40	0,60 to 0,75
Homogenization	-	+	++	+	+	++	++	++	-	++
Suspension	-	+	++	++	++	++	+++	+	-	+
Dispersion	-	+	+	++	++	+	+	-	++	-
Gas / Liquid	-	-	+	+++	+++	-	-	-	+++	-
Heat Transfer	-	+	++	++	++	++	++	+++	+	++
Cristallization	++	++	+	-	-	++	+++	++	-	++

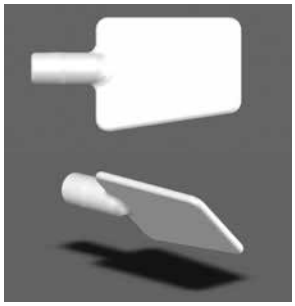
+ : suitable ++ : suit well +++ : suit perfectly - : not advisable

Reactor		Flat Blade					Trapezoidal				
Nominal Volume Litres	ø mm	Blade ø (mm)	Tail ø (mm)	Hub ø (mm)	Weight (kg)	Article Code	Blade ø (mm)	Tail ø (mm)	Hub ø (mm)	Weight (kg)	Article Code
1 000	1 200	660	58	190	8	7 614 486	660	58	190	8	7 617 042
1 600	1 400	660			8	7 614 486	660			8	7 617 042
2 500	1 600	750			10	7 614 487	750			11	7 617 024
4 000	1 800	750			10	7 614 487	750			11	7 617 024
6 300	2 000	850			13	7 614 488	850			13	7 617 031
8 000	2 200	850			13	7 614 488	850			13	7 617 031
10 000	2 400	1 050	70	222	21	7 614 489	1 050	70	222	23	7 617 061
12 500	2 400	1 050			21	7 614 489	1 050			23	7 617 061
16 000	2 600	1 050			21	7 614 489	1 050			23	7 617 061
20 000	2 800	1 200	88	270	33	7 614 490	1 200	88	270	30	7 617 087
25 000	3 000	1 200			33	7 614 490	1 200			30	7 617 087
32 000	3 400	1 372			38						
40 000	3 400	1 372			38						

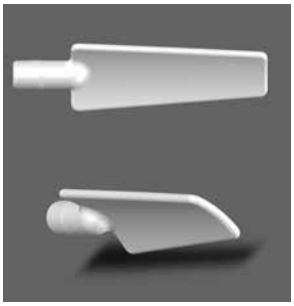
Reactor		HydroFoil					OptiFoil				
Nominal Volume Litres	ø mm	Blade ø (mm)	Tail ø (mm)	Hub ø (mm)	Weight (kg)	Article Code	Blade ø (mm)	Tail ø (mm)	Hub ø (mm)	Weight (kg)	Article Code
1 000	1 200	720	58	190	7	7 614 444	740	58	190	10	7 617 083
1 600	1 400	720			7	7 614 444	740			10	7 617 083
2 500	1 600	850			9	7 614 445	900			14	7 617 078
4 000	1 800	850			9	7 614 445	950			14	7 617 082
6 300	2 000	950			14	7 614 446	1 050			21	7 617 077
8 000	2 200	950			14	7 614 446	1 050			21	7 617 077
10 000	2 400	1 100	70	222	18	7 614 447	1 300	70	222	38	7 617 080
12 500	2 400	1 100			18	7 614 447	1 300			38	7 617 080
16 000	2 600	1 200			20	7 614 448	1 300			38	7 617 080
20 000	2 800	1 350	88	270	30	7 614 449	1 450	88	270	43	7 617 072
25 000	3 000	1 350			30	7 614 449	1 450			43	7 617 072
32 000	3 400	1 450			38	7 617 039	1 600			46	7 617 084
40 000	3 400	1 450			38	7 617 039	1 600			46	7 617 084



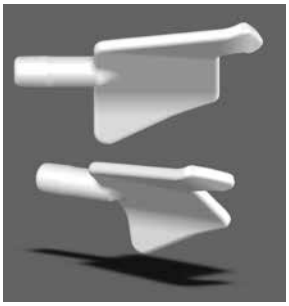
Flat Blade



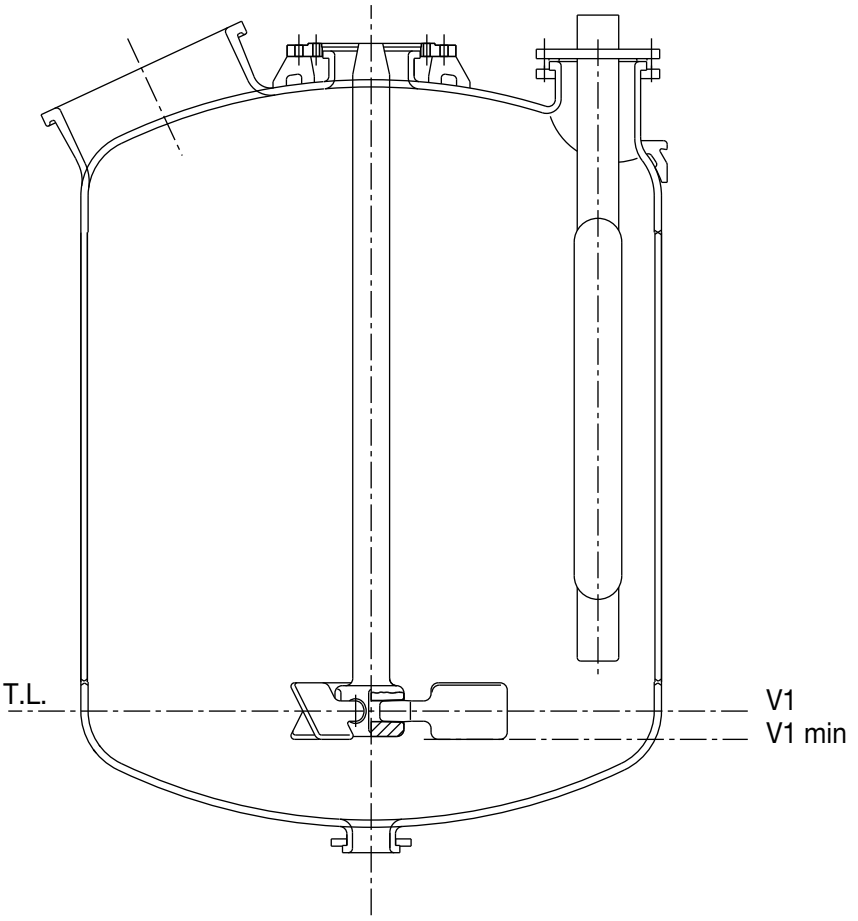
Trapezoidal Blade



HydroFoil Blade



OptiFoil Blade


T.L.
V1
V1 min

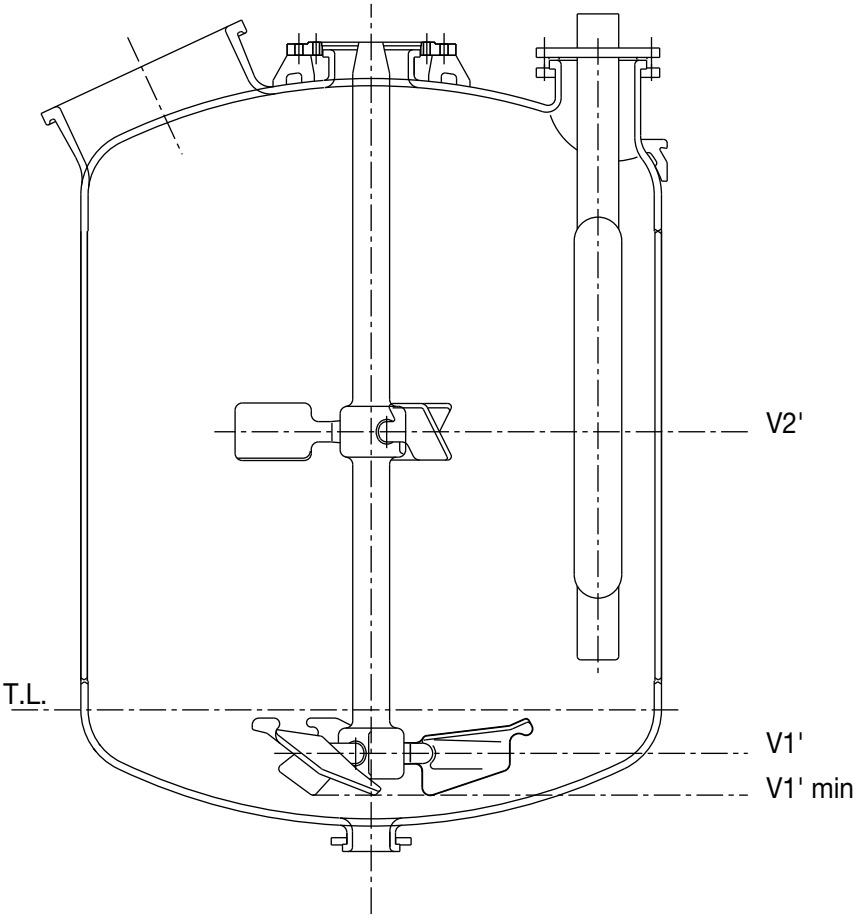
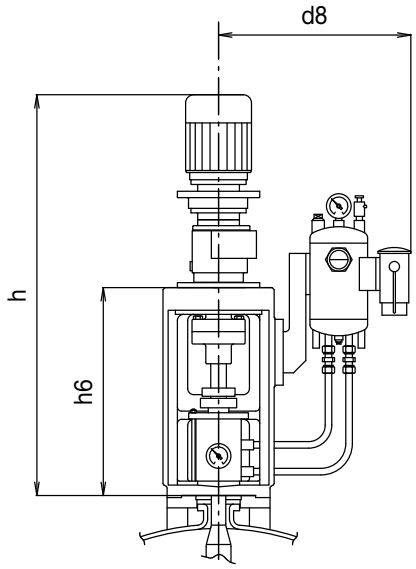
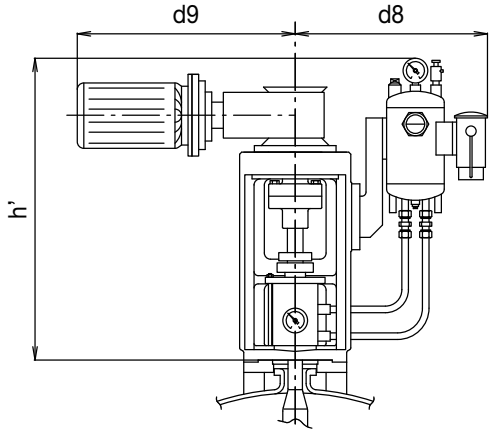

V2'
T.L.
V1'
V1' min

TABLE A STANDARD LENGTH		AGITATED VOLUMES	Minimum NON AGITATED VOLUMES (lower point of the lower blades)										
Reactor		(on blade axis)	OptiFoil		Standard Flat Blade					Trapezoidal		HydroFoil	
Nominal Volume Litres	ø mm	one level	Blade ø	V1 min	Blade ø	90°	60°	45°	30°	90°	60°	Blade ø	45°
		V1				V1 min	V1 min	V1 min	V1 min	V1 min	V1 min		V1 min
1 000	1 200	158	740	56	660	75	85	98	115	48	61	720	70
1 600	1 400	250	740	110	660	137	152	170	193	99	117	720	131
2 500	1 600	370	900	170	750	207	228	254	289	140	168	850	215
4 000	1 800	540	950	233	750	326	353	387	431	237	275	850	337
6 300	2 000	736	1 050	283	850	441	479	525	586	332	383	950	485
8 000	2 200	1 300	1 050	866	850	940	986	1 042	1 217	800	865	950	992
10 000	2 400	1 690	1 300	922	1 050	1 143	1 220	1 304	1 414	906	1 005	1 100	1 255
12 500	2 400	1 690	1 300	922	1 050	1 143	1 220	1 304	1 414	906	1 005	1 100	1 255
16 000	2 600	2 140	1 300	1 241	1 050	1 638	1 593	1 692	1 822	1 222	1 340	1 200	1 510
20 000	2 800	2 680	1 450	1 475	1 200	1 853	1 960	2 088	2 256	1 629	1 764	1 350	1 910
25 000	3 000	3 300	1 450	1 905	1 200	2 342	2 465	2 613	2 806	2 082	2 238	1 350	2 407
32 000	3 400	4 840	1 600	3 010	1 372	3 200	3 363	3 558	3 813	2 973	3 165	1 450	3 467
40 000	3 400	4 840	1 600	3 010	1 372	3 200	3 363	3 558	3 813	2 973	3 165	1 450	3 467

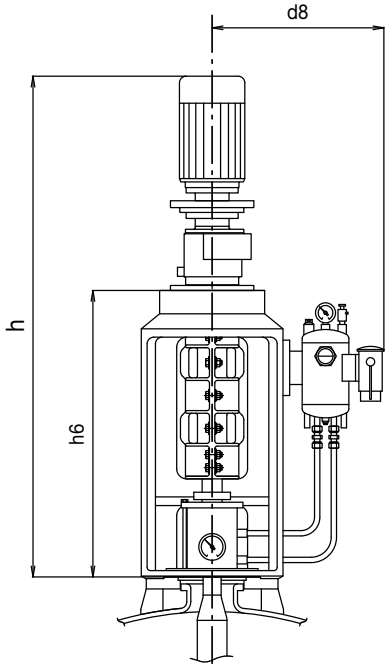
TABLE B EXTENDED LENGTH		AGITATED VOLUMES		Minimum NON AGITATED VOLUMES (lower point of the lower blades)									
Reactor		(on blade axis)		OptiFoil		Standard Flat Blade					Trapezoidal		HydroFoil	
Nominal Volume Litres	ø mm	1st level	2nd level	Blade ø	V1' min	Blade ø	90°	60°	45°	30°	90°	60°	Blade ø	45°
		V1'	V2'				V1' min	V1' min	V1' min	V1' min	V1' min	V1' min		V1' min
1 000	1 200	90	627	740	13	660	24	30	39	52	9	15	720	37
1 600	1 400	108	1 295	740	15	660	28	35	46	62	11	17	720	43
2 500	1 600	156	1 706	900	24	750	40	51	66	89	12	22	850	70
4 000	1 800	238	2 202	950	34	750	80	96	118	149	36	52	850	124
6 300	2 000	357	3 347	1 050	94	850	129	153	185	231	68	94	950	208
8 000	2 200	394	3 952	1 050	127	850	164	189	222	268	98	127	950	245
10 000	2 400	465	5 539	1 300	64	1 050	150	183	225	287	59	92	1 100	267
12 500	2 400	465	5 539	1 300	64	1 050	150	183	225	287	59	92	1 100	267
16 000	2 600	542	6 466	1 300	83	1 050	184	221	270	340	78	116	1 200	270
20 000	2 800	728	8 786	1 450	121	1 200	247	297	363	457	155	207	1 350	385
25 000	3 000	854	10 100	1 450	129	1 200	308	366	441	548	201	262	1 350	466
32 000	3 400	1 212	11 770	1 600	361	1 372	448	530	536	788	345	432	1 450	586
40 000	3 400	1 212	11 770	1 600	361	1 372	448	530	536	788	345	432	1 450	586



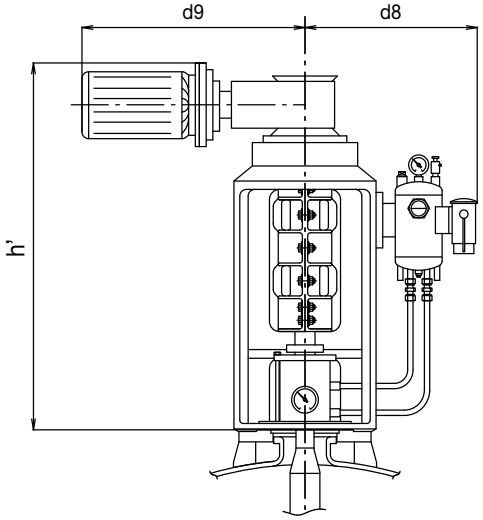
MDL 40-50



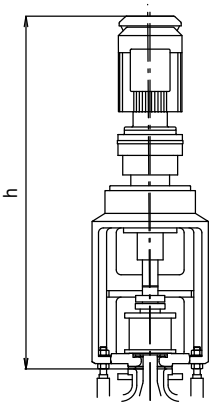
MDL 40-50



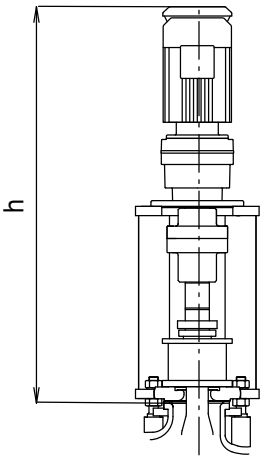
MDL 60-160



MDL 60-160



MNS 40-50



MNS 60-80

Reactor Type		MDL Type (Flange)	Constant Speed 50 Hz	Variable Speed 10-50Hz	High Variable Speed 10-60Hz	All types of standard agitators Impeller, GlasLock® Max. density / viscosity : 1300 kg/m3 / 500 cP (*)
			rpm			Motor Power (kW)
AE/OPX	63 100 160	**40** (E125)	176	32/176	32/200	**0,75**
	250	**50** (E200)	166	32/166		**1,1**
					32/184	**1,5**
	400	**50** (E200)	166	32/166	32/184	**1,5**
AE/OPX/CE	630	**60** (E250)	143	29/143		**2,2**
					29/166	**3**
AE	1000	**60** (E250)	143	29/143		**3**
			169	29/169		**4**
BE/OPX	1000	**80** (E300)	110	21/110	29/150	**4**
AE/BE/CE OPX	1600	**80** (E300)	110	21/110		**4**
			111		21/125	**5,5**
	2500	**80** (E300)	111	21/111		**5,5**
			114		21/125	**7,5**
CE	4000 AN	**80** (E300)	114	30/114		**7,5**
					30/120	**11**
AE/BE/CE OPX	4000	**100** (E400)	99	20/99		**7,5**
					20/115	**11**
	6300	**100** (E500)	99	20/99		**11**
					20/115	**15**
BE/CE/OPX	8000	**100** (E500)	99	20/99		**11**
					20/110	**15**
	10000 12500 16000	**125** (E700)	79	25/79		**18,5**
			91		25/100	**22**
BE/CE	20000 25000	**140** (E700)	73	20/73		**30**
			86		20/90	**37**
	32000 40000	**160** (E900/1)	73	20/73		**37**
					20/90	**45**

Reactor Type		MDL Type (Flange)	Constant Speed 50 Hz	Variable Speed 10-50Hz	High Variable Speed 10-60Hz	Anchor agitator Max. density / viscosity: 1300 kg/m3 / 15 000 cP (*)
			rpm			Motor Power (kW)
AE	63 100 160	**40** (E125)	112	21/112		**0,75**
	250	**50** (E200)	79	15/79		**1,1**
					15/93	**1,5**
	400	**50** (E200)	79	15/79	15/93	**1,5** (max viscosity = 8 000 cP)
	630	**60** (E250)	55	12/55		**2,2**
					12/65	**3**
	1000	**60** (E250)	55	12/55		**3**
					12/65	**4**
	1600 2500	**80** (E300)	38	8/38		**4**
			40		8/45	**5,5**
	4000	**100** (E400)	30	6/30	6/36	**7,5**
	6300	**100** (E500)	30	6/30		**7,5**
					6/36	**11**

(*) for higher values of viscosity or density, a simulation is required to calculate the necessary motor power

Agitator drive MDL	40	50		60			80				100			125		140		160**
Motor Power kW	0,75	1,1	1,5	2,2	3	4	4	5,5	7,5	11	7,5	11	15	18,5	22	30	37	45
h *	1040	1090	1115	1505	1505	1505	1725	1790	1825	1940	1995	2110	2155	2440	2475	2565	2680	3100
h' *	695	720	720	1105	1105	1105	1285	1305	1305	1335	1455	1480	1480	1720	1720	1770	1795	-
h6	510	535		865			1015				1150			1350		1350		1400
d8	470	515		510			580				690			770		770		600
d9 *	538	548	573	682	682	688	722	787	825	-	872	985	1030	1097	1135	1233	1347	-
Max. torque (Nm) **	50	150		320			800				1750			3200		5800		11800
Average Weight (daN) *	122	183		291			577				963			1519		1722		2600

* With a standard motor ** Depending on the reactor size

DRIVE UNIT
for glass-lined, stainless steel & alloy reactor

THE MAIN ADVANTAGES

- 3D modeling
- Flow modeling
- Turbulence studies
- Mixing simulation
- Improved heat exchange
- Optimization of the operating parameters
- Integration of all mechanical aspects
- Global certification: PED, ATEX, Machinery Directives, ...
- F.A.T. with dynamic test
- Easy maintenance by side dismantling of the mechanical seal

DE DIETRICH MECHANICAL SEAL

STANDARD DE DIETRICH - M06 VERSION

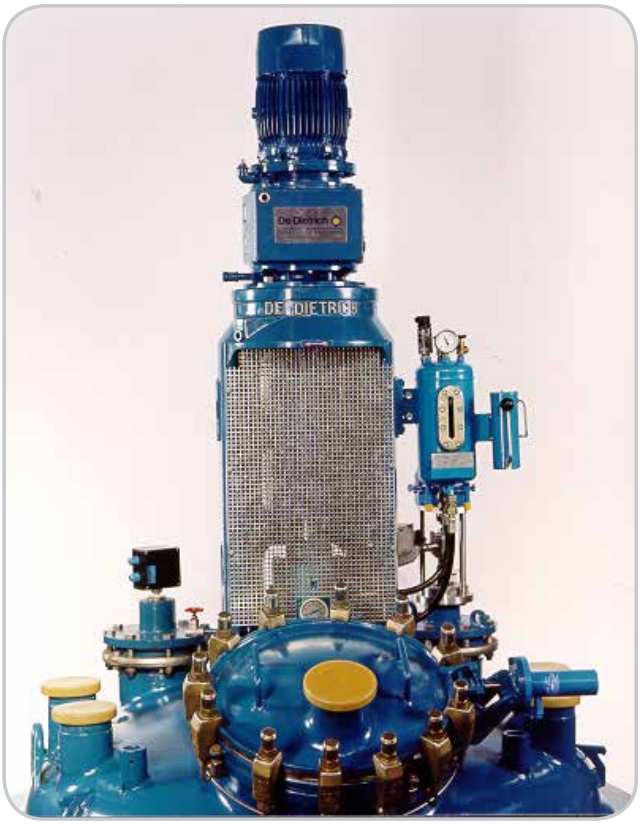
The De Dietrich mechanical seal M06 is a double liquid lubricated seal.
Atex: EX II 2 GD (either for Zone 1(Gas) or Zone 21 (Dust)).

The gas group IIA, IIB or IIC does not influence the seal selection.

Temperature classes:
- Basic RCRS version with oil lubrification is T3.
  For T4, choose the RSRS version

Combination of material:

	RCRS (basic version)	RSRS	SSRS
Product side (PTFE wedge)	Carbon / Ceramic	Carbon / SIC	SIC / SIC
Atmospheric side (o-ring in FPM)	Carbon / SIC	Carbon / SIC	Carbon / SIC
Housing	Basic version: painted carbon steel - Also available with 316 stainless steel		

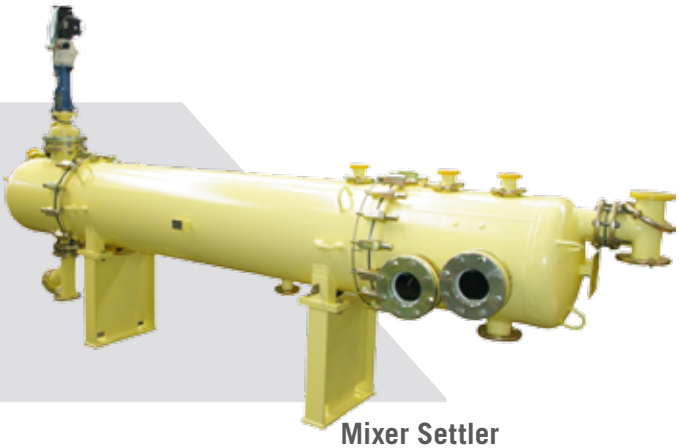


Column DN2600

Mixer Settler

Heat Exchanger

PAC Unit

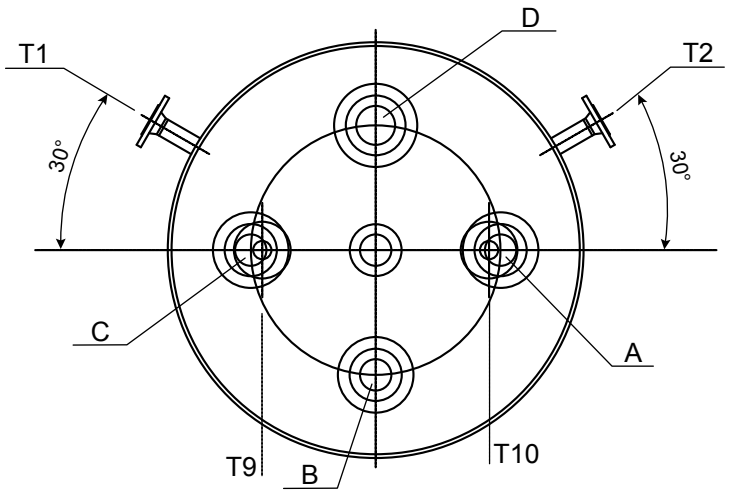


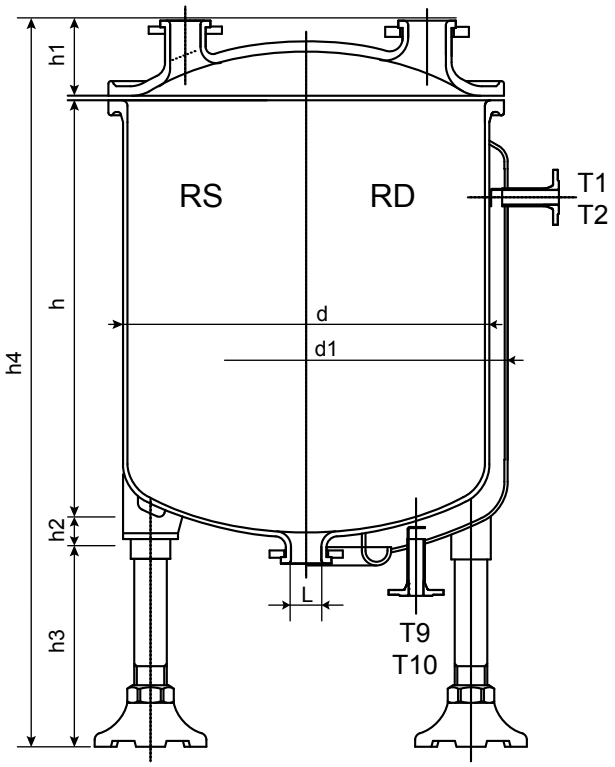
Mixer Settler

Heated tank

EQUIPMENT

CLAMPED TOP RECEIVER RS/RD

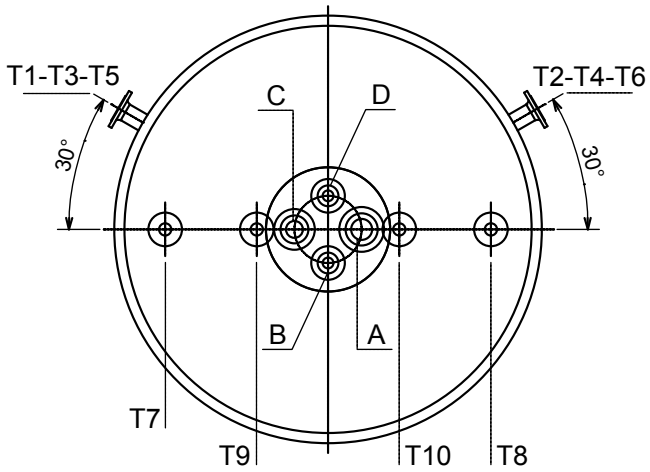


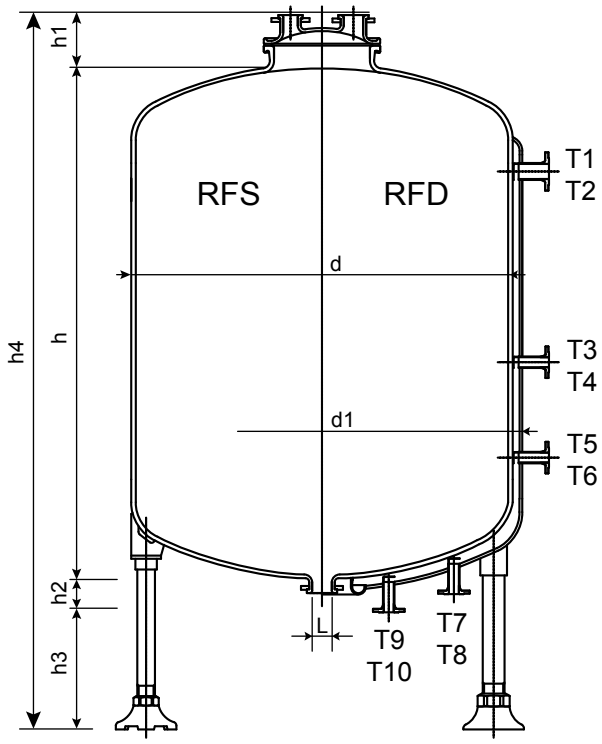


	Design pressure	Design temperature
Inside	-1/+6 bar	-25/+200 °C
Jacket	-1/+6 bar	-25/+200 °C

Nominal capacity	**Litres**	**50**	**100**	**200**	**500**	**800**
Total capacity	**Litres**	52	108	210	525	875
Jacket capacity	**Litres**	32	44	80	130	200
Heating area	**m²**	0,52	0,76	1,5	2,8	3,75
Main dimensions	**d**	400	500	600	800	1000
	h	450	600	800	1100	1180
	d1	500	600	700	900	1100
	h1	140	150	160	170	205
	h2	80	80	80	80	85
	h3	415	415	425	425	500
	h4	1090	1255	1475	1785	1980
Nozzles on tank	**A**	50	50	50	80	80
	B	-	80	80	80	80
	C	50	50	50	80	80
	D	100	100	100	100	100
	L	50	50	50	50	80
Jacket Nozzles	**T1**	25	25	25	40	40
	T2	25	25	25	40	40
	T9	25	25	25	40	40
	T10	25	25	25	40	40
Number of leg supports		3	3	3	3	4
RS	**Total weight approx. (DaN)**	112	175	270	480	660
RD	**Total weight approx. (DaN)**	165	250	390	700	950

CLOSED RECEIVER RFS/RFD

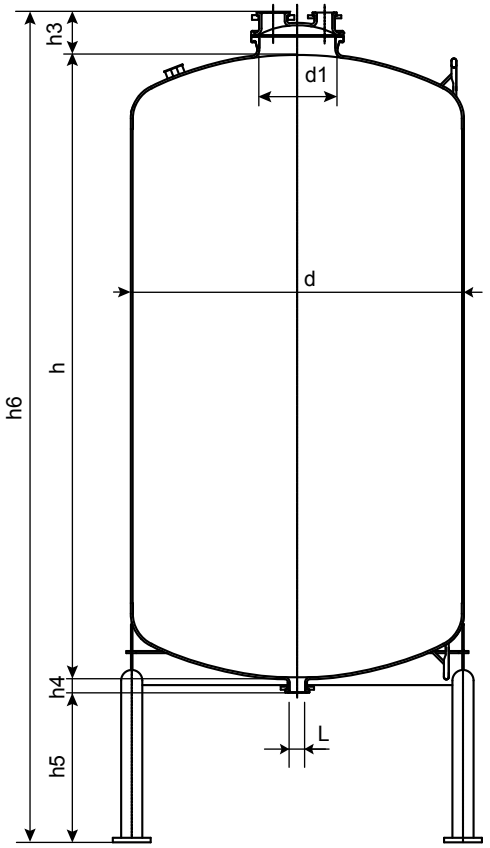


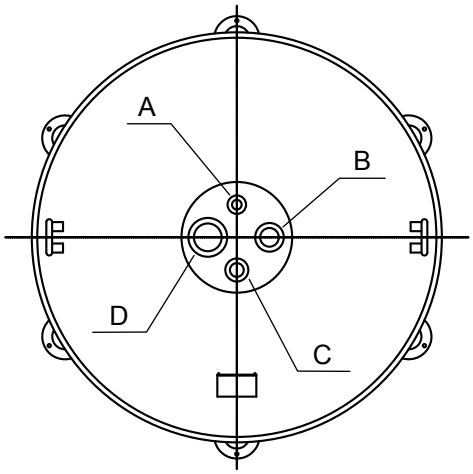


	Design pressure	Design temperature
Inside	-1/+6 bar	-25/+200 °C
Jacket	-1/+6 bar	-25/+200 °C

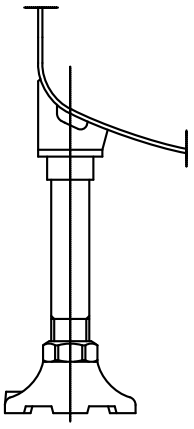
Nominal capacity	Litres	1200	2000	3000	4000	6000
Total capacity	Litres	1325	2200	3325	4500	7125
Jacket capacity	Litres	250	320	400	475	625
Heating area	m²	4,45	6,3	8,3	10	14
Main dimensions	d	1200	1400	1600	1800	2000
	h	1400	1700	1950	2100	2650
	d1	1300	1500	1700	1900	2100
	d2	500	500	500	500	500
	h1	250	250	270	270	270
	h2	100	100	100	100	100
	h3	615	615	650	650	715
	h4	2365	2665	2970	3120	3735
Nozzles on tank	A / C	50	50	50	50	50
	B	80	80	80	80	80
	D	100	100	100	100	100
	L	100	100	100	100	100
Jacket Nozzles	T1-T2	80	80	80	80	80
	T3-T4	-	-	40	40	50
	T5-T6	40	40	40	40	50
	T7-T8	-	-	-	-	50
	T9-T10	40	40	40	40	50
Number of leg supports		4	4	4	4	6
RFS	Total weight approx. (DaN)	920	1350	1900	2500	3400
RFD	Total weight approx. (DaN)	1420	2200	2900	3850	5200

VERTICAL CSV

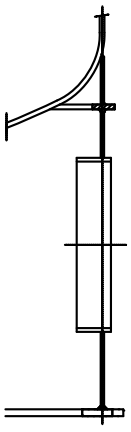




Φ ≤ 1800
Removable support legs

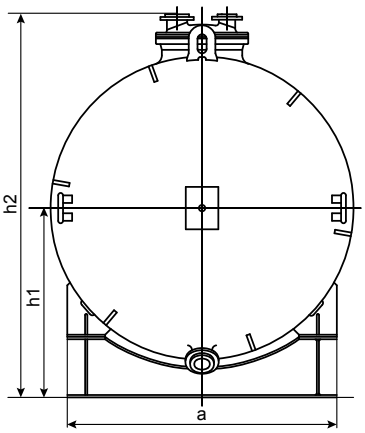


Φ ≥ 2000
Skirt support

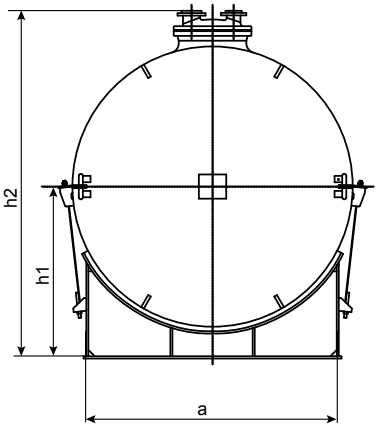


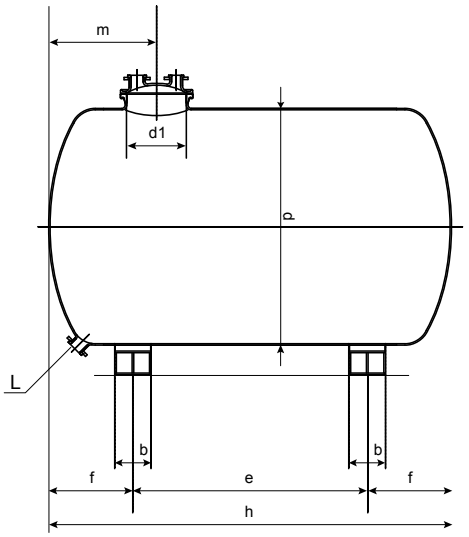
HORIZONTAL CSH

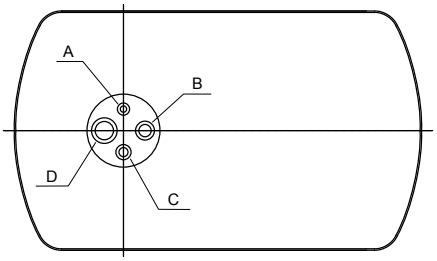
Tanks Φ ≤



Tanks Φ ≥





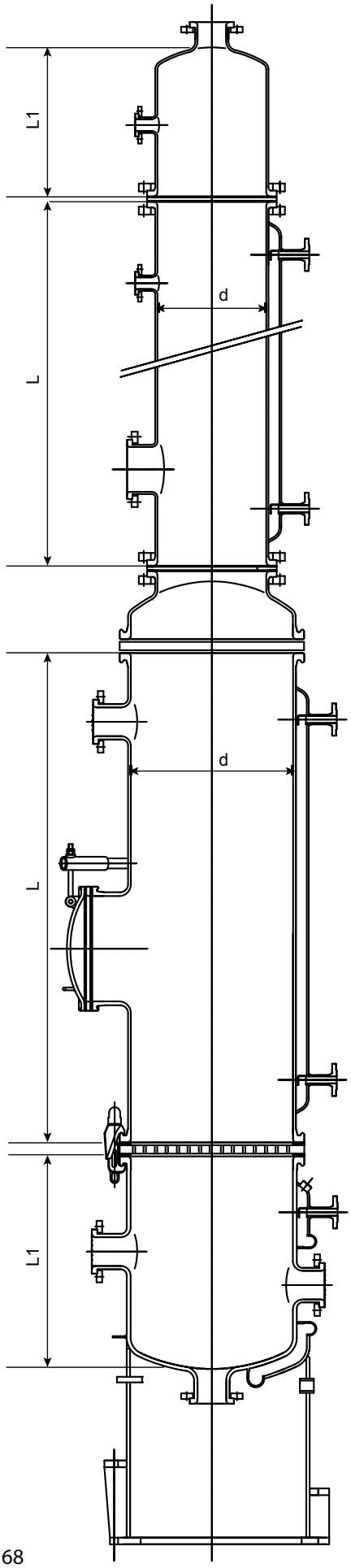


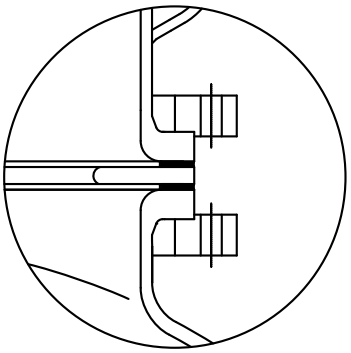
	Design pressure	Design temperature
Inside	+3 bar	-25/+200 °C

Option: -1/+6 bar

Nominal capacity (litres)		1600	2500	4000	6300	10000	12500	16000	20000	25000	32000	40000	50000	63000	80000	100000	120000
Total capacity (litres)		1680	2550	4060	6325	10200	12650	16300	20200	25600	32575	40400	50950	63400	80800	100500	120750
Design pressure		3 bar															
Main dimensions	d	1200	1200	1600	1800	2000	2000	2200	2400	2600	2800	2800	3000	3200	3400	3800	4000
	h	1700	2500	2300	2800	3600	4400	4700	4900	5300	5800	7100	7800	8500	9600	9600	10400
	d1	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600
	a	1070	1070	1400	1600	1780	1780	2025	2200	2375	2550	2550	2750	2925	3100	3450	3625
	b	200	200	240	300	300	300	220	240	260	280	280	300	320	340	380	400
	e	800	1600	1100	1500	2200	3000	3400	3500	3800	4200	5500	6100	6700	7700	7500	8200
	f	450	450	600	650	700	700	650	700	750	800	800	850	900	950	1050	1100
	m	700	700	800	850	900	900	1050	1100	1150	1250	1250	1300	1350	1450	1550	1600
	h1	850	850	1050	1150	1250	1250	1350	1450	1550	1650	1650	1750	1850	1950	2150	2250
	h2	1720	1720	2120	2320	2520	2520	2720	2920	3120	3345	3345	3545	3745	3945	4345	4545
	h3	250	250	250	270	270	270	270	270	270	295	295	295	295	295	295	295
	h4	90	90	90	100	100	100	100	100	100	100	100	100	100	100	100	100
	h5	500	500	500	600	600	600	600	600	600	800	800	800	800	800	800	800
	h6	2560	3360	3160	3770	4570	5370	5670	5870	6270	6995	8295	8995	9695	10795	10795	11595
Nozzles on cover	A	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
	B	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	C	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
	D	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
Outlet nozzle	L	80	80	80	100	100	100	100	100	100	150	150	150	150	150	150	150
Weight approx. (DaN) without saddles or legs		660	890	1380	1825	2520	2980	3580	4865	5920	6890	8810	10840	13600	16870	21480	26440

Dimensions and weight for guidance only
Capacity: up to 140m^3 upon request

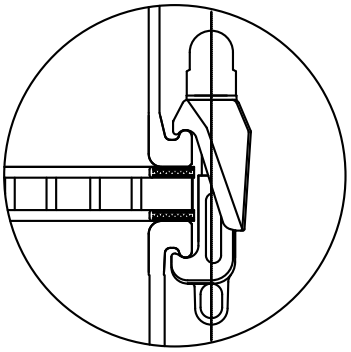




Assembling with donut

	Design pressure	Design temperature
Inside	-1/+6 bar	-25/+200 °C
Jacket	-1/+6 bar	-25/+200 °C

DN	d (mm)	L max (mm)	L1 max (mm)	Assembly
200	219,1	3000	-	**With loose flanges**
250	273,0	3000	-	
300	323,9	3000	500	
350	355,6	3000	750	



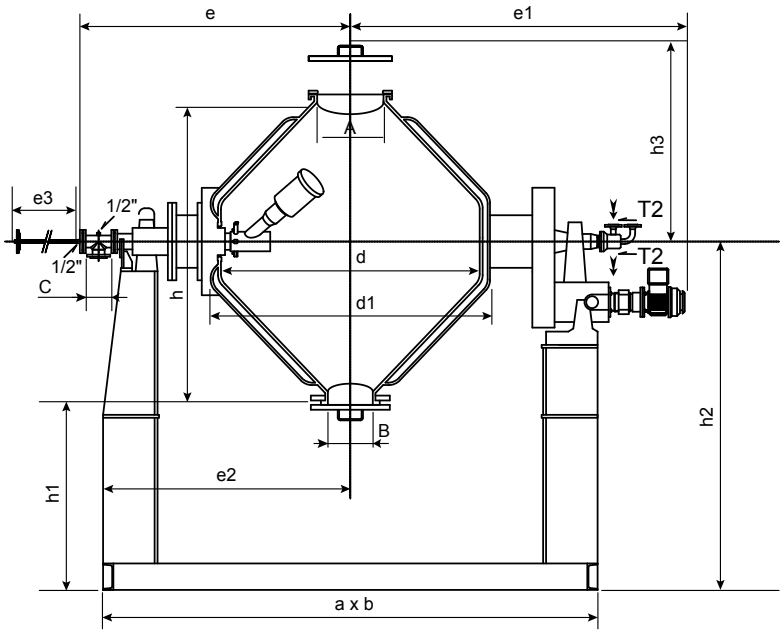
Assembling with perforated or slotted grid

DN(1)	d (mm)	L max (mm)(1)	L1 max (mm)(1)	Assembly
400	406,4	3000	750	**With clamps**
500	508,0	3000	1000	
600	600	4000	1400	
800	800	4500	2000	
1000	1000	4500	2500	
1200	1200	5400	4000	
1400	1400	5400	4000	
1600	1600	5400	4000	
1800	1800	5400	4000	
2000	2000	5400	4000	
2200	2200	5400	4000	

(1) Customized dimensions on request

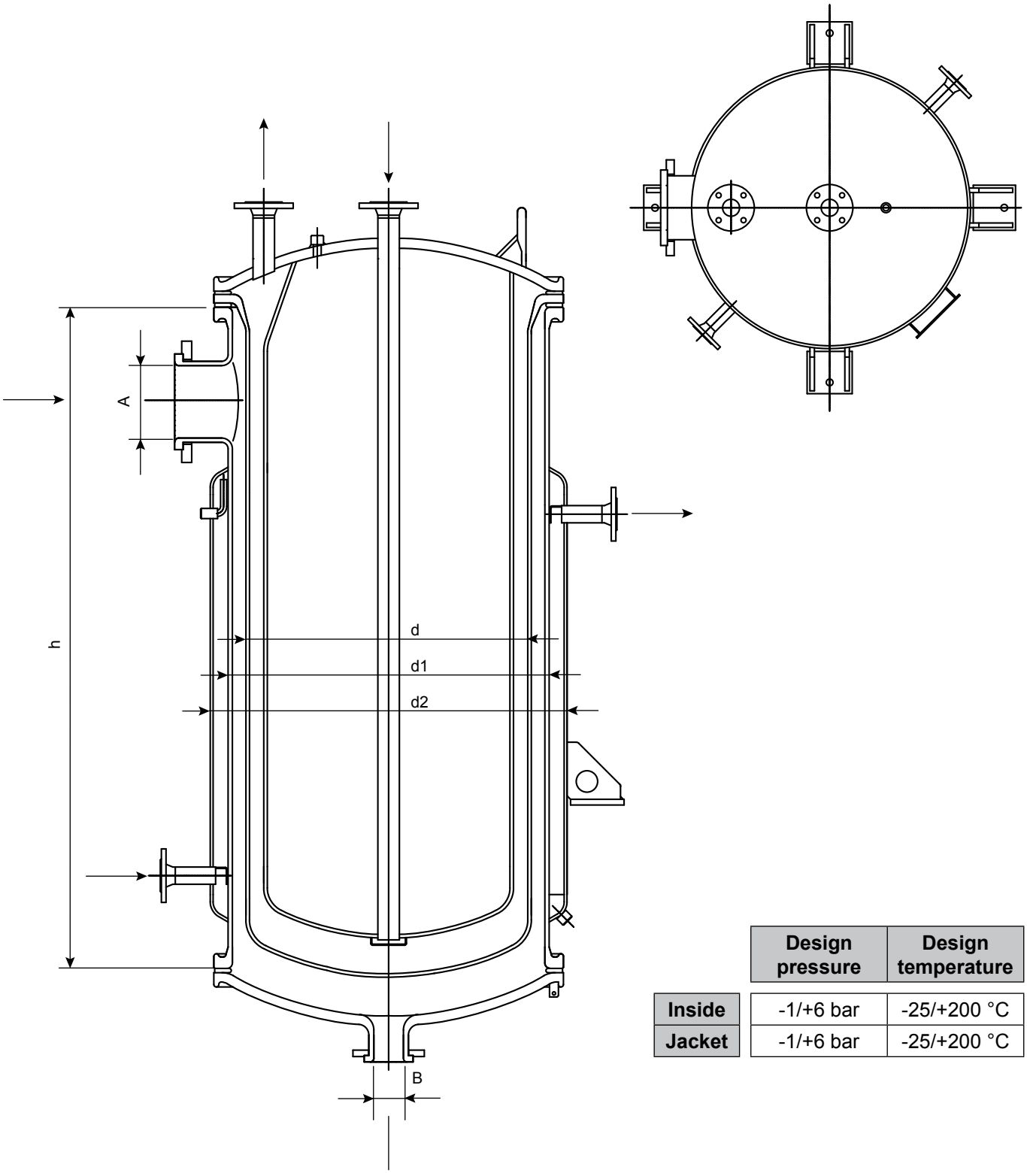
	Inner vessel	Jacket
Pressure	Vacuum	-1 / +6 bar
Temperature	0 / +120°C	0 / +200°C

e3 :
dismantling of the thermometer pocket



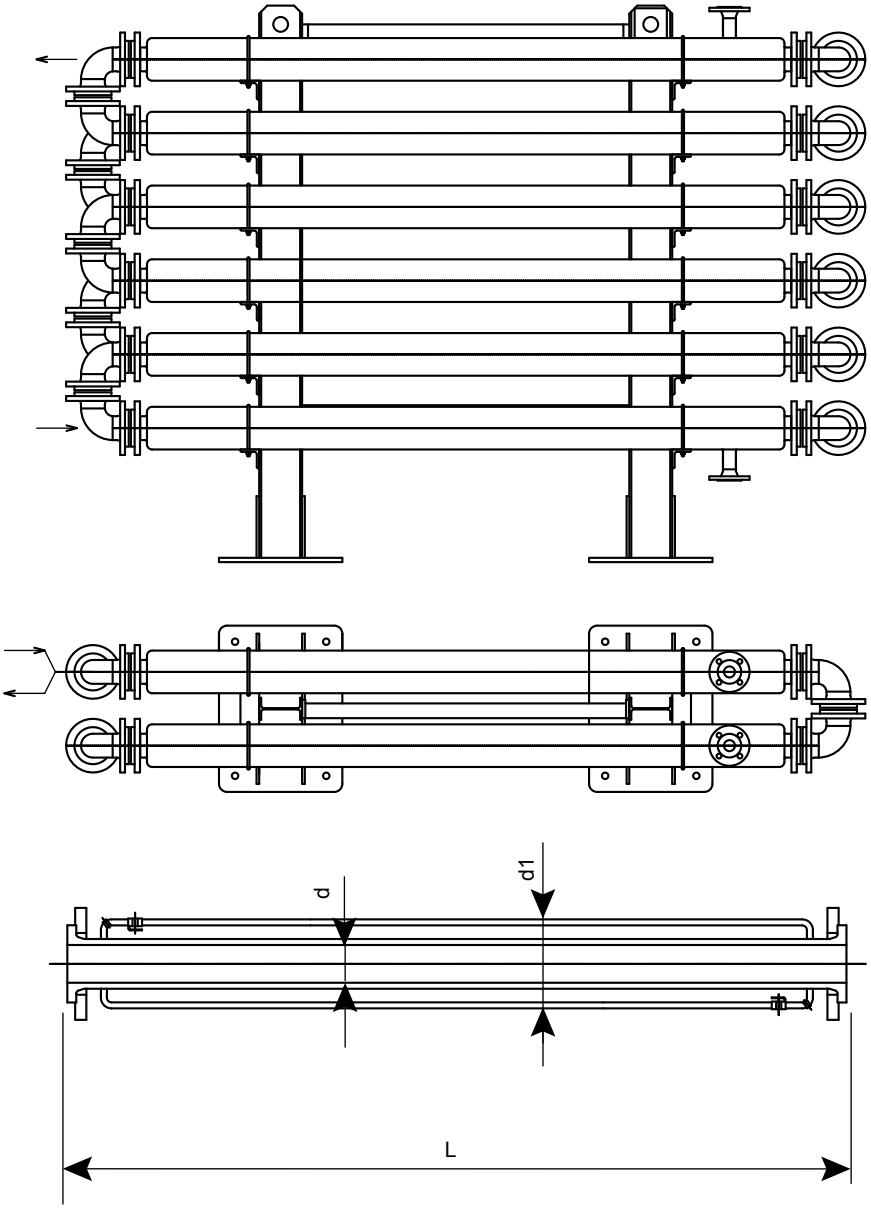
Options:
- Material: stainless steel
- Size up to 16m³ on request

Type		SR 100	SR 400	SR 1000	SR 1600	SR 2500	SR 4000	SR 6300
Total capacity	Litres	120	475	1040	1625	2550	4300	6500
Jacket capacity	Litres	54	60	200	296	475	800	950
Heating area	m²	1,15	2,8	4,8	6,7	9,5	13,1	17,9
Overall dimensions	d	600	1000	1300	1500	1800	2100	2400
	h	772	1215	1547	1813	2120	2576	2920
	d1	700	1100	1400	1600	1900	2250	2550
	h1	876	1288	1327	1494	1490	1502	1581
	h2	1300	1950	2150	2450	2600	2850	3100
	h3	520	785	935	1070	1225	1465	1640
	a x b	1795x900	2355x1200	2705x1500	3084x1700	3384x2000	3937x2300	4301x2600
	e	1185	1380	1625	1800	1945	2240	2390
	e1	1390	1485	1830	2100	2370	2470	2750
	e2	980	1260	1435	1629	1779	2030	2212
	e3	1160	1160	1320	1450	1450	1650	1650
Nozzles	A	300	450	450	450	450	500	500
	B	150	150	200	200	200	250	250
	C	50	50	80	100	100	125	125
Connection for heating medium	T1	1"	1"	1"	1" 1/4"	1" 1/4"	1" 1/4"	1" 1/4"
	T2	1 1/2"	1 1/2"	1 1/2"	2"	2"	2 1/2"	2 1/2"
Motor power : - with mechanical variator - with frequency inverter	kW	1.5 2.2	2.2 3	3 4	4 5.5	5.5 7.5	11 15	15 18.5
Mechanical seal	Ø	75	75	100	120	120	140	140
Speed variation	R.P.M.	5 - 30	5 - 30	3 - 18	1,5 - 9	1,5 - 6,7	0,85 - 6,3	1,2 - 6,3
Weight	Total	1900	2100	3300	4300	5800	8300	11000
	Vessel only			1380	1895	3100	4900	6600
	Kg							



	Design pressure	Design temperature
Inside	-1/+6 bar	-25/+200 °C
Jacket	-1/+6 bar	-25/+200 °C

Exchange area (m^2)	d	d1	d2	h	A	B	Weight (kg)
2	324	400	500	1150	100	50	550
4	500	600	700	1600	150	50	1000
6	600	700	800	1900	150	80	1500
8	800	900	1000	1900	200	80	2300
10	900	1000	1100	2100	250	100	2650
14	1000	1100	1200	2500	250	100	3700



	Design pressure	Design temperature
Inside	-1/+10 bar	-25/+200 °C
Jacket	-1/+10 bar	-25/+200 °C

Nominal size	25	40	50	80	100	150	200	250
d	33,7	48,3	60,3	88,9	114,3	168,3	219,1	273
d1	76,1	101,6	114,3	159	193,7	244,5	323,9	355,6
L maxi.	2000	2000	3000	3000	3000	3000	3000	3000
Exchange area for L max. (m^2)	0,16	0,262	0,511	0,782	1,00	1,48	1,93	2,4
Inner cross section cm^2	4,3	11	19	44	77	179	313	497
Jacket cross section cm^2	30	52	61	115	159	200	376	320
Weight for L maxi. kg	23	34	57	96	114	211	313	462

SHELL AND TUBE HEAT EXCHANGER

Heat exchangers made of inert, non-metallic materials are a requirement in the chemical and pharmaceutical industries where it is essential to avoid any interaction between the materials of construction and the substances being processed.

Shell and tube heat exchangers can be used as condensers as well for the heat transfer between two liquids or gases

QVF® shell and tube heat exchangers from De Dietrich Process Systems provide versatile possibilities of use due to combination of different types of materials in regard to product corrosion and process conditions.

STRUCTURAL DESIGN

The tube sheet of the heat exchanger consists of pure PTFE. The internal tubes are sealed with single-piece tapered ring fittings without additional sealing. The shell and header are sealed using O rings.

The internal tubes are made of either borosilicate glass 3.3 or silicon carbide.

The following materials are used, depending on the type:

- Shell: glass/glass-lined steel/steel/other
- Internal tubes: glass/SiC
- Tube plate+fitting: PTFE
- Supporting plate: 1.4301
- Hoods: glass/1.4301

Both the steel and glass headers can be equipped with segments so that a 1 or 3-pass running mode is possible.

The location of the connection nozzles on the shell must be determined when ordering.

The baffles in the shell are made of PTFE and held through glass spacer rods.

For vertical installation, the heat exchangers can be equipped with a drain valve in the tube sheet, if desired. This special form also requires a special holder.

DESIGN DATA

All heat-related specifications refer to the outside surface of the internal tubes. The internal tubes are used in fixed lengths. The various transfer surfaces result from the number and length of the internal tubes.

Classification of the heat exchangers is made according to nominal heat transfer area.

The maximum temperature difference accross the wall of the tube is 130 K. Regardless of the specified temperature range, the shock temperature of 120°C must not be exceeded for borosilicate glass components. For other material, follow data specifications.

CORE-THERM: High pressure heat exchanger

Core-Therm is a special execution for height operating pressure – 1 / + 10 bar and large temperature range of – 40 / + 200 °C

The diffusion-resistant CORE-THERM tube plate with its integral support plate and the corrosion-resistant materials PFA and PTFE can be used at high pressures up to 10 bar and also operated under vacuum.

SiC tubes of course meets all the requirements of an optimum heat exchange tube because of its heat conductivity of 125 W/mK and its high corrosion resistance.

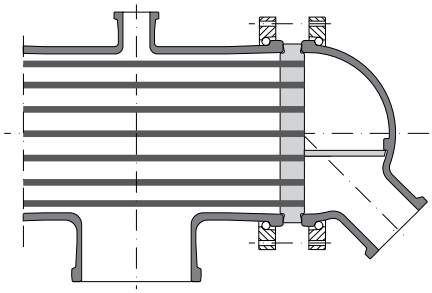
The usual way to operate a shell-and-tube condenser is with the product in the shell and for this reason, QVF® Core-Therm heat exchangers are equipped with De Dietrich® glass-lined steel shell, which have proved their suitability for difficult applications.

Because of the corrosion resistance of the heat exchange tubes and the shell the service and product sides can be selected to suit the particular operating requirements. Only the standard stainless steel headers need replacing with special corrosion-resistant headers in case of corrosive request on both sides.

Liquid/liquid heat transfer

Two product flows are countercurrent with optimal flow velocity.
Both sides have corrosion-resistant materials.

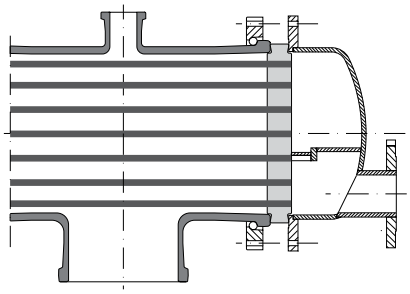
Type 1	Shell	Tubes	Header
Fluid	Product		Product
Material	Glass	Glass / SiC	Glass
Working pressure bar g	-1/+1(*)	-1/+3	-1/+3
Working temperature °C	-20/+150	-20/+150	-20/+150



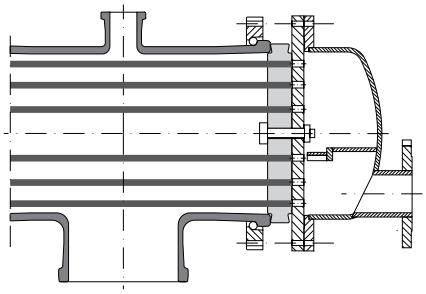
Condensation

In condensation processes, the cooling water side is generally non corrosive.
For higher pressures, the PTFE tube sheet is reinforced with a stainless steel plate on the cooling water side.

Type 2	Shell	Tubes	Header
Fluid	Product		Service
Material	Glass	Glass / SiC	Steel
Working pressure bar g	-1/+1(*)	-1/+3	-1/+3
Working temperature °C	-20/+150	-20/+150	-20/+150

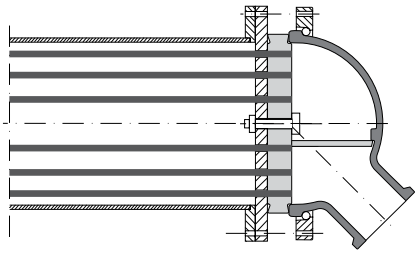


Type 3	Shell	Tubes	Header
Fluid	Product		Service
Material	Glass	Glass / SiC	Steel
Working pressure bar g	-1/+1(*)	-1/+6	-1/+6
Working temperature °C	-20/+150	-20/+150	-20/+150



* DN200 / DN300 = 1 bar - DN150 = 2 bar

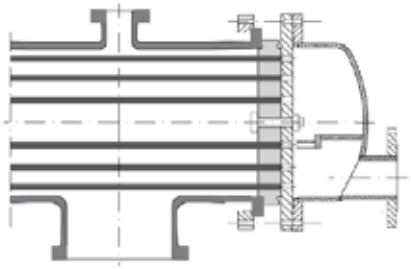
Type 4	Shell	Tubes	Header
Fluid	Service		Product
Material	Steel	Glass / SiC	Glass
Working pressure bar g	-1/+6	-1/+3	-1/+3
Working temperature °C	-20/+150	-20/+150	-20/+150



Type 5 & 6

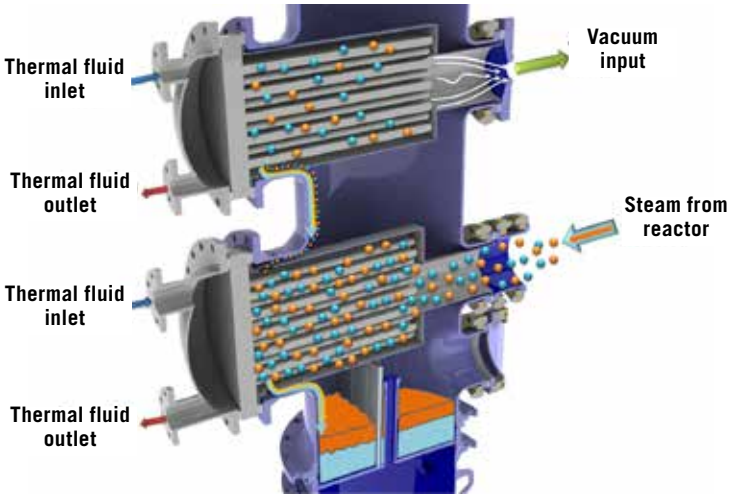
GMP version with chamber to avoid any cross contamination between the service and the product side (on request)

Type 7	Shell	Tubes	Header
Fluid	Product		Service
Material	Glass-lined steel	Glass / SiC	Steel
Working pressure bar g	-1/+6	-1/+6	-1/+6
Working temperature °C	-20/+150	-20/+150	-20/+150



CONDENSATION AND SEPARATION UNIT
Thermipack®

- **A compact system**
  3 units in one
- **Thermipack®**
  - Glass-lined metal free
  - Stainless steel
  - Alloy
- **High performances for the integrated condensers**
  - Tubular Silicone Carbide
  - Alloy C276
  - Stainless steel 316L
- **Available in size DN600, DN700, DN900**

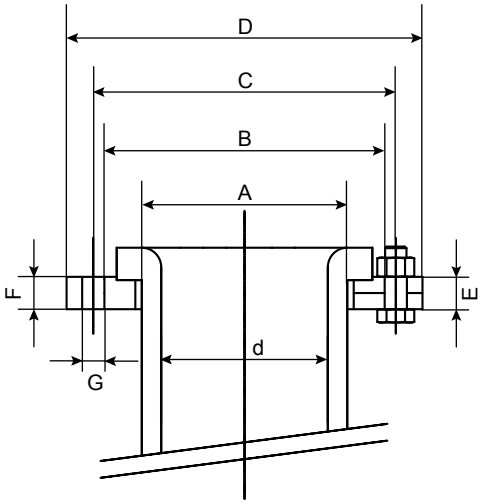


REACTOR RANGE		Thermipack® Range	CONDENSER				STORAGE
			ALLOY		SILICON CARBIDE		
Volume min.	Volume max.	DN - Ø	Primary	Trap	Primary	Trap	
(liter)	(liter)	(mm)	(m^2)	(m^2)	(m^2)	(m^2)	(liter)
	< 2500	DN600-600	9	3	6	2	115
≥ 2500	< 6300	DN700-700	12	6	9	4	190
≥ 6300	16000	DN900-850	24	12	17	9	340

Assembly by means of loose flanges drilled to PN10 standard or alternatively to the ANSI 150 lbs standard.

Tightening torque on bolts

See technical sheet gaskets

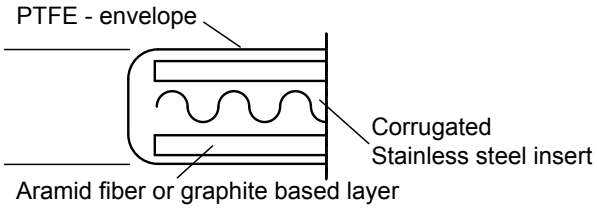


LOOSE FLANGES PN 10

DN	25	40	50	80	100	150	200	250	300
A	48	66	78	108	135	188	238	294	344
B	70	90	104	140	160	216	271	324	373
C	85	110	125	160	180	240	295	350	400
D	115	150	165	200	220	285	340	395	445
E	18	18	18	20	20	24	26	28	32
F	16	16	16	18	18	21	23	25	29
G	14	18	18	18	18	22	22	22	22
N x holes	4	4	4	8	8	8	8	12	12
Weight kg	1	1,6	2	3	3	5,5	7,6	10,5	14

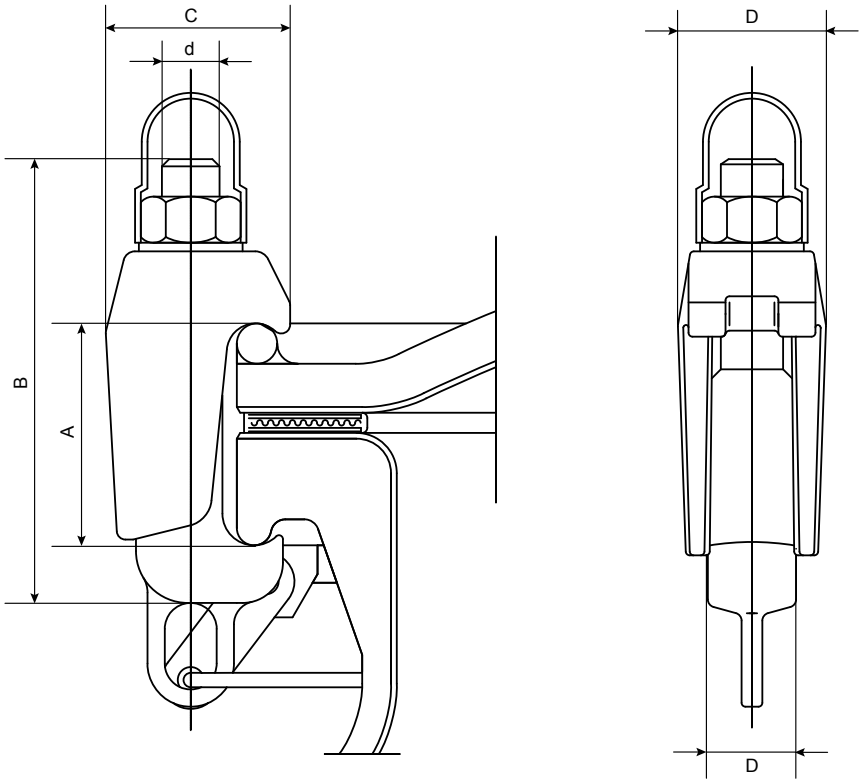
LOOSE FLANGES ANSI 150 LBS

DN	1"	1 1/2"	2"	3"	4"	6"	8"	10"	12"	16"
A	46	63	79	112	136	189	238	294	357	447,7
B	63	82,5	104	137	160	218	273	327	384	474
C	79	98,5	120,5	152,5	190,5	241	298	362	432	539,7
D	108	127	153	190	229	280	343	406	483	596,9
E	14	14	16	18	20	25	28	32	35	50
F	12	12	14	16	17	22	25	29	32	46
G	15	15	18	18	18	22	22	25	25	28,6
N x holes	4	4	4	4	8	8	8	12	12	16
Weight kg	0,71	0,9	1,5	2,4	3,8	5,3	8,5	13,15	21	44



Gaskets							Tightening torque* Insert	
Utilisation		Nominal size	Outside diameter	Inside diameter	Clamps or bolts		Aramid fiber	Graphite
		mm	mm	mm	Number	ø	Nm	Nm
Covers	CE	800	875	787	24	M24	220	180
		1000	1075	982	28	M24	250	200
		1200	1275	1177	32	M24	280	220
		1400	1485	1382	40	M24	270	220
Covers	AE	400	467	398	12	M20	150	120
		508	565	497	12	M20	190	150
		600	655	582	16	M20	170	140
		700	775	687	20	M24	240	190
	RS	800	875	787	24	M24	220	180
		1000	1075	982	28	M24	250	200
		1200	1275	1177	32	M24	280	220
		1400	1485	1382	40	M24	270	220
	RD	1600	1695	1582	44	M24	280	230
		1800	1885	1782	52	M24	270	210
		2000	2085	1982	64	M24	240	190
Covers	RFS / RFD CSH / CSV	500	605	522	16	M20	180	150
		600	705	622	20	M20	170	160
Handhole		100	162	113	4	M24	130	100
		150	212	163	4	M24	170	140
		200	270	213	6	M24	170	140
		250	320	263	6	M24	200	160
Manhole		350 / 450	430 / 530	367 / 467	10	M24	240	190
		500	605	522	12	M24	290	230
		600	705	622	16	M24	250	200
Nozzles		25	70	30	4	M12	20	20
		32	82	38	4	M16	40	30
		40	92	47	4	M16	40	30
		50	104	59	4	M16	50	40
Pipes		80	140	89	8	M16	40	30
		100	162	113	8	M16	50	40
		125	190	138	8	M16	60	50
		150	212	163	8	M20	70	60
Valves		200	270	213	8	M20	110	90
		250	328	263	12	M20	100	80
		300	378	313	12	M20	120	90
		350	430	370	16	M20	90	80
		400	490	419	16	M24	150	120
Covers	SR	435	512	450	8	M24	270	220
		450	530	457	8	M24	330	260
		500	605	522	12	M24	290	230
Sight glass		50	102	68	4	M16	40	30
		80	127	88	8	M16	30	30
		100	152	113	8	M16	40	30

* These torques correspond to greased threadings - Design pressure 6 bar



Material : forged steel 25 CrMo 4 galvanized, yellow passivated
Option : stainless steel

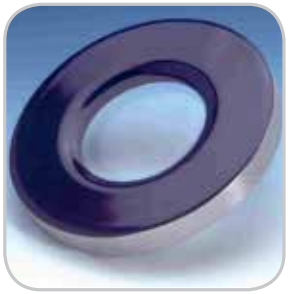
Type		A						Weight	Maxi. allowable load at		
	d	Mini.	Maxi.	B	C	D	E		+ 20° C	+ 200° C	+ 250° C
M 20 B	20	60	85	154	64	48	30	1,60 kg	33 342 N	31 185 N	29 714 N
M 24 BC	24	76	96	175	72	56	34	2,54 kg	52 858 N	49 327 N	46 974 N
M 24 BL	24	115	135	194	72	56	34	2,60 kg	52 858 N	49 327 N	46 974 N
M 27 BC	27	100	130	220	88	61	40	4,00 kg	77 668 N	72 471 N	69 039 N
M 27 BL	27	125	175	265	88	61	40	4,50 kg	77 668 N	72 471 N	69 039 N

All dimensions in millimeters - Dimensions and weights for guidance only

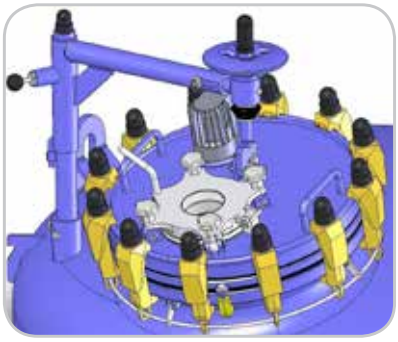
FUSED GLASS

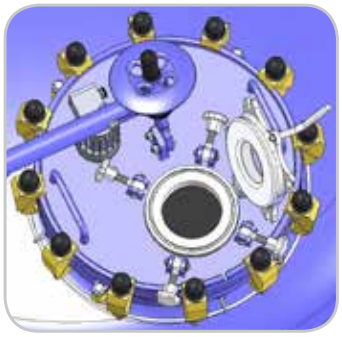
- No gaskets
- No dead zones
- Easy cleaning
- Improved visibility

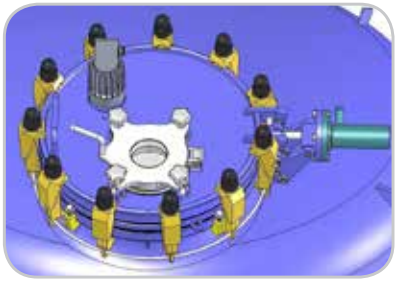
Glass-lined carbon steel, chromed



Manhole cover with Quick Opening for davit or hinges







Flat cover DN 350/450, DN 500 or DN 600 with Quick Opening DN 150, -1/6 bar, -25°C/+200°C

FUSED GLASS QUICK & EASY

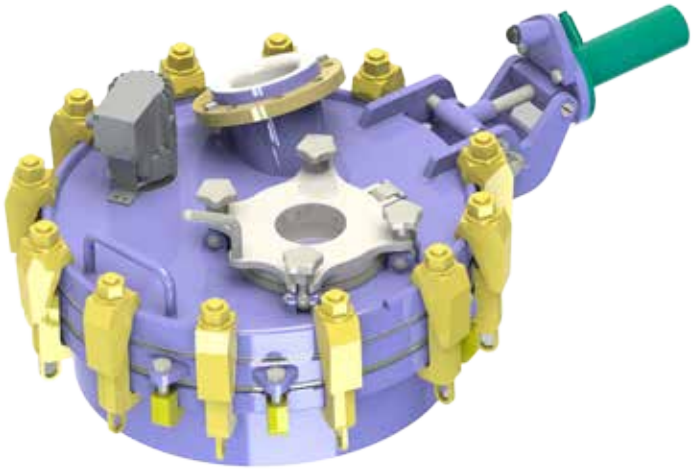
- Easily accessible for a quick charging of your product
- A visibility in the reactor thanks to the Fused Glass cover
- A safe system
- Tightening only by hand
- A tested sealing thanks to FFPM O-rings (Kalrez, Chemraz or similar) assembled on a PTFE seat
- No retention areas
- Optimal cleanability

Large size DN 300

De Dietrich® DN300 Quick Opening:
- A high chemical resistance glass
- A quick, efficient and simple opening of the cover for an ergonomic access

This system is available for DN500 and DN600 flat covers.
Available in chromed steel.

Operating conditions
In temperature: -25°C/+170°C
In pressure: -1/+6 bar



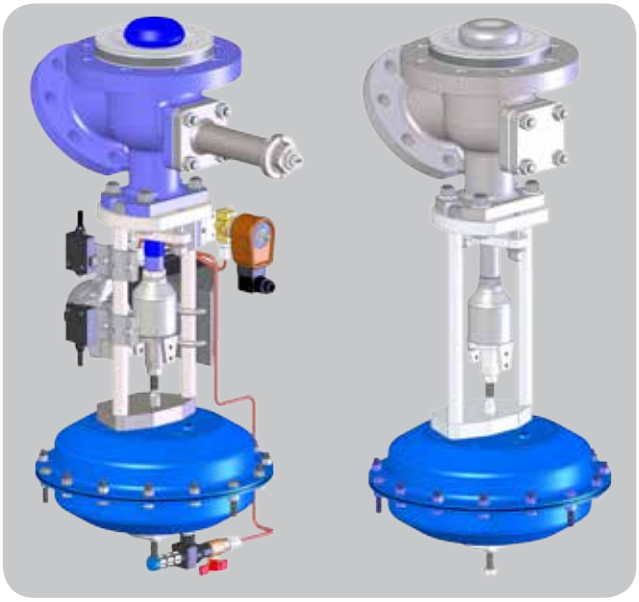
Specific design upon request

BOTTOM OUTLET VALVE

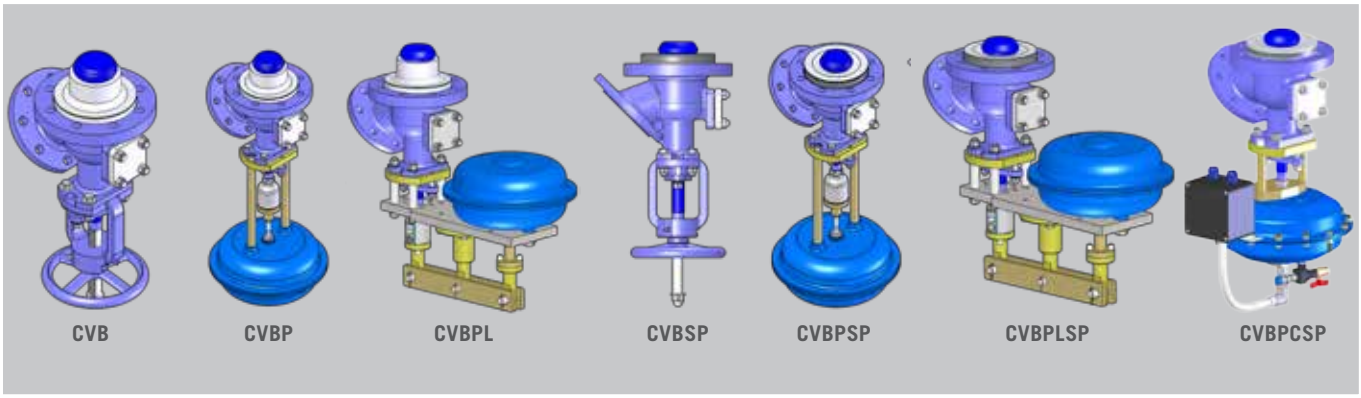
THE CLEANVALVE RANGE:
AVAILABLE IN ENAMEL DD3009, STAINLESS STEEL & ALLOY

THE BENEFITS OF OUR CLEANVALVE

- No cross contamination
- No need to dismantle valve between batches
  => reduced production cost
- For retrofitting or new reactors
- For standard nozzle or blockflange



THE RANGE

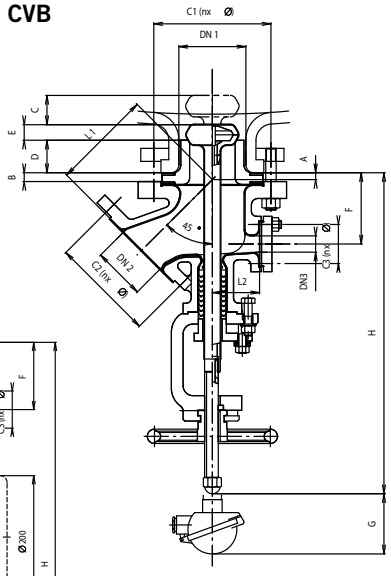


CVB Valve

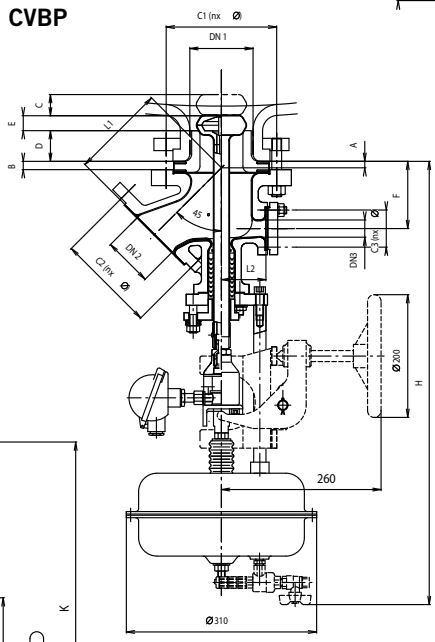
	Manual		Non FireSafe		Reinforced Seat	150/100	DN Input / DN Output
P	Pneumatic	FS	FireSafe	SP	Flat Seat	100/80	DN Input / DN Output
PL	Pneumatic Lateral					80/50	DN Input / DN Output
PC	Pneumatic Compact					50/32	DN Input / DN Output

Example: Valve CVBPLSP 100/80 - CVB Body - Pneumatic lateral - Flat Seat - 100/80

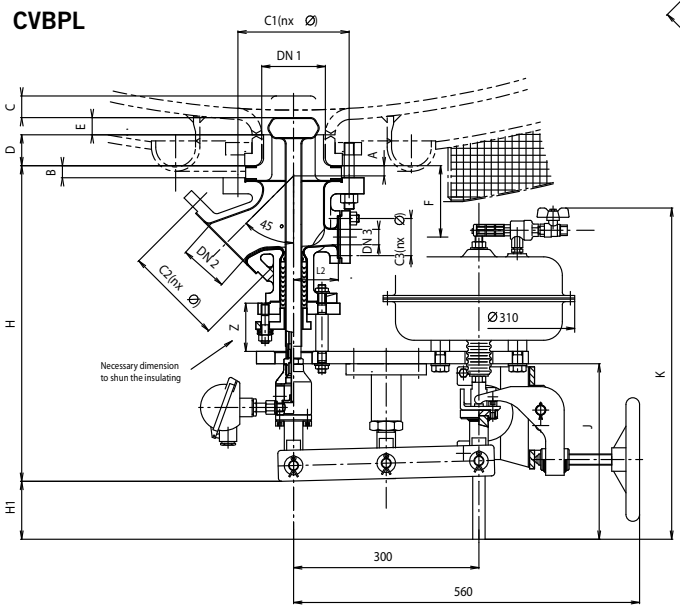
CVB



CVBP



CVBPL



JIS 10K

DN1/DN2	DN1		DN2	
	C1	n x Ø	C2	n x Ø
50/32	120	4x18	100	4x17
80/50	150	8x19	120	4x19
100/80	175	8x18	150	8x18
150/100	240	8x22	175	8x18

CVB - FLANGES DRILLING PN 10/16

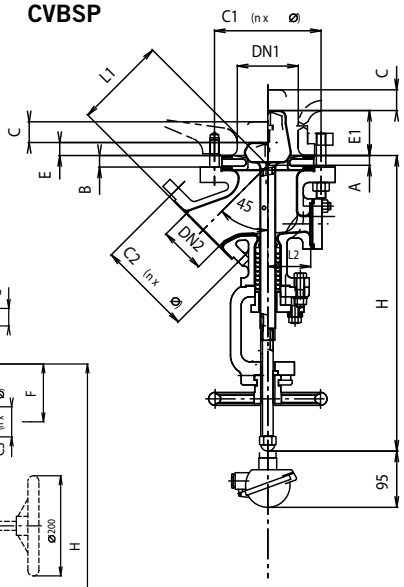
DN1/DN2	DN1		DN2	
	C1	n x Ø	C2	n x Ø
50/32	125	4x18	100	4x17
80/50	160	8x18	125	4x18
100/80	180	8x18	160	8x18
150/100	240	8x22	180	8x18

ANSI 150 LBS

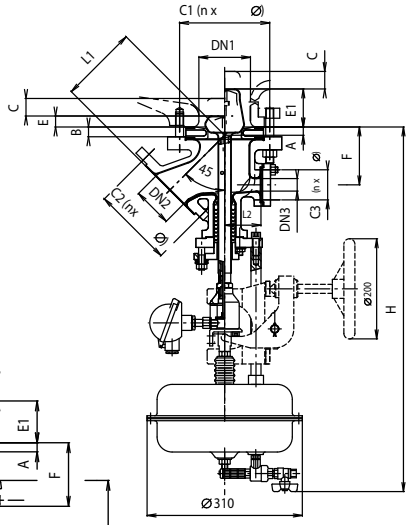
DN1/DN2	DN1		DN2	
	C1	n x Ø	C2	n x Ø
2"x1"1/2	120,6	4x18	98,6	4x17
3"x2"	152,4	4x19	120,6	4x19
4"x3"	190,5	8x18	152,4	4x18
6"x4"	241,3	8x22	190,5	8x18

Size	Sizes common to all models										Sizes specific to each model														
DN1/DN2	DN3			L1	L2	A	B	D	E	F	CVB				CVBP				CVBPL						
	DN	C3	n x Ø								C	H	bar	daN	C	H	bar	daN	C	H	H1	J	K	bar	daN
50/32	20	75	2xM12	100	42	8	12	42	17	68	35	355	-1/25	10	35	645	-1/25	26	35	425	95	285	535	-1/25	35
80/50	20	75	4xM12	115	57	45	13	42	23	112	35	420	-1/25	16	35	705	-1/25	32	35	490	90	285	535	-1/25	41
100/80	25	85	4xM12	155	72	11	14	50	25	109	45	485	-1/16	29	35	720	-1/16	41	35	505	95	285	535	-1/16	50
150/100	25	85	4xM12	175	92	12	16	60	29	128	55	515	-1/16	40	55	790	-1/16	54	55	550	65	285	560	-1/16	63

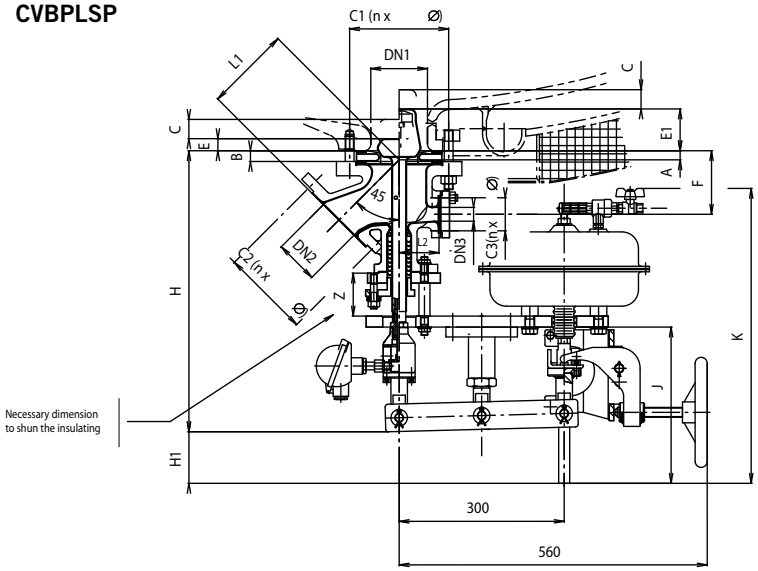
CVBSP



CVBPSP



CVBPLSP

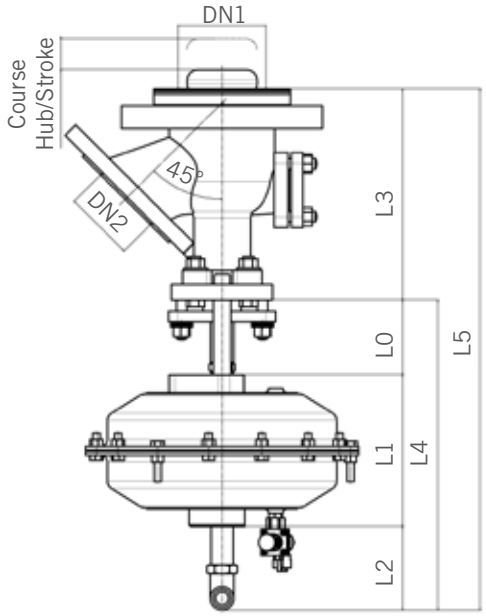


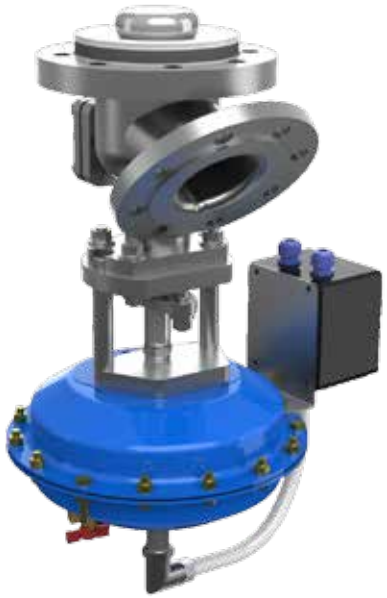
JIS 10K

DN1/DN2	DN1		DN2	
	C1	n x Ø	C2	n x Ø
50/32	120	4x18	100	4x17
80/50	150	8x19	120	4x19
100/80	175	8x18	150	8x18
150/100	240	8x22	175	8x18

Size	Sizes common to all models										
DN1/DN2	DN3			L1	L2	A	B	D	E	E1	F
	DN	C3	n x Ø								
50/32	20	75	2xM12	100	42	16	20	-	13	59	76
80/50	20	75	4xM12	115	57	55	23	-	19	65	122
100/80	25	85	4xM12	155	72	17	20	-	21	75	116
150/100	25	85	4xM12	175	92	19	23	-	25	89	136

Size	Sizes specific to each model													
DN1/DN2	CVBSP				CVBPSP				CVBPLSP						
	C	H	bar	daN	C	H	bar	daN	C	H	H1	J	K	bar	daN
50/32	35	365	-1/25	10	35	655	-1/25	26	35	435	65	285	510	-1/25	35
80/50	35	430	-1/25	16	35	715	-1/25	32	35	500	65	285	510	-1/25	41
100/80	45	500	-1/16	29	35	730	-1/16	41	35	515	65	285	510	-1/16	50
150/100	55	530	-1/16	40	55	800	-1/16	54	55	565	70	285	560	-1/16	63

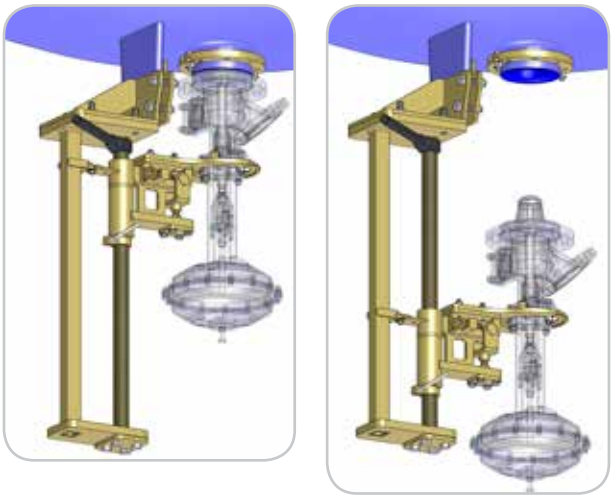




DN1/DN2	COURSE HUB / STROKE	L0	L1	L2	L3	L4	L5	CVBPL	CVBP
50/32	35	85	172	95	164	352	516	400	645
80/50	35	85	172	95	228	352	580	465	705
100/80	35	85	172	95	241	352	583	480	720
150/100	35	105	192	115	261	412	673	525	790

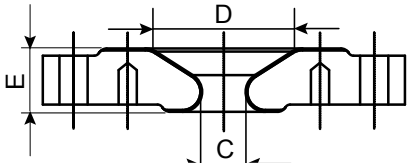
ASSEMBLY AND DISMANTLING TOOL FOR VALVE

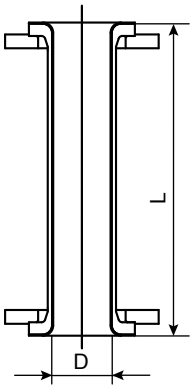
Dismantling kit for forklift



Alternative tool: fixed on the lifting lug

PIPES & FITTINGS





REDUCING FLANGES

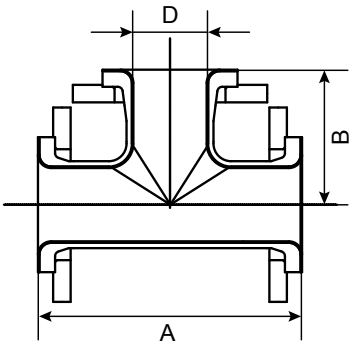
D mm	C mm	25	40	50	80	100	150	200	250
40	E mm	35							
	Weight kg	4							
50		35	35						
		4,9	4,7						
80		35	35	35					
		7,1	6,8	6,7					
100		45	45	45	45				
		10,9	10,6	10,5	9,6				
150		45	45	45	45	45			
		19	18,6	18	17,2	16,3			
200		45	45	45	45	45	45		
		27,5	27	26	24	23	21		
250		45	45	45	45	45	45	45	
		37,2	36,8	36	34	33	29	24	
300		45	45	45	45	45	45	45	45
		49	47	46	44	43	40	32	30

STRAIGHT PIPES

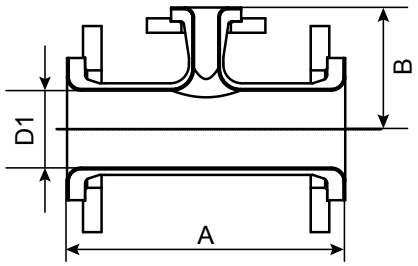
D mm	25	40	50	80	100	150	200	250	300
L mm	Weight kg								
100	3,1	4,8	6,3	8,1	10,6				
150	3,4	5,2	6,6	10,6	12,6	21	30	40	
200	3,5	5,4	7	11,2	13,4	22,5	32	42	53
250	3,7	5,6	7,2	11,8	14,2	24	34	45	53
300	3,8	5,8	7,5	12,4	15	26	36	48	60,5
500	4,6	6,6	8,6	13,5	18	31	45	61	75
800	5	8	10,5	18	23	40	58	80	97
1000	5,5	9	11,5	20	26	45	66	92	112
1500	8	11	14	26	35	60	88	123	149
1800	10	13	16	30	40	68	100	143	171
2000	11,1	14,6	17	32	44	74	110	155	186
2500			21	38	52	89	132	187	223
3000			25,5	44	60	104	155	218	260

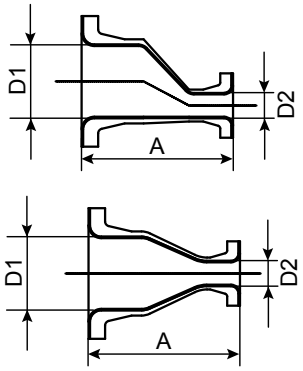
TEES

D mm	25	40	50	80	100	150	200	250	300
A mm	180	210	230	270	310	390	520	630	700
Weight kg	5,4	8,6	12	19	26	45	70	99	120



Main dimensions for the loose flanges see page





REDUCING TEES

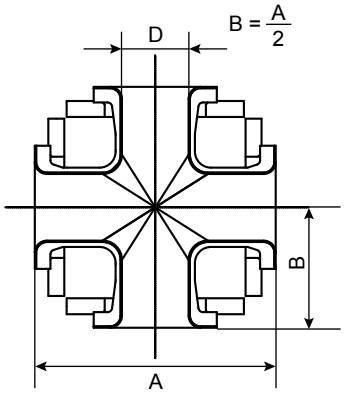
D1 mm	D2 mm	25	40	50	80	100	150	200	250
50	A mm	230	230						
	B mm	100	110						
	Weight kg	9	10						
80		270	270	270					
		115	125	130					
		13,5	15	16					
100		310	310	310	310				
		125	135	140	150				
		14,5	17	19	21				
150		390	390	390	390	390			
		155	165	170	180	185			
		30	32	33	34	35			
200		520	520	520	520	520	520		
		185	195	200	210	215	225		
		48	49,5	51	52	53	58		
250		630	630	630	630	630	630	630	
		230	240	245	255	260	270	275	
		65	66	68	72	76	81	85	
300		700	700	700	700	700	700	700	700
		290	300	305	315	320	330	335	340
		101	106	111	116	120	125	129	137

REDUCERS

D1 mm	D2 mm	25	40	50	80	100	150	200	250
50	A mm	140	140						
	Weight kg	5	5,8						
80		160	160	160					
		4,25	6,8	8,5					
100		175	175	175	175				
		5	8	10	11,4				
150				225	225	225			
				10,6	14,8	18,5			
200				250	250	250	250		
				15,6	20,8	26	30		
250					300	300	300	300	
					28	35	39	44	
300						350	350	350	350
						32	48	52	57

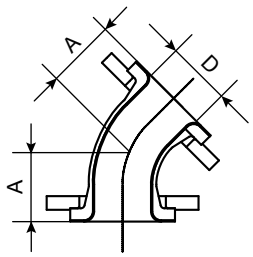
CROSSES

D mm	25	40	50	80	100	150	200	250	300
A mm	180	210	230	270	310	390	520	630	700
Weight kg	7	11,5	16	25	33	58	88	126	148



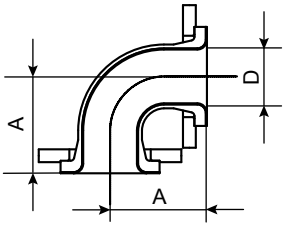
45° ELBOWS

D mm	25	40	50	80	100	150	200	250	300
A mm	60	70	80	95	105	150	180	220	260
Weight kg	3,3	5,3	7	11	14	24	39	57	73



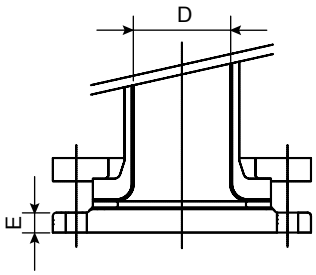
90° ELBOWS

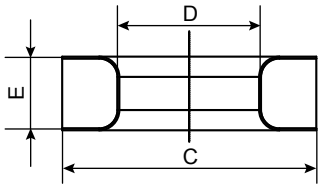
D mm	25	40	50	80	100	150	200	250	300
A mm	90	105	115	135	155	195	260	315	350
Weight kg	3,5	5,6	7,5	12	15,5	25	43	64	82



BLIND FLANGES

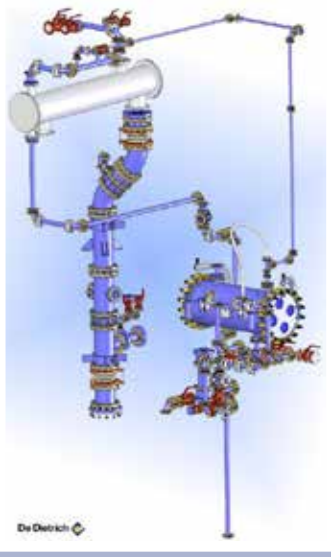
D mm	25	40	50	80	100	150	200	250	300
E mm	16	16	18	20	20	22	24	26	26
Weight kg	1,3	2,2	3	5	6	11	17	25	28,5





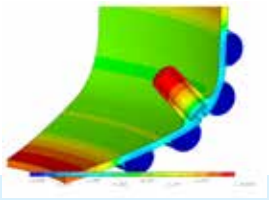
ADAPTERS

D mm	25	40	50	80	100	150	200	250	300
C mm	68	88	102	138	158	212	268	320	370
E mm (on enamel)	**Weight kg**								
15	1,5	1,7	1,8	2,2	2,1	2,1	2,4	2,4	2,4
20	2	2,3	2,4	3	2,7	2,9	3,2	3,2	3,2
25	2,5	2,9	3,1	3,7	3,4	3,6	4	4,1	4
30	3,1	3,5	3,7	4,4	4,1	4,3	4,8	4,9	4,9
40	4,1	4,1	4,6	5,9	5,5	5,7	6,4	6,5	6,4
50				6,1	6,9	7,2	8,1	8,1	8



More than 6000 pieces on stock

De Dietrich



INTRUMENTATION

Sampling System

Temperature probe

Enamel Monitoring

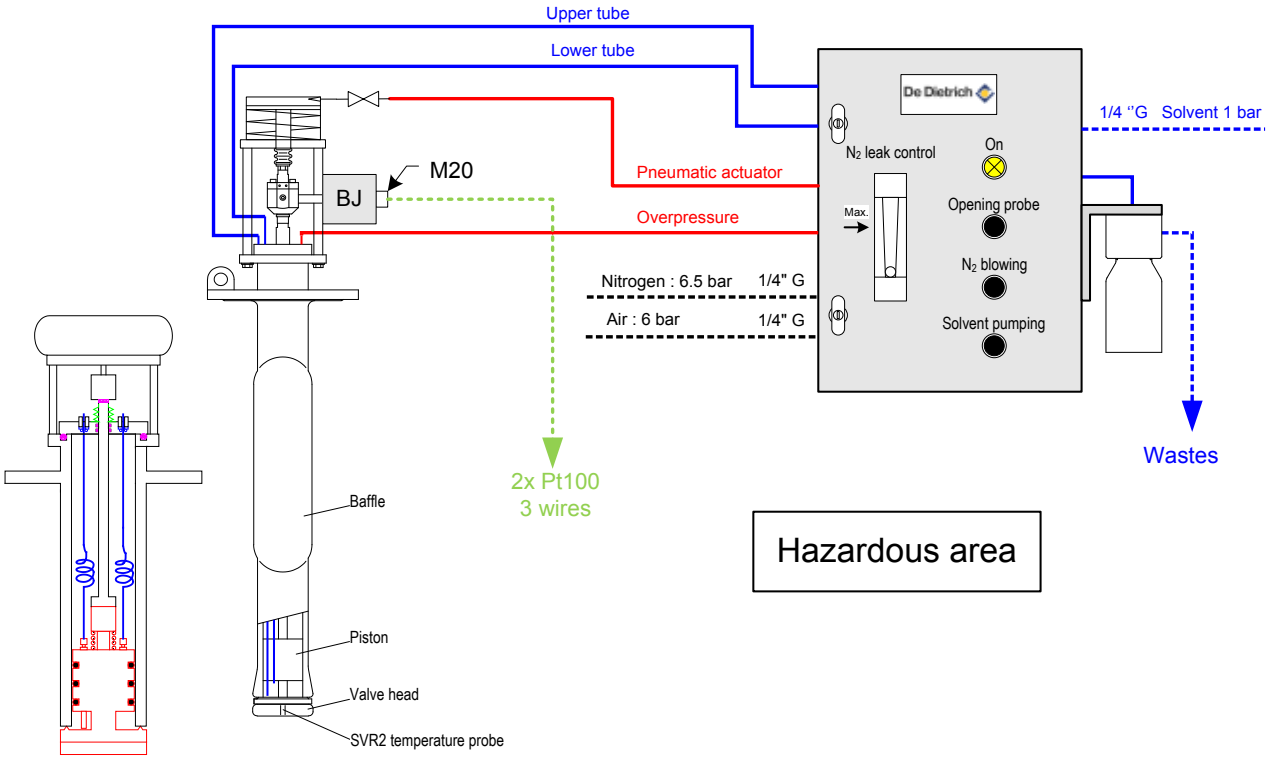
THE ONLY SYSTEM FOR SAMPLING EVEN UNDER FULL VACUUM & TOTALLY CIP

The Multiprobe® System is fully "Plug & Play"

- Use completely safe
- Representative sampling
- Avoid any cross contamination between 2 samples
- Fluid circuit completely "Metal free"

WORKING CONDITIONS:

- Pressure: -1 / +6 bar
- Temperature:-25 / +150° C
- Viscosity maximum: 1000 cP
- Particles maximum: 200µ
- Conformity with directive 94/9 CE classified in: CE Ex II 2 G
- Conformity with directive 97/23 CE



Assembling diagram

MULTIPROBE® pH

4 functions in a single probe:

→Baffle effect does not need any other nozzle

→Sampling

- Sample is blown out by N_2 pressure
- Takes the sample in the heart of the reactor (and not near the outlet nozzle)
- Perfect CIP of the sampling circuit
- Sampling is quasi-instantaneous
- Sampling is possible under full vacuum, under pressure up to 6 bar and at the boiling point of the product
- Duplication of the samling is possible

→Temperature measurement by SVR probe independent of the other functions

→pH measurement

SIZE:

- Nozzle: DN150 mini
- Length under flange: 600 mini, 4000 maxi
- Height above flange: 600 mm
- Cabinets: h x w x d, 640 x 420 x 170 mm, placed at a maximum distance of 5 m from the baffle

WORKING CONDITIONS:

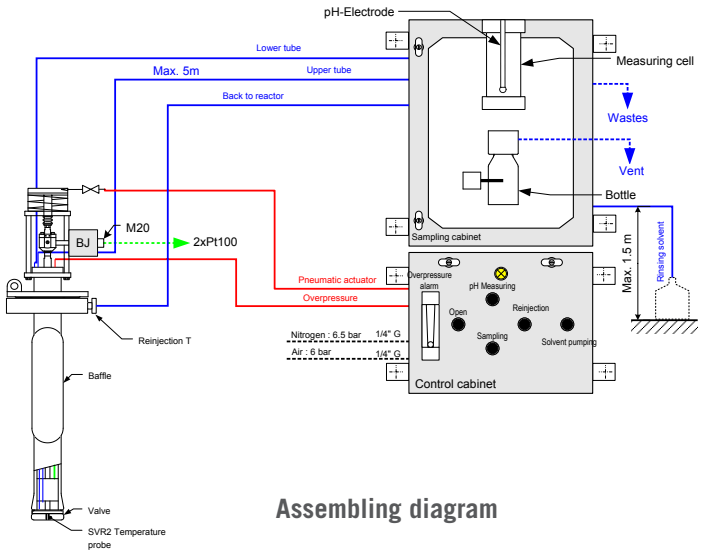
- Maximum temperature: 150° C
- Pressure range: -1 / +6 bar
- Maximum viscosity of product: 2,000 cp. for more viscous products (up to 10,000 cp.) ask for a test

SAFETIES:

- Overpressurization of the baffle compared to the process pressure
- Leak detection by monitoring this internatl N_2- overpressure circuit
- Detection of flask presence by limit switch

MULTIPROBE® MAIN CHARACTERISTICS

Min. nozzle size: DN	50	80	150		150
Option					150 pH
Material	Alloy	Glass-lined / Alloy	Glass-lined	Alloy	Glass-lined / Alloy
Temperature: °C	-20 / +150		-25 / +150	-25 / +200	-5 / +130
Pressure: bar	-1 / 6				
Max. particules size: µm	200				
Viscosity: cP	500		1000		
T° measurement: Pt100 3 wires	1	2			
Max. electrode: Nbr					4



Assembling diagram

SAMPLING SYSTEM
TSU (Transfer Sampling Unit)

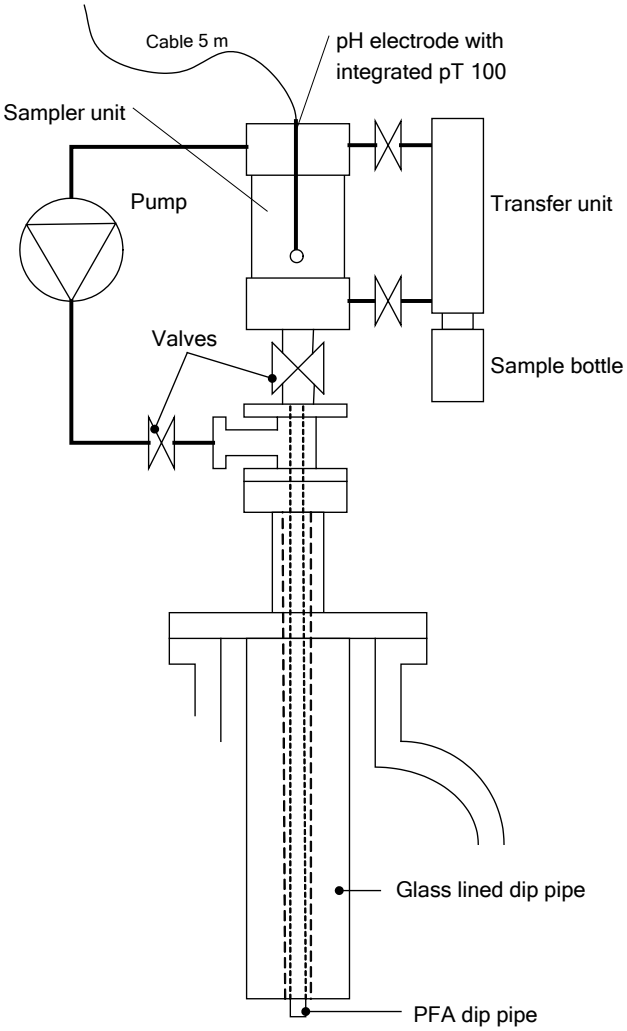
A COMPLETE VACUUM SAMPLING DEVICE

This system is foreseen to be mounted
on a dip pipe DN 50 or DN 2"

- No sampling in a reactor under vacuum
- Cleaning (not during the process)
- Sampling representative after 2-3 samplings

WORKING CONDITIONS:

- Pressure: 0 / +10 bar
- Temperature: -25 / +200° C
- pH via an external circuit with pump (7 bar / 120° C)



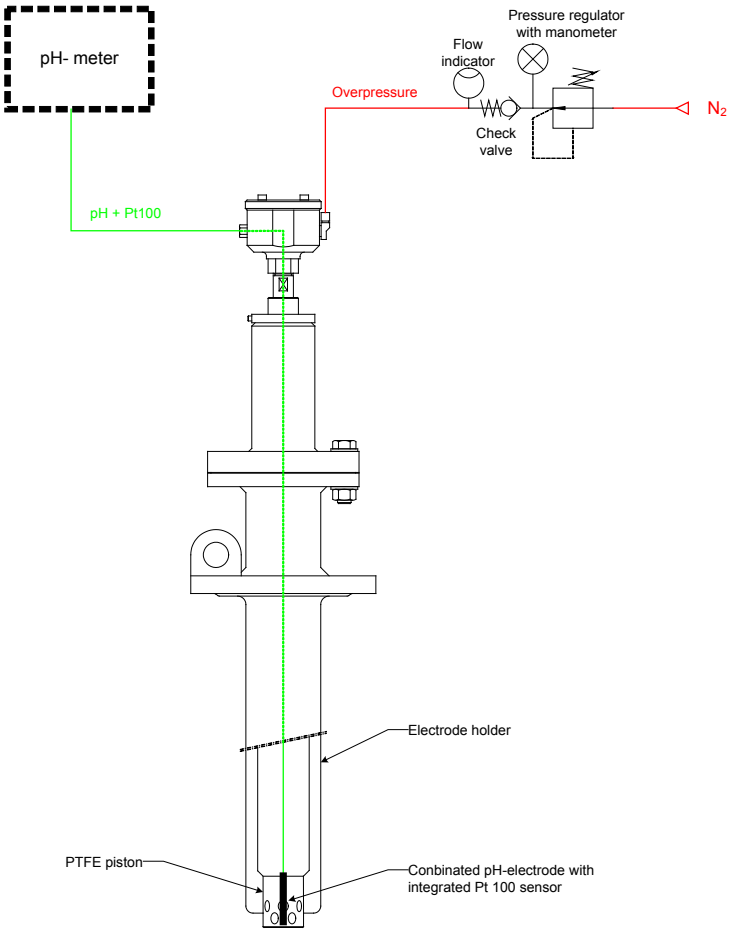
ELECTRODE HOLDER PROBE TYPE GPE

This system is foreseen to be mounted on a dip pipe DN 50 or DN 2"

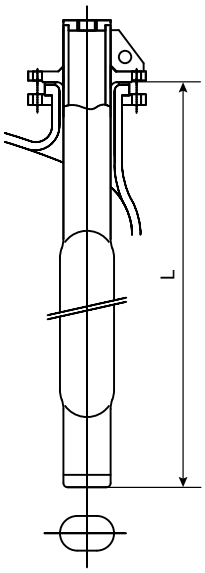
WORKING CONDITIONS:

- Pressure: -1 / +6 bar
- Temperature: -5 / +130° C
- Nozzle size: DN50 for alloy - DN80 mini for glass-lined
- In conformity with Directive 94/9 CE classified in: CE Ex II 2 G

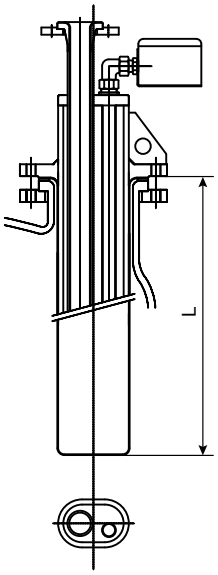
	GPE 50	GPE 80	GPE 100
Min. nozzle size: DN	50	80	100
Material	Alloy	Glass-lined / Alloy	
Temperature: °C	-5 / +130		
Pressure: bar	-1 / 6		
Max. electrode: Nbr	1	1	3



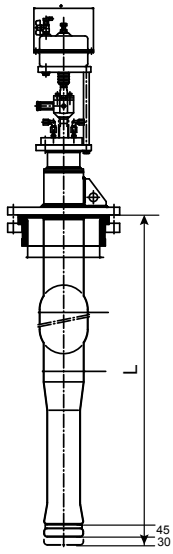
BEAVERTAIL BAFFLE



COMBO BAFFLE



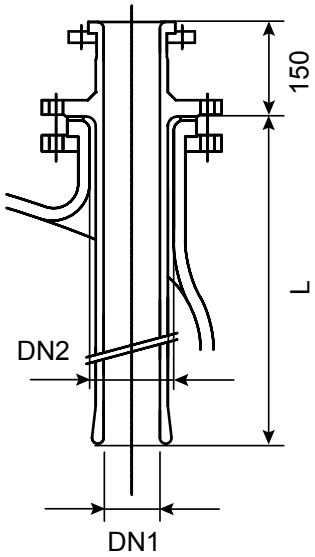
BLE SAMPLING BAFFLE



	Nozzle	Dipping length L / volume V (mm / litres)		
	DN	Standard	Maxi	
AE 63	50	475 / 25	540 / 12	
AE 100	50	675 / 25	740 / 12	
AE 160	80	750 / 45	842 / 21	
AE 250	80	810 / 82	956 / 29	
AE 400	80	1025 / 111	*Imp.: 1034 / 107	Other: 1183 / 35**
AE 630	100	1040 / 187	1214 / 58	
AE 1000	200	1200 / 360	*Imp.: 1261 / 294	Other: 1439 / 103***
AE 1600	200	1420 / 500	1652 / 160	
AE 2500	200	1660 / 663	1891 / 223	
AE 4000	250	2030 / 912	*Imp.: 2140 / 645	Other: 2295 / 276***
AE 6300	250	2530 / 1232	2829 / 349	
BE 1000	200	1200 / 356	1436 / 103	
BE 1600	200	1420 / 482	1641 / 160	
BE 2500	200	1660 / 638	1885 / 210	
BE 4000	250	2030 / 883	2290 / 261	
BE 6300	250	2530 / 1196	2823 / 333	
BE 8000	300	2505 / 1100	2678 / 515	
BE 10000	250	2500 / 1867	2786 / 684	
BE 12500	250	3100 / 1833	3358 / 757	
BE 16000	250	3400 / 2110	3663 / 848	
BE 20000	300	3700 / 2483	3927 / 1209	
BE 25000	300	4000 / 2996	4206 / 1655	
CE 630	100	1040 / 178	-	
CE 1600	200	1200 / 524	1449 / 160	
CE 2500	200	1420 / 715	1670 / 248	
CE 4000	250	1800 / 949	*Imp.: 1938 / 613	Other: 2079 / 273***
CE 6300	250	2320 / 1196	2607 / 349	
CE 8000	300	2505 / 1100	2678 / 515	
CE 10000	250	2500 / 1802	2796 / 684	
CE 12500	250	3100 / 1911	3376 / 757	
CE 16000	250	3400 / 2120	3664 / 848	

Remarks :
- The indicated dimensions are not applicable with Anchor agitator
- All dimensions are applicable for OPTIMIX design reactor.

* with Impeller agitator
** with welded turbine
*** with Glaslock® agitator

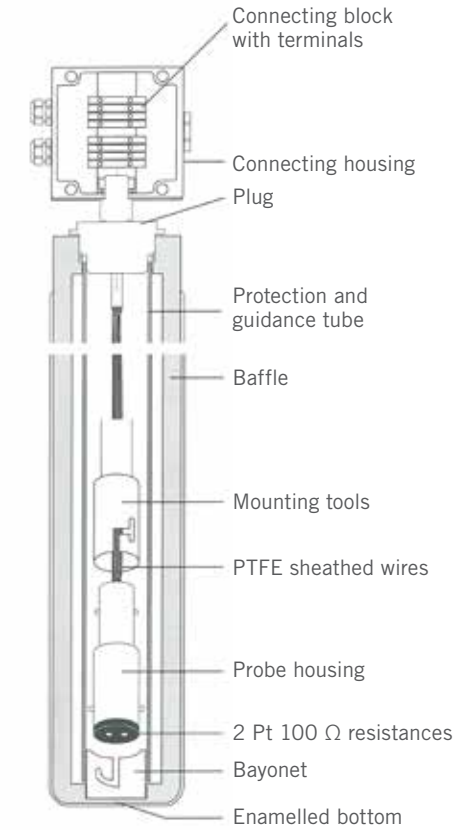


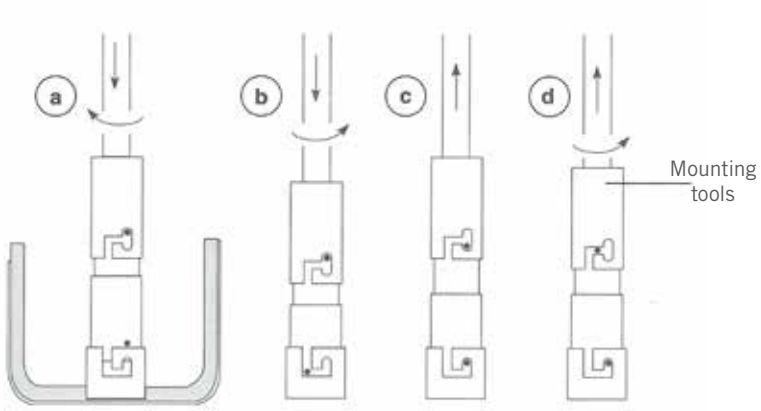
	Nozzle	Dip-pipe	Dipping length L / volume V (mm / litres)	
	DN1	DN2	Standard	Maxi
AE 63	-	-	-	-
AE 100	-	-	-	-
AE 160	80	40	825 / 25	838 / 22
AE 250	80	40	925 / 40	952 / 30
AE 400	80	40	1150 / 51	1181 / 36
AE 630	100	50	1175 / 87	1213 / 59
AE 1000	100	50	1300 / 223	1390 / 126
AE 1600	100	50	1500 / 347	1622 / 169
AE 2500	100	50	1650 / 607	1836 / 252
AE 4000	150	80	2050 / 805	2257 / 308
AE 6300	150	80	2500 / 1250	2792 / 384
BE 1000	100	50	1300 / 220	1387 / 127
BE 1600	100	50	1500 / 330	1610 / 169
BE 2500	100	50	1650 / 584	1824 / 252
BE 4000	150	80	2050 / 776	2245 / 308
BE 6300	150	80	2500 / 1250	2779 / 420
BE 8000	150	80	2500 / 936	2615 / 552
BE 10000	200	100	2650 / 1164	2761 / 841
BE 12500	200	100	3000 / 2240	3341 / 799
BE 16000	200	100	3000 / 3930	3579 / 1030
CE 1600	100	50	1300 / 346	1421 / 169
CE 2500	100	50	1500 / 486	1623 / 252
CE 4000	150	80	1850 / 769	2040 / 308
CE 6300	150	80	2300 / 1184	2569 / 386
CE 8000	150	80	2500 / 936	2615 / 552
CE 10000	200	100	2650 / 1164	2761 / 841
CE 12500	200	100	3000 / 2240	3341 / 799
CE 16000	200	100	3000 / 3930	3579 / 1030

Maximum dipping length for a non-agitated vessel

DN2	DN1	L Max
50	40	1850
100	50	2850
150	80	3350
200	100	3350

Assemby of a DR probe in a baffle

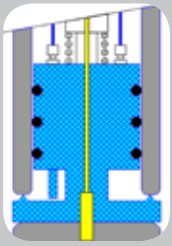




Easy assembly & disassembly

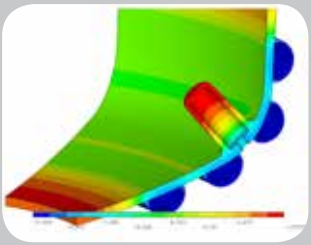
CLASSICAL APPLICATIONS

Combo dip pipe



Multiprobe®

Valve



Pad type

Baffle

TEMPERATURE PROBE

Since its conception, thousand of temperature probes have been mounted and adopted by our customers, due to its advantages:

- One electric circuit for each element
- Probe mounted in a fully glass-lined equipment: - no gasket
  - no leak
- Probe dismountable from the outside of reactor:
  - during the process
  - for exchange or calibration
- Very good contact secured by De Dietrich® bayonet system for DR probe and the spring for SVR and SLR probes
- Short response time due to: - ceramic insulating material with low thermal inertia
  - thin film ceramic Pt 100 Ω element
  - special treatment of the bottom
  - minimum wall thickness

Response time

- The use of platinium resistances deposited on thin ceramic supports
- The mounting of these into an insulating material with a low thermal inertia
- The quality of the contact between the measuring element and the bottom of the baffle or the thermowell guaranteed by the bayonet system give the system a response time equivalent to that of a thermoprobe resistance mounted into a tantalum tip.

Description

The measuring probe, which is externally removable, consists of a measuring head held against the plan bottom of the entirely glass-lined baffle, thermowell or stem/head.
The head features 2 (DR2 or SVR2) or 3 (DR3) Pt 100 Ω resistances with a thin ceramic support which are fitted into insulating materials with a low thermal inertia.
For the DR probe, a bayonet secured at the lower end of the baffle permits easy assembly into socket by maintaining the measuring head against the bottom of the baffle or thermowell.
The assembly or removal of the system is made from the outside of the vessel by means of a tool incorporating a bayonet welded to a tubular extension piece.

Explosion protection

The probes are intended to be incorporated into "Ex i " circuits.
The ATEX safety of the probe is ensured by the temperature transmitter which has to be "Ex i" certified (EN 60079-11).

Accuracy

In standard, the temperature probe is equipped with Pt 100Ω resistances with 3 wires.
This standard gives a accuracy of ±1,5°C in the range from -25°C up to +200°C.
We deliver on request:

- A calibration certificate for three points: +25°C, +100°C and +150°C
- A high accuracy probe class A with calibration certificate according to DIN EN 60751.

Maintenance

Easy to replace exernally, without entering the vessel, or removing the baffle or thermowell, the DR, SLR and SVR probes reduce to a minimum the down time of the reactor.

Various possible configurations
STANDARD
with 2 elements Pt 100 Ω **DR2** - **SVR2** - **SLR2**
or 3 elements Pt 100 Ω **DR3**
Other features on request.

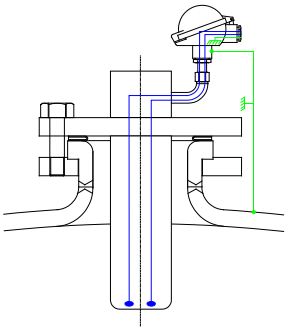
SVR / SLR / DR

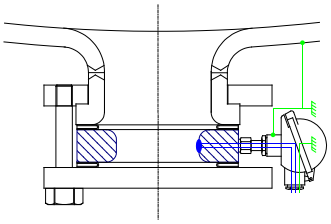


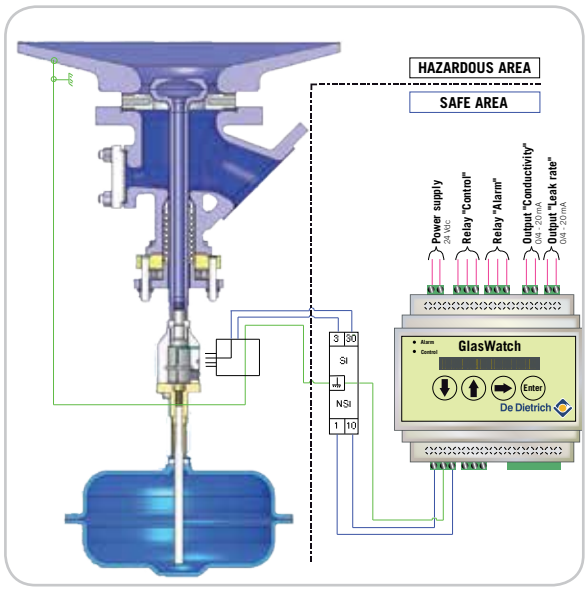
ENAMEL MONITORING
GlasWatch

CONTINUOUS AND AUTOMATIC MONITORING OF THE LINING INTERGRITY

- Supervision through the input of the installed De Dietrich probes
- Visuel alarm and system control
- Alarm and control output relays
- 4-20 mA output signal







Conductivity evalutation

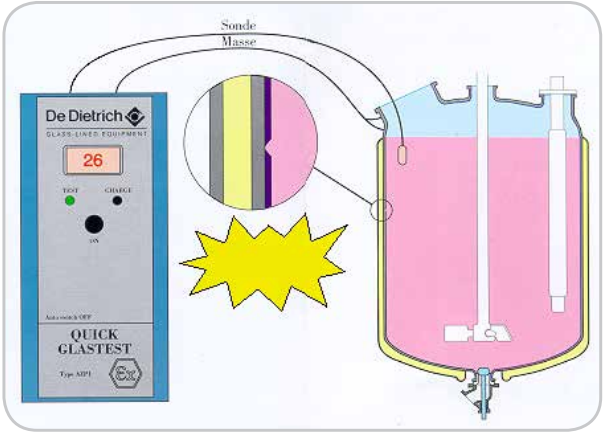
- Range 0.1 to 20 mS/cm
- 4-20 mA output signal

ENAMEL MONITORING
Portable Glastest AZP1

- Punctual control
- Conductivity range 0.1 to 20 mS/cm
- Non corrosive conditions

Working principle

Same as for the GlasWatch: calculation and display of a leak rate depends only on the size of the glass defect



D.E.Co.S.: DE DIETRICH ENAMEL CONTROLLING SYSTEM

Dedicated Glass-lining Monitoring System for PAC Process (PolyAluminium Chloride)

The D.E.Co.S. System allows the possibility of early detection to any damage to the enamelled surface and consequently allows a quick repair.

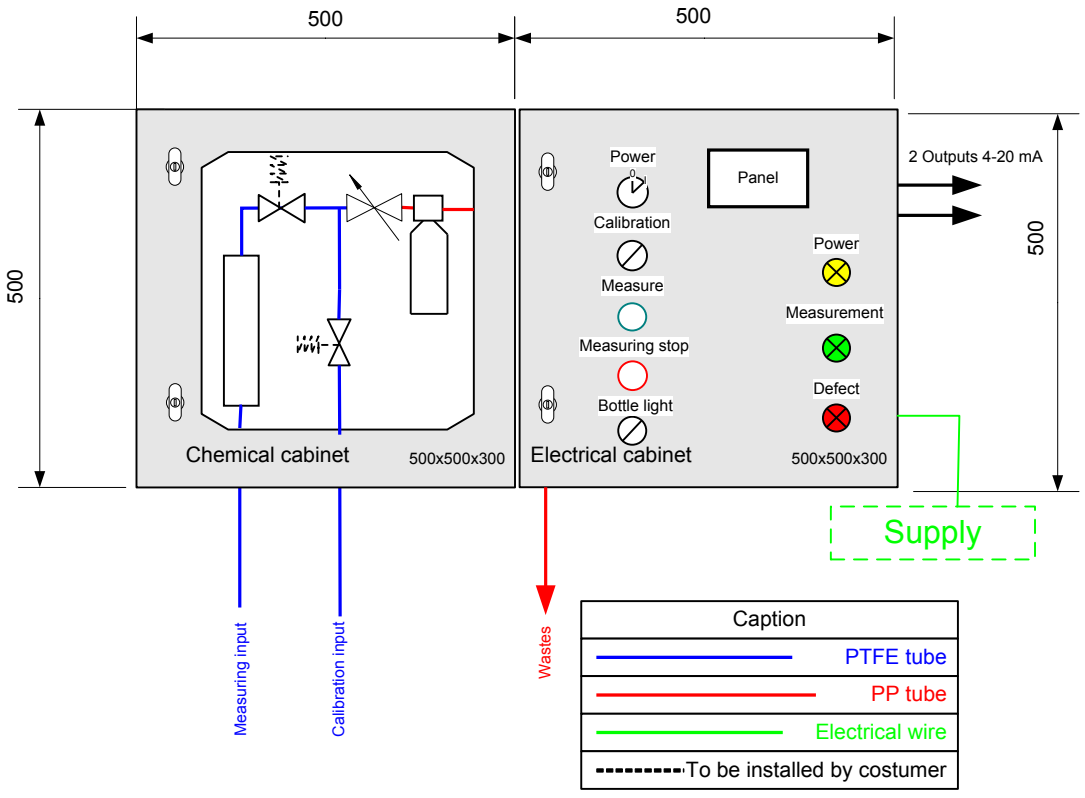
- Integrated and easy-handling system
- Monitoring system of the entire reactor
- Full services package provided
- Increase the life-span of the reactor
- Less maintenance

Chemical cabinet

Washes the extracted sample of gas from the PAC and HCl steams.

Electrical cabinet

Enables the measurement of released gas rate during the steel corrosion in the sampled gas.
This measure is done redundantly and thanks to two measuring cells.
These two measurements are displayed on a screen and given out through 2x 4-20 mA outputs to be wired with your D.E.Co.S. System.

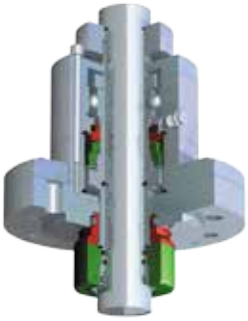


CLEANABILITY

INTERNAL TECHNICAL SOLUTIONS

Inverted gas lubrificated mechanical seal

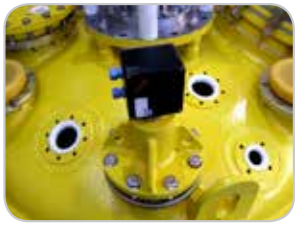
- Only C/SiC or SiC/SiC and enamel in contact with product
- Limited dead spots



Spraying devices

- A wide range of spraying devices (spray ball, spray ring) for an optimum cleanability
- Material: Alloy, PTFE, ...

Block Flange



OptiMix®: optimization of the cleanability with 3 integrated baffles

- All the nozzles remain free for the process
- Better access for the cleaning
- No dead zones
- High axial flow behind the baffles to avoid deposit

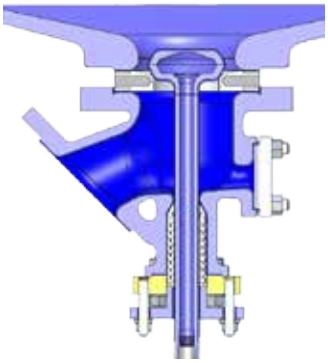
the baffles to avoid deposit

EXTERNAL TECHNICAL SOLUTIONS

Welded insulation

- Foamglass or rockwool
- Welded stainless steel sheathing
- Complete insulation

CleanValve CVB with flat seat

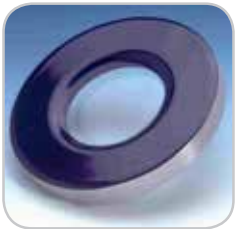


Retractable spray device for outlet valve

- Directly installed on the side nozzle of the valve body
- No dismantling required for cleaning
- Conformity ATEX: CE II 2G IIC T4

Fused Glass

- No gaskets, no dead zones, easy cleaning
- Available as sight glass for nozzles
- Incorporated into Quick & Easy handhole cover
- Can be incorporated into flat cover



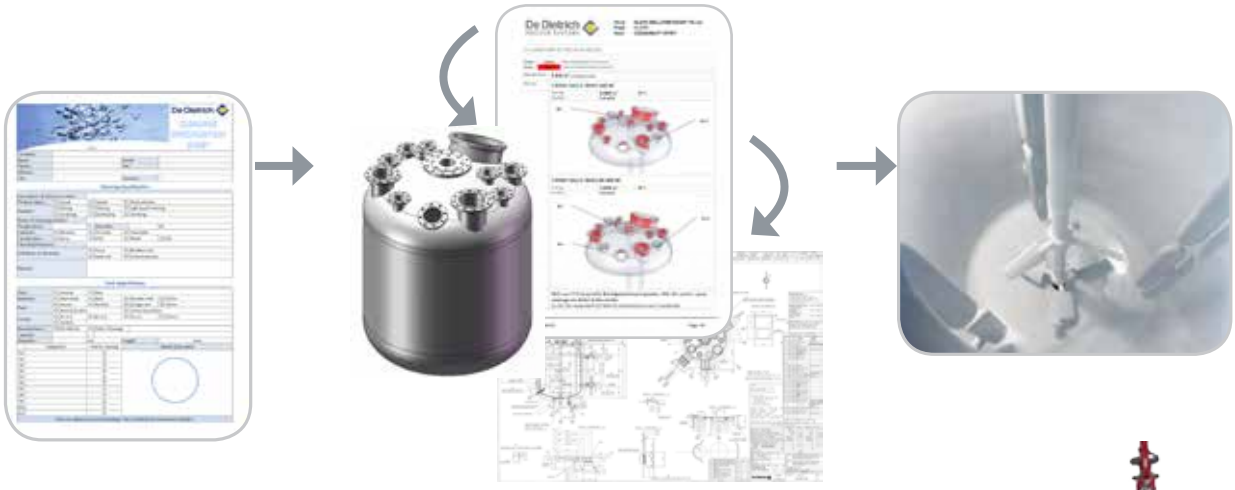
CIP SOLUTIONS (CLEANING IN PLACE)

Why investing in CIP: Cleaning In Place

- To save time to optimize your reactor operation
- To reduce solvent consumption for cleaning
- To define a repetitive cleaning cycle for constant efficiency

Our approach in 3 steps:

- Step 1: Cleaning specification sheet to understand your require
- Step 2: Optimized reactor design using results of cleaning study
- Step 3: Validation by test in our workshops or on your site



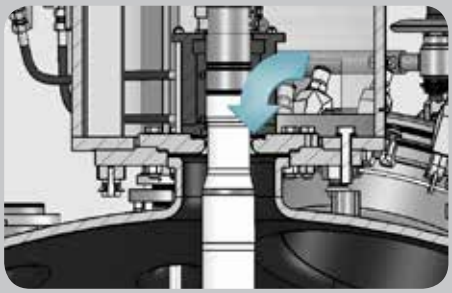
From a graphic study

- The user-oriented report highlights the potential areas non-accessible to the cleaning system, in order to optimize the reactor design and guide the choice towards the differents solutions.

In red, areas non-accessible for the spray ball

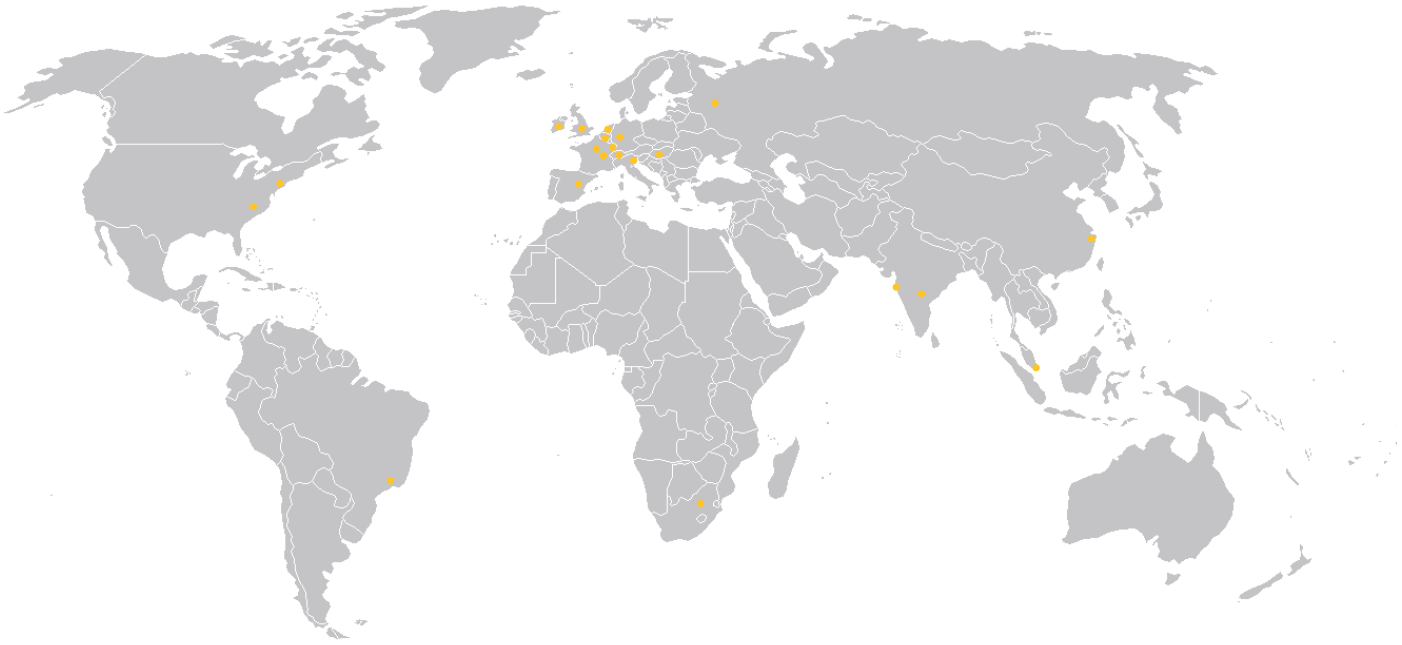
De Dietrich® designs the whole CIP System for your specific application

Mechanical seal with spraying system



De Dietrich

NOTE



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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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