



PRODUCTS PORTFOLIO

Glass-Lined Technology

& other materials



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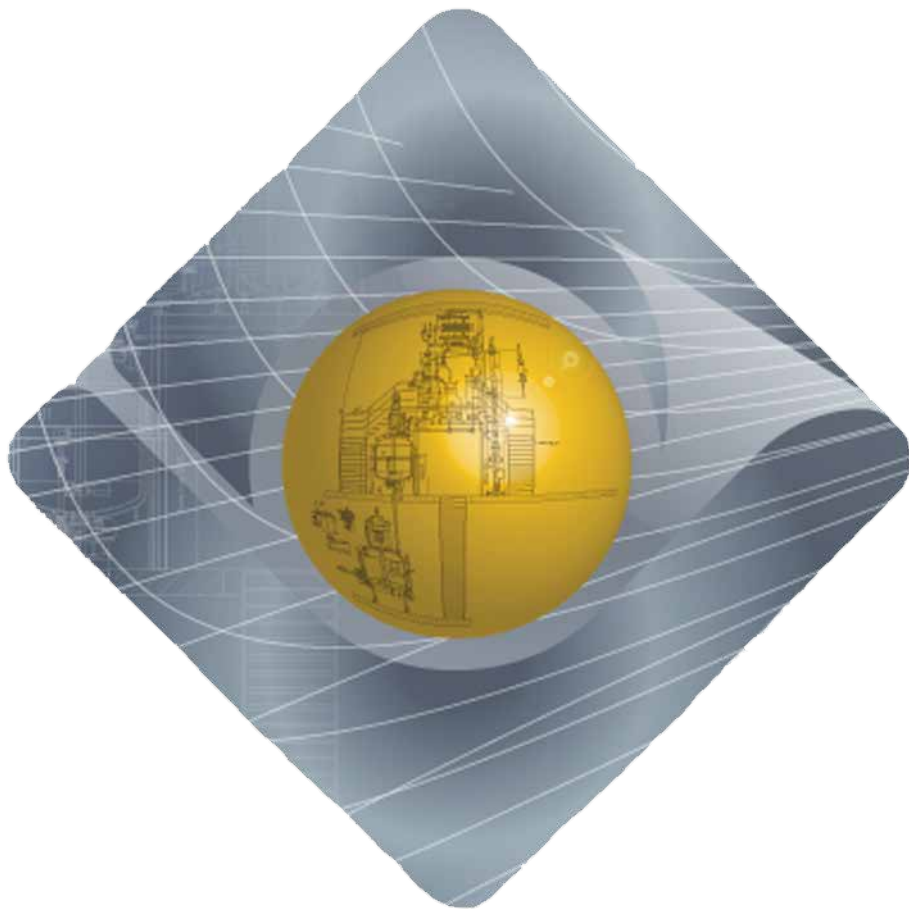
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GENERAL INFORMATION

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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.

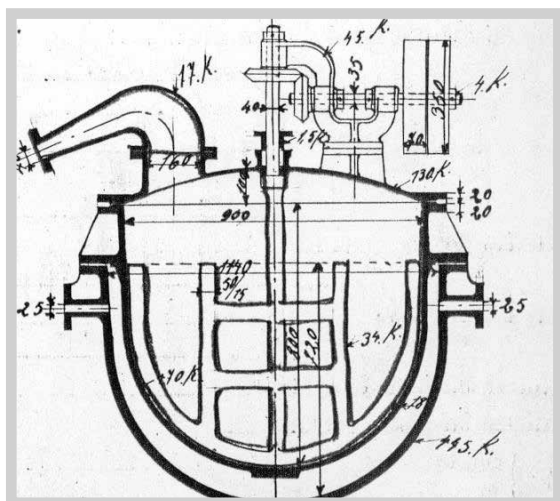
This symbol of quality is still the logo of the De Dietrich Group.

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.

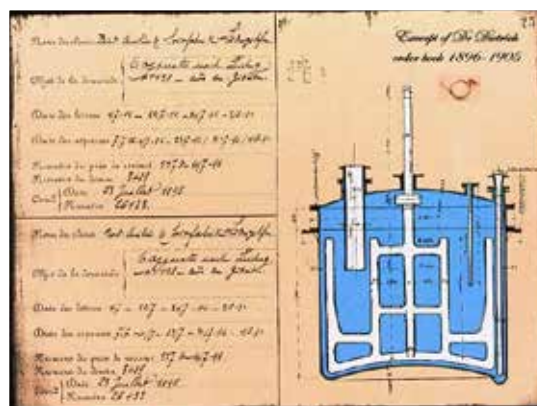
Ever since the development of this manufacturing technique has kept up with the great boom of the chemical industry.

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 in this particular field.



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



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
- Advanced 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

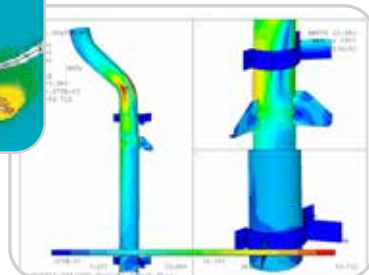
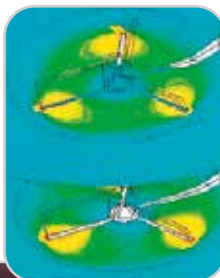
STOCK

- Equipment lifecycle management
- Optimized stock
- Spare parts list



REVAMPING / REGLOSSING

- 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

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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 _____ 10

Thermal properties _____ 11

Chemical properties _____ 12-13

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.

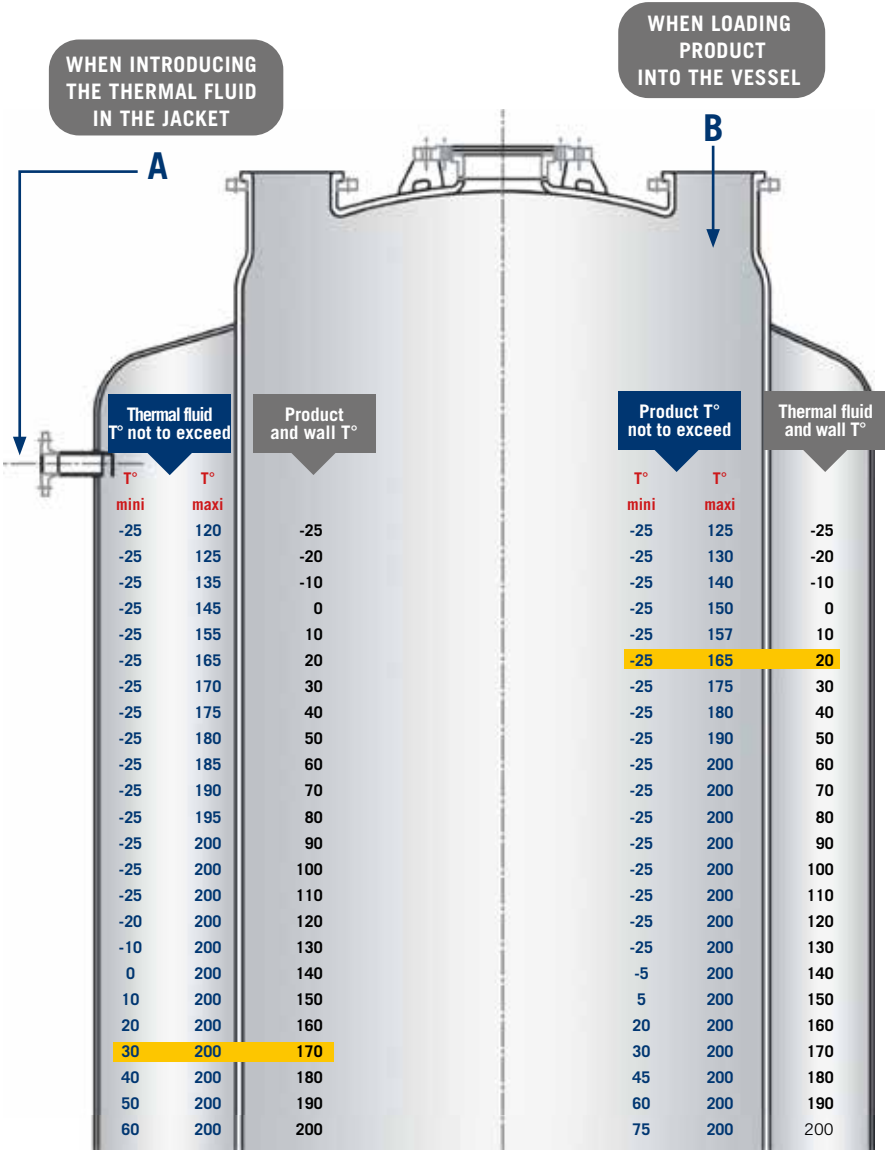
THERMAL PROPERTIES

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



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.

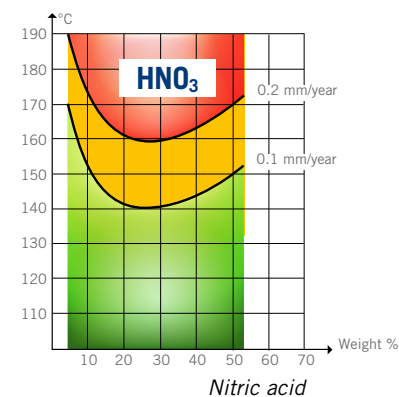
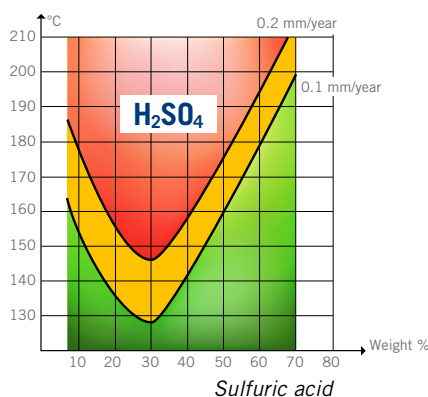
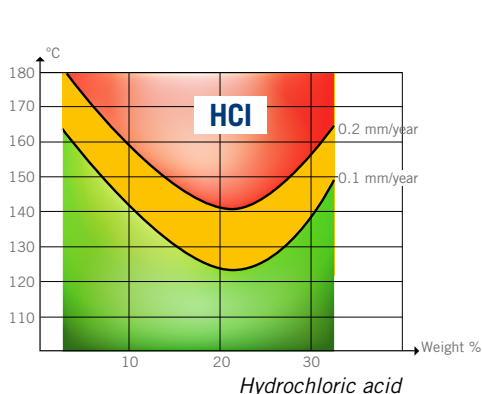
CHEMICAL PROPERTIES

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).



ISOCORROSION CURVES

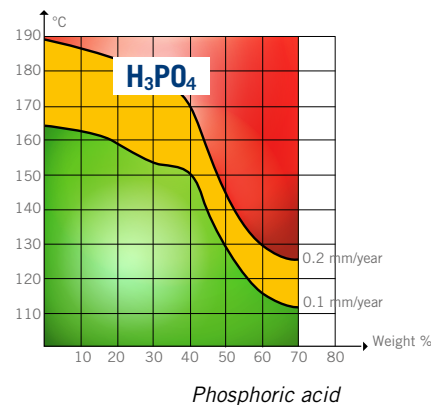
OUR ISOCORROSION CURVES ARE ESTABLISHED FOR MOST CURRENT PRODUCTS. THEY SHOW AS A FUNCTION OF PRODUCT CONCENTRATION THE TEMPERATURES AT WHICH THE WEIGHT LOSSES CORRESPOND TO 0.1 AND 0.2 MM/YEAR.

 THE USE OF GLASS IS NOT ADVISABLE

 CARE MUST BE TAKEN OF THE ADVANCE OF THE CORROSION

 GLASS CAN BE USED WITHOUT PROBLEMS

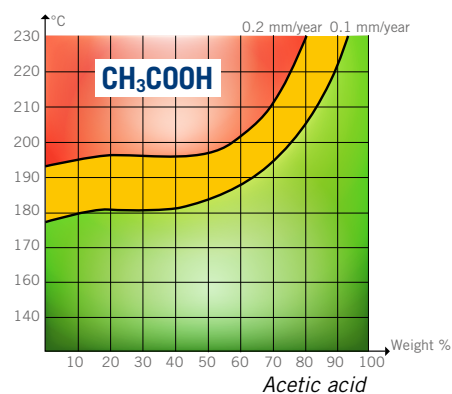
ALL THE TEST HAVE BEEN PERFORMED IN TANTALUM LINED REACTORS AND USING A RATIO VOLUME OF PRODUCT / SURFACE OF ENAMEL (V/S) > 20 TO AVOID THE INHIBITION OF THE ATTACK BY DISSOLVED SILICA.



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.

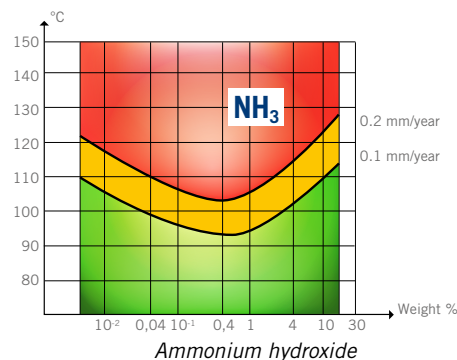
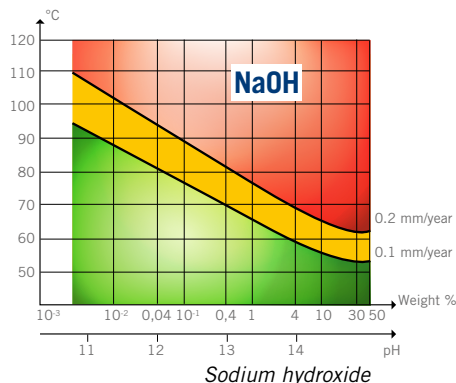
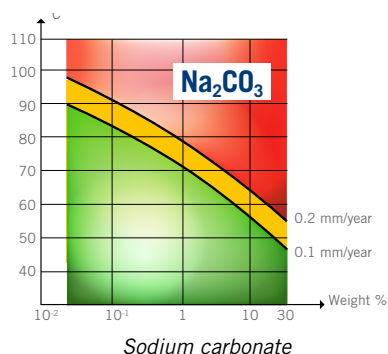


RESISTANCE TO ALKALIS

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

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 ₂ O - 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/cm ² /h	2.35
Mechanical shocks	Improvement against former glass: 80 %		



RESISTANCE TO WATER VAPOR

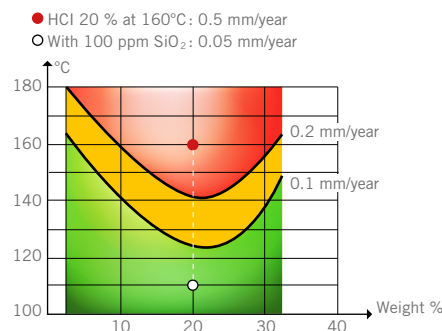
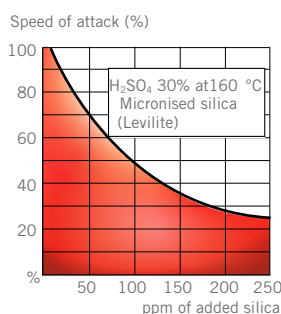
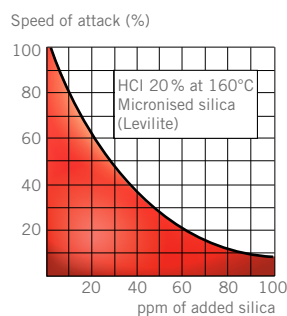
Resistance to water is excellent. The behavior of glass in neutral solutions depends on each individual case but in general is very satisfactory.

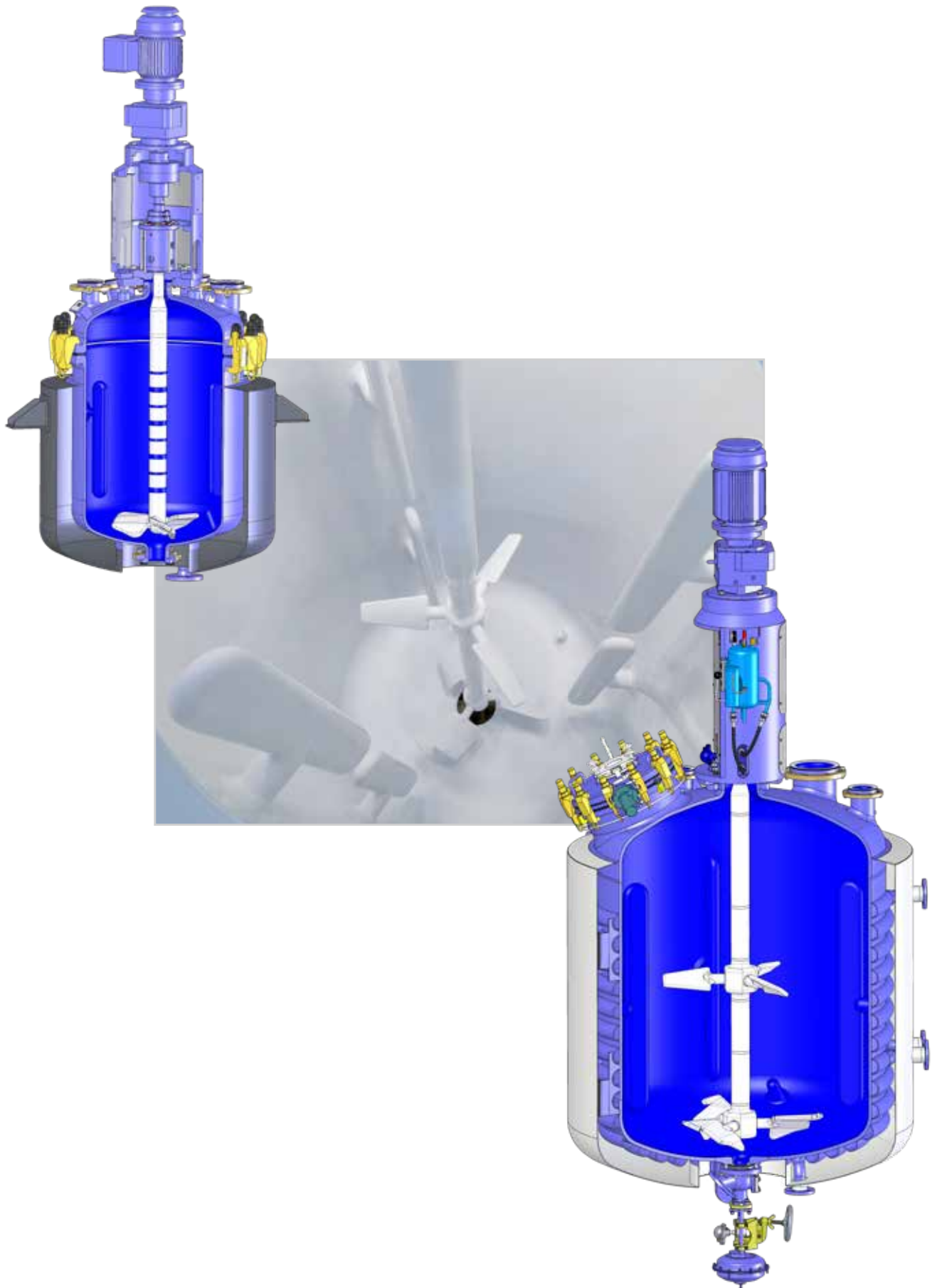
CORROSION INHIBITION

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.

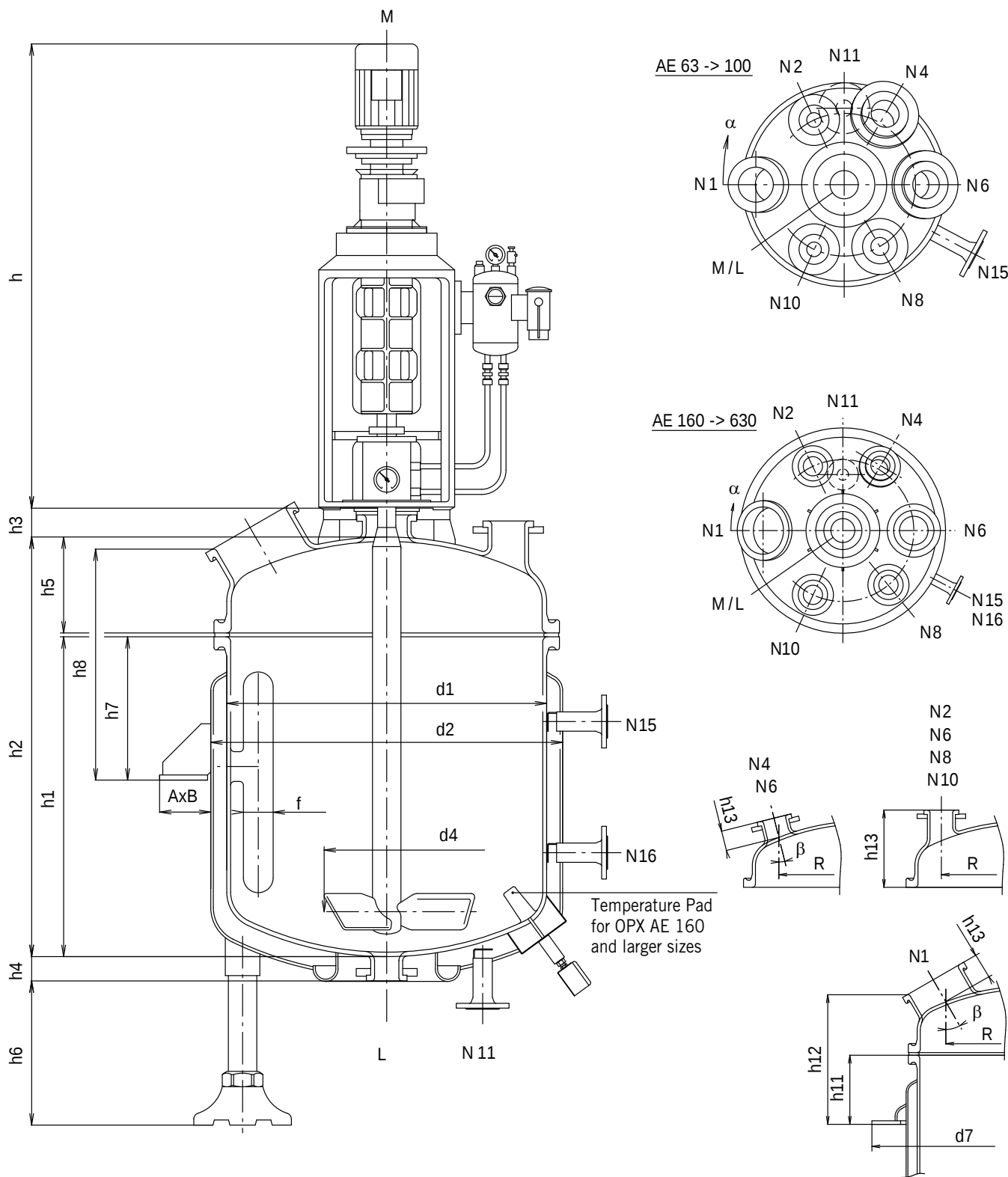
Corrosion values	Pure Product	500 ppm CaCO ₃	300 ppm SiO ₂	Silicon Oil 2 ml/l
NaOH 1N 80 °C	0.18 mm/year	0.09 mm/year		
Buffer pH= 1 ; 100°C + HF 430 ppm	1.5 mm/year		0.42 mm/year	
HCl 20 % vapor 110 °C	0.036 mm/year			< 0.005 mm/year





REACTORS

OptiMix® DIN Range	16-21
OPX AE 63 - 630	16-17
OPX CE 630, OPX BE 1000 - 4000	18-19
OPX BE 6300 - 40000	20-21
OptiMix® - HE DIN Range	22-23
DIN Range	24-37
AE 63 - 630	24-25
AE 1000 - 6300	26-27
BE 1000 - 6300	28-29
BE 8000 - 40000	30-31
CE 630 - 4000AN	32-33
CE 4000NN - 8000	34-35
CE 10000 - 40000	36-37
Half-coil Vessel	38-39
EURO EZ	40-43
EZOT 500 - 2000	40-41
EZWB 2000 - 6000	42-43
Pharma Reactor	44-45
Bio Reactor	46-47
Laboratory Reactor	48-49
Specific achievements	50-51



	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

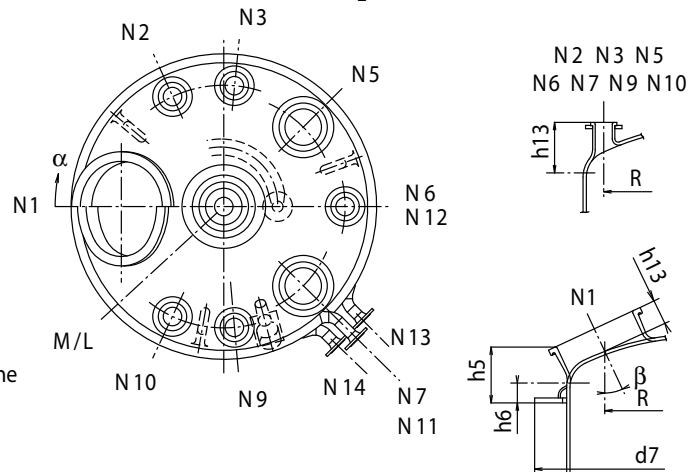
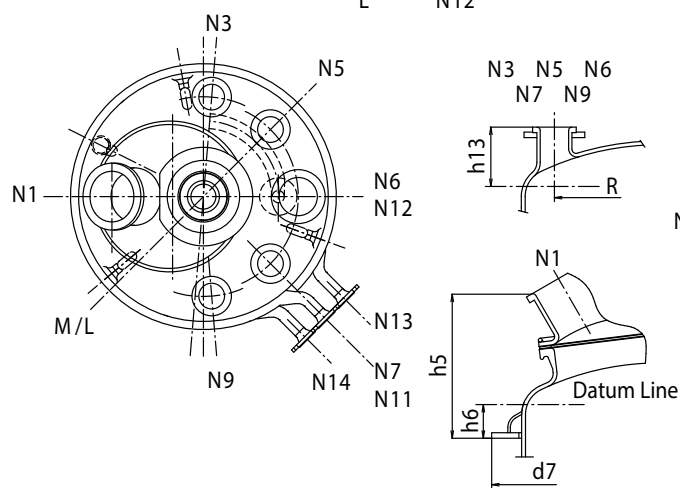
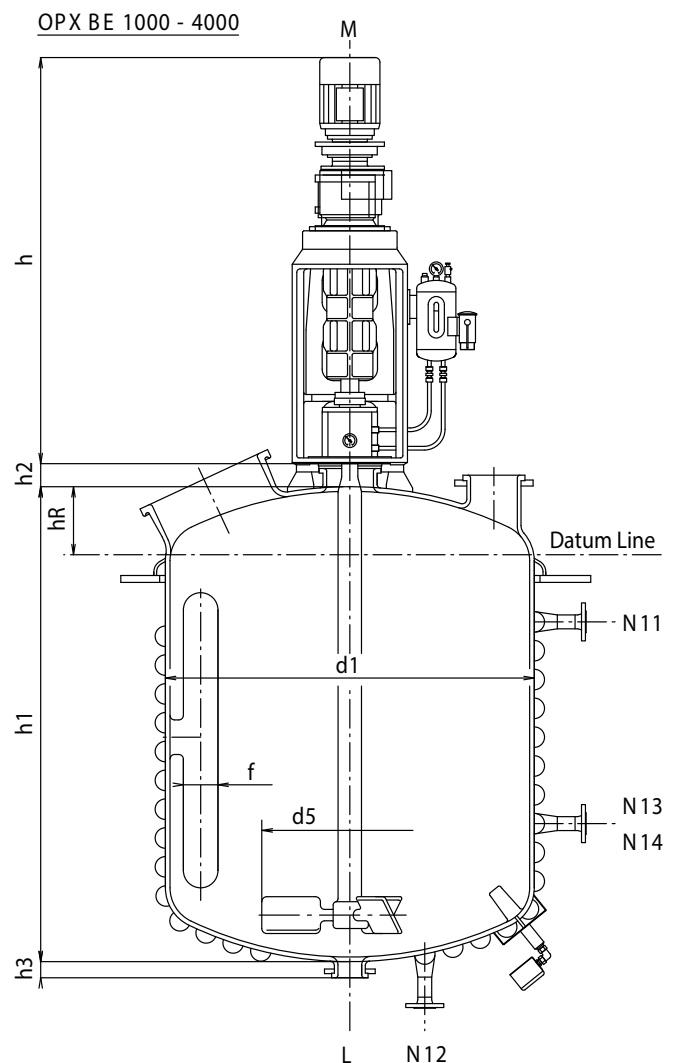
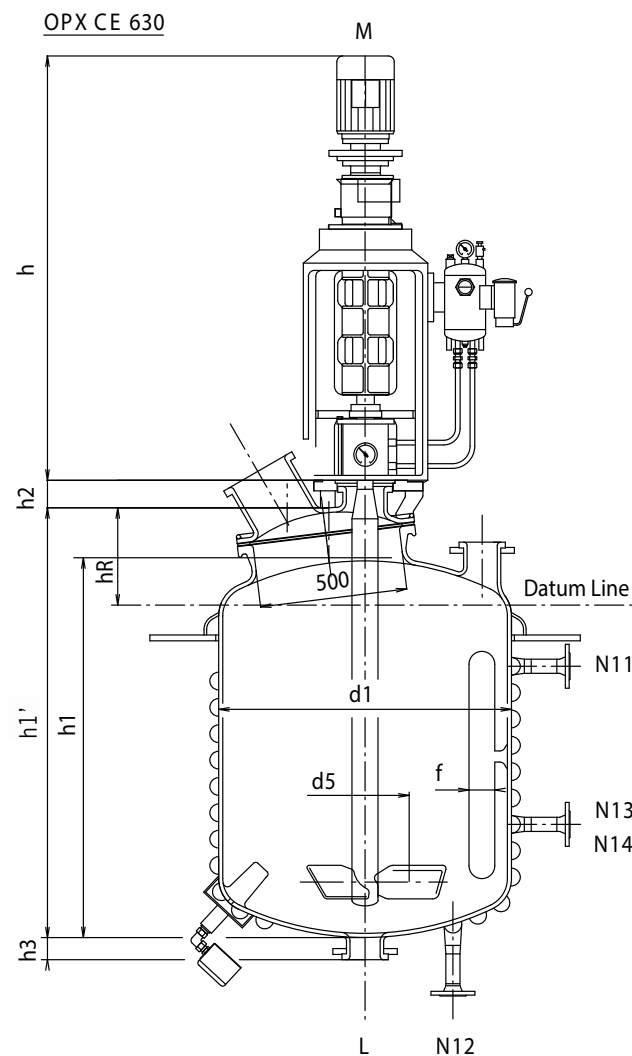
			OPX AE 63	OPX AE 100	OPX AE 160	OPX AE 250	OPX AE 400	OPX AE 630	
Nominal capacity	Litres		63	100	160	250	400	630	
Total capacity	Litres		90	127	210	327	533	847	
Jacket capacity	Litres		24	38	55	77	120	152	
Heating area (with jacket)	m²		0,56	0,88	1,25	1,7	2,5	3,1	
Approx. weight without motor and supporting	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	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

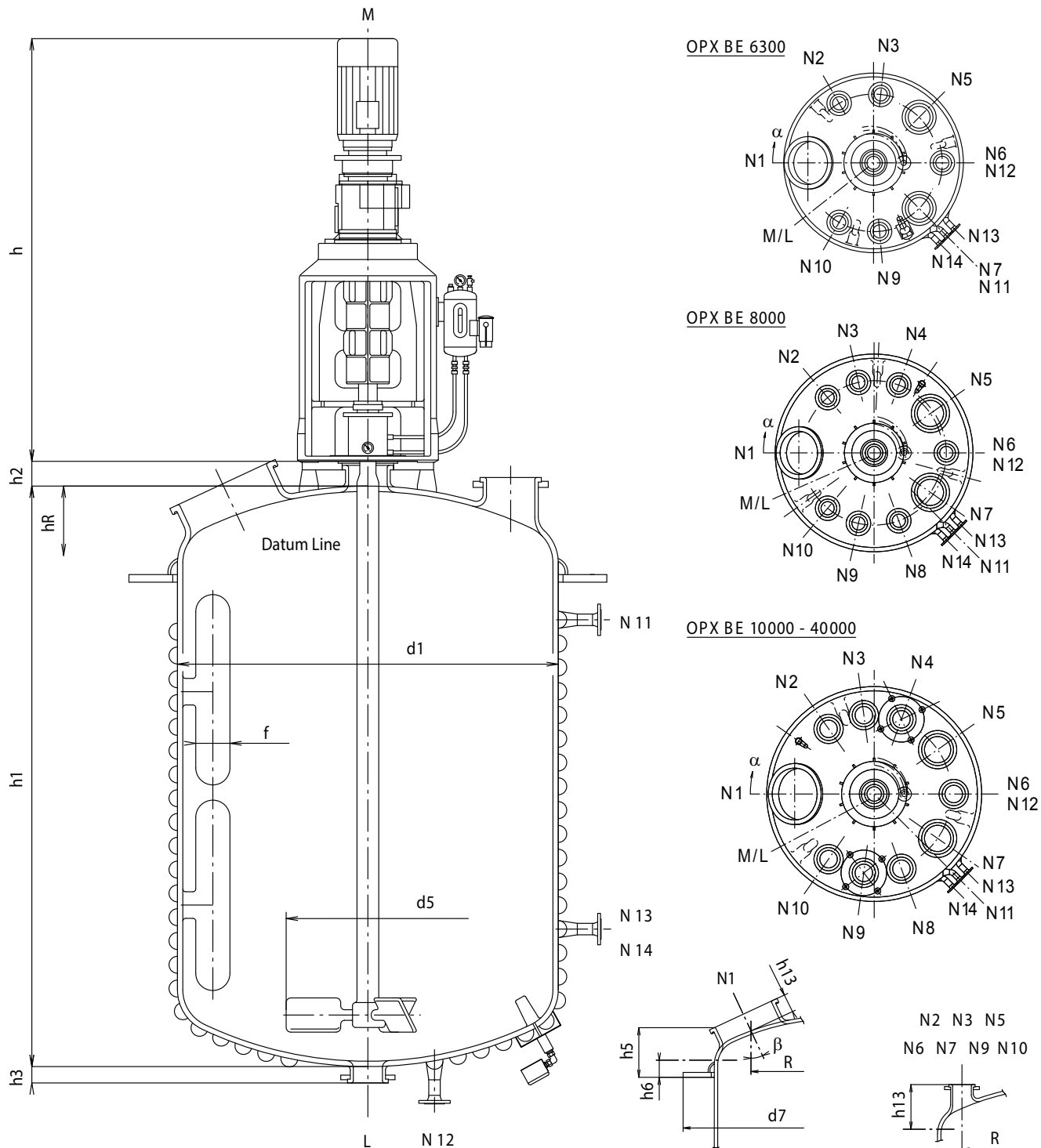
		OPX CE 630	OPX BE 1000	OPX BE 1600	OPX BE 2500	OPX BE 4000	
Nominal capacity	Litres	630	1000	1600	2500	4000	
Total capacity	Litres	847	1458	2310	3463	5381	
Half Coil capacity	Litres	33	45	65	157	228	
Heating area (with half coil)	m²	3,0	4,1	5,9	8,0	11,6	
Approx. weight without motor and supporting	daN	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°
	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



	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
		h5 min.	405	475	500	500	575	535	560	715
		h6 min.	140	145	145	145	165	175	180	205
Nozzles on Vessel	M	DN	200	200	250	250	250	300	300	300
	L	DN	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°
	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°
	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°
	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°
	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°
	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°
	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°
	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°
	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°
	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°
Half Coil Nozzles	N12	DN / α	50 / 180°	50 / 180°	50 / 180°	50 / 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°
	N13		50 / 225°	50 / 225°	50 / 225°	50 / 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°
Drive	MDL Type		100	100	125	125	125	140	140	160
	h*		2200	2200	2 500	2 500	2 500	2680	2680	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

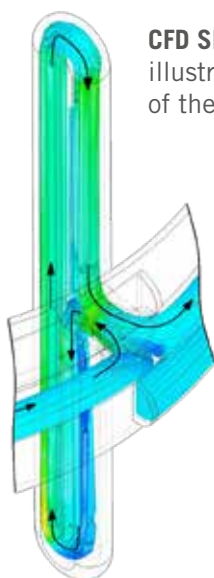
In the continuity of the highly experienced OptiMix® design with hundreds of reactors in operation since 2003 and to meet the market requirements, De Dietrich® has extended the range of the OptiMix® reactors to provide improved heat transfer and reduce processing times.

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 27% enabling a more homogeneous, faster thermal management and therefore cycle times shortened.

KEY ADVANTAGES

- HEATED / COOLED BAFFLES
- HEAT EXCHANGE AREA INCREASED UP TO 27%
- REDUCED REACTION TIME
- CLEARANCE OF ALL THE NOZZLES
- IMPROVED CLEANING FACILITIES:
 - No dead zone
 - Less vortex means reduced splashing on wall and upper head

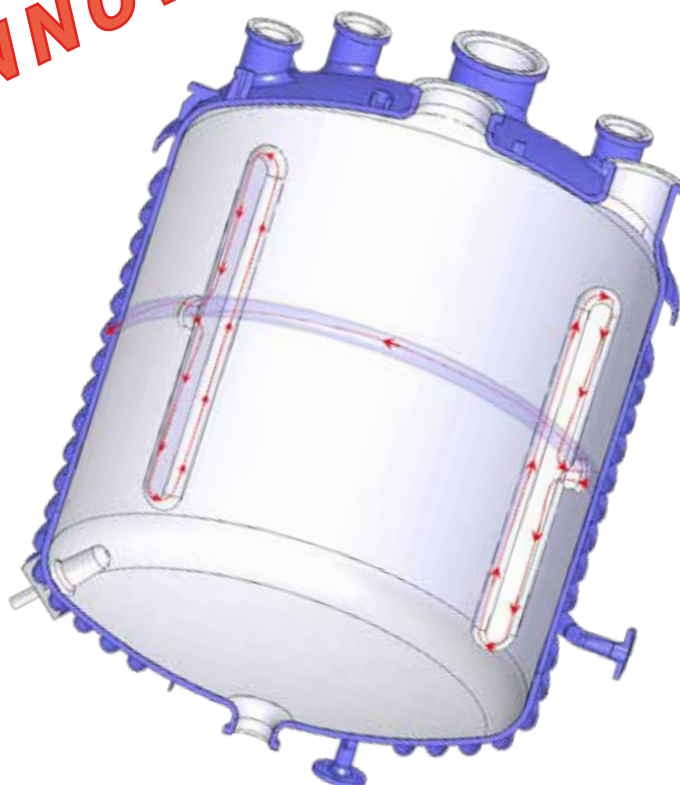


CFD SIMULATION

illustrating the turbulent flow of the fluid through the baffles

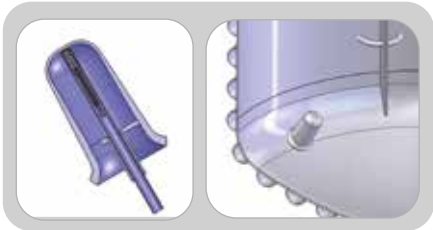


INNOVATION!
PATENTED



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



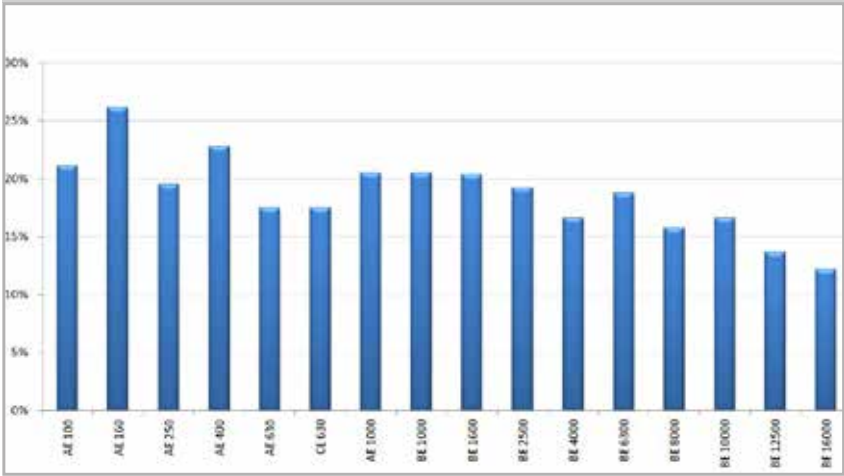
TEMPERATURE PROBE INTEGRATED IN THE WALL

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	m²	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

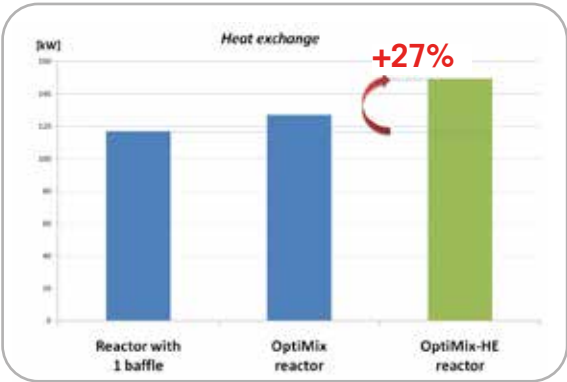
* For other dimensions and nozzle layout, see the OptiMix® range - larger sizes on request

ACCELERATE YOUR HEAT TRANSFER UP TO 27%



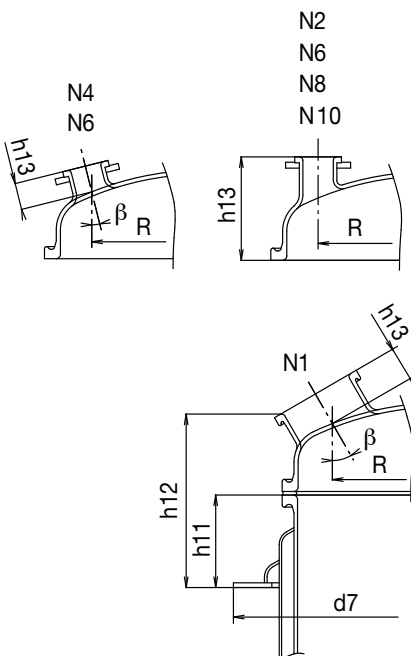
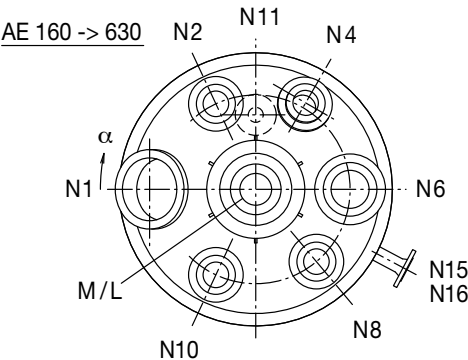
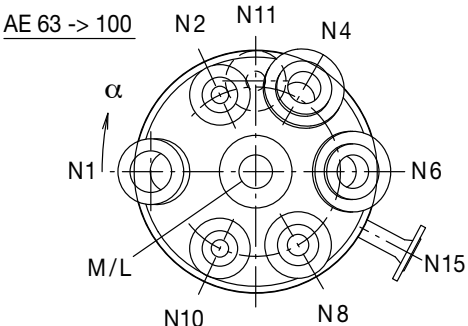
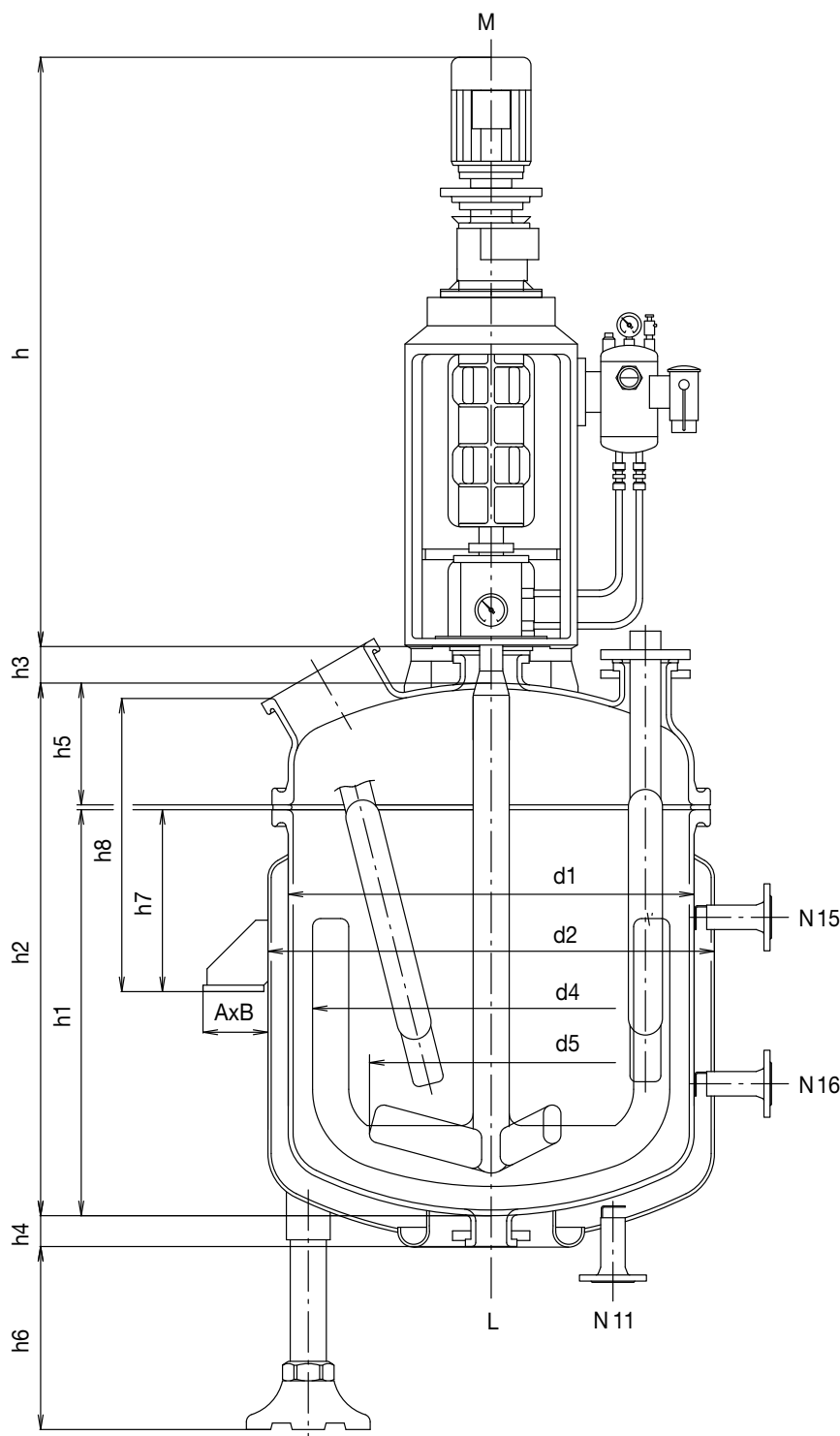
HEATING AREA INCREASED DRASTICALLY
between standard reactors and OPX-HE reactors

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

N1
N4
N8
N2/N6/N10

Allocation of Nozzles	
Anchor	Impeller
Handhole with sight glass	
Thermowell	Light glass
Light glass	Beavertail baffle
Free	

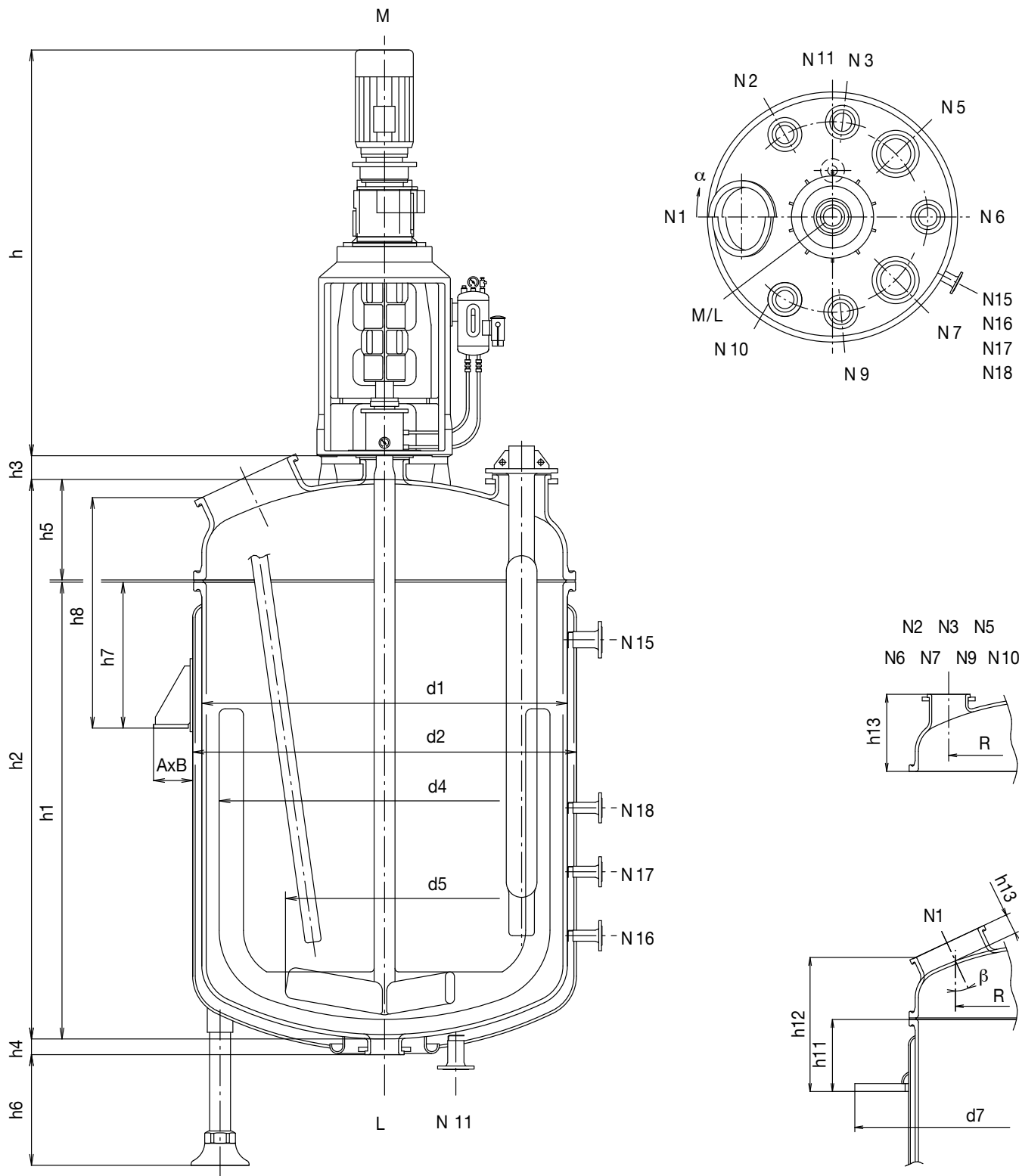
		(*)	AE 63	AE 100	AE 160	AE 250	AE 400	AE 630
Nominal capacity	Litres		63	100	160	250	400	630
Total capacity	Litres		90	127	210	327	533	847
Jacket capacity	Litres		24	38	55	77	120	152
Heating area (with jacket)	m ²		0,56	0,88	1,25	1,7	2,5	3,1
Approx. weight without motor and supporting	daN		480	530	640	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		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	DN / h13 R / α	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		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	DN / h13 R / β	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		40 / 90°	40 / 90°	40 / 90°	40 / 90°	40 / 90°	50 / 90°
	N15	DN / α	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

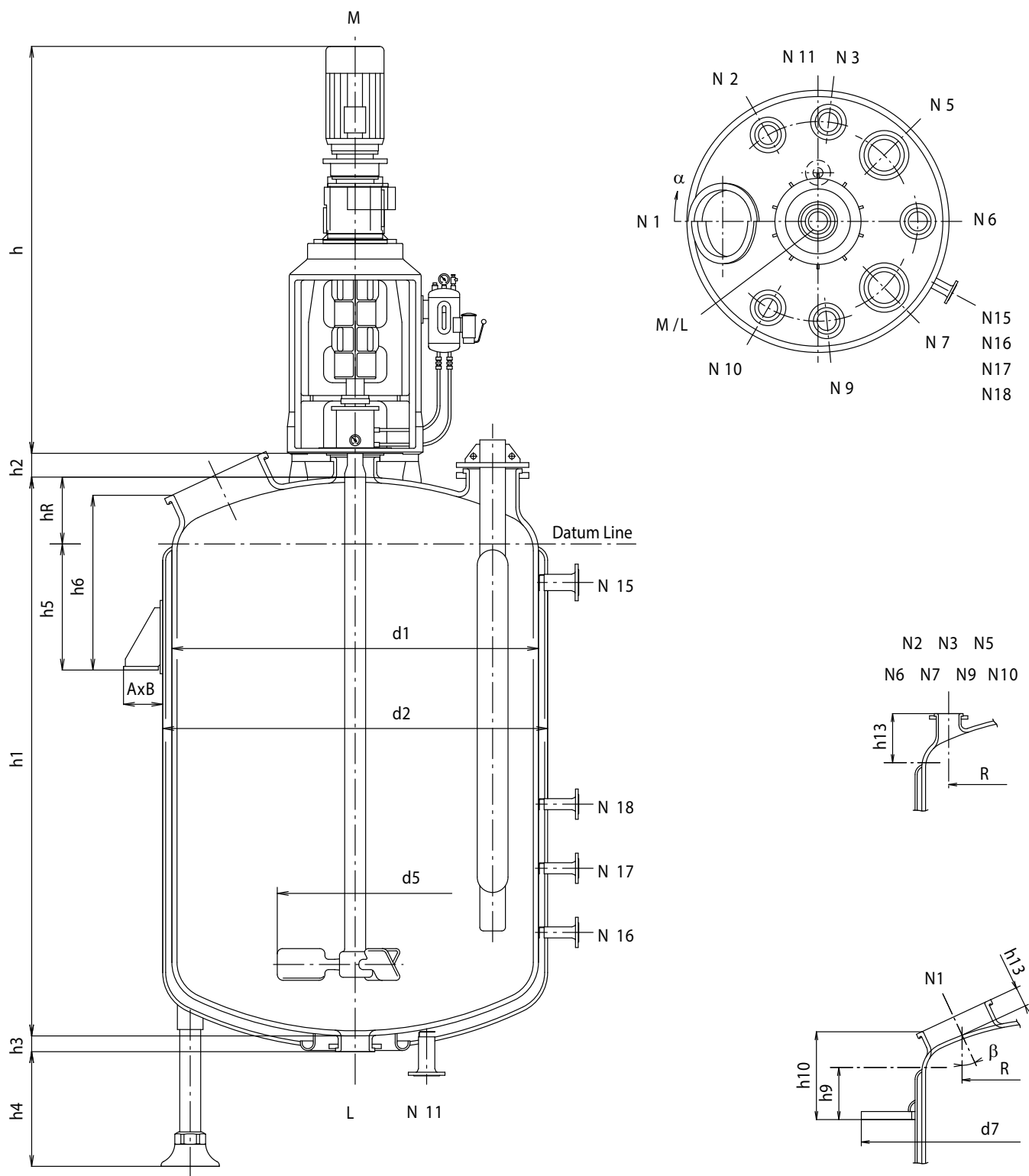
Allocation of Nozzles	
Anchor	Impeller
N1	Manhole with sight glass
N5 or N7	Thermowell
N6	Light glass
N2/N3/N9/N10	Free

			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)	m ²		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°
	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

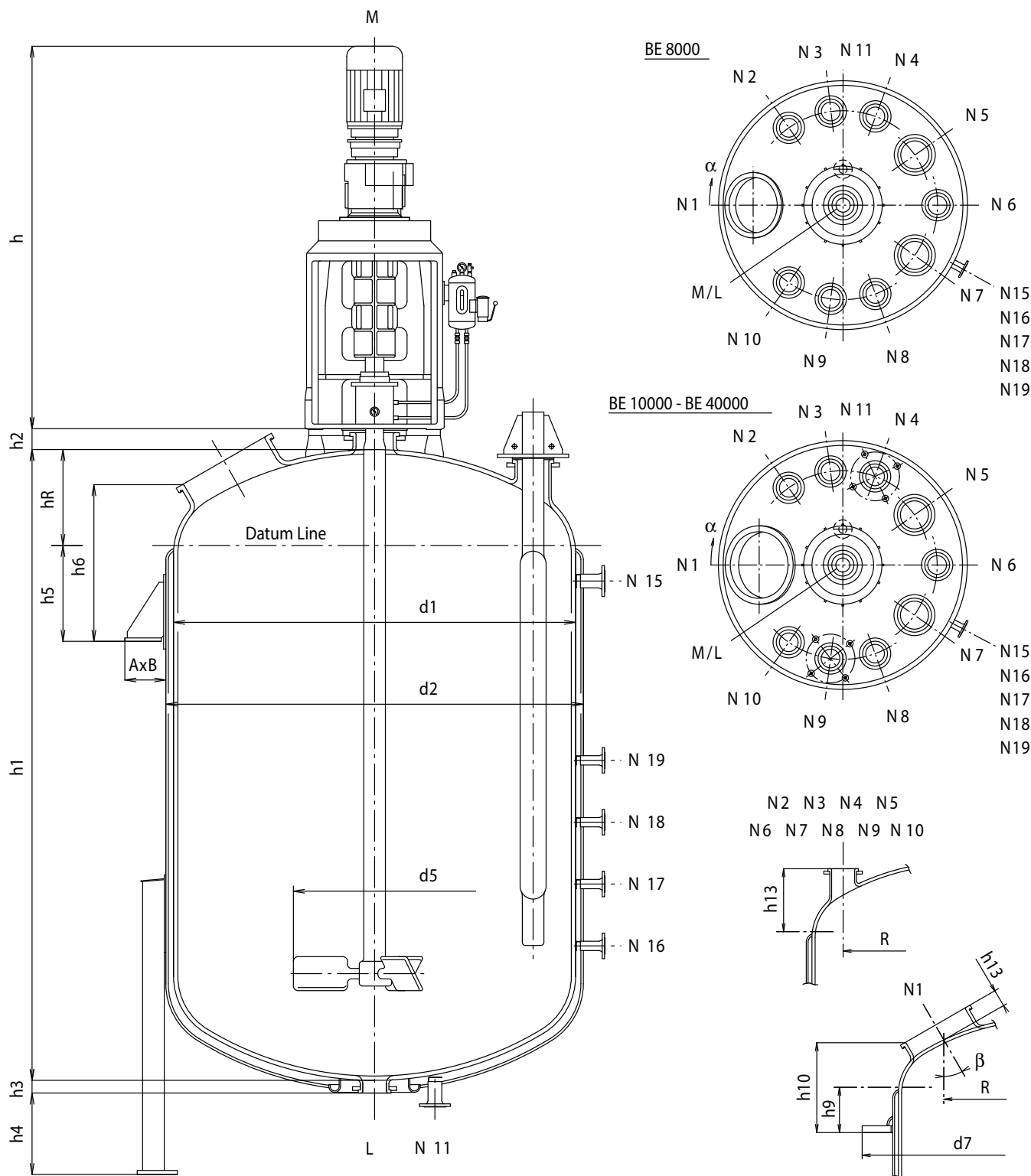
Allocation of Nozzles	
N1	Manhole with sight glass
N5 or N7	Beavertail baffle
N6	Light glass
N2/N3/N9/N10	Free

			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)	m ²		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

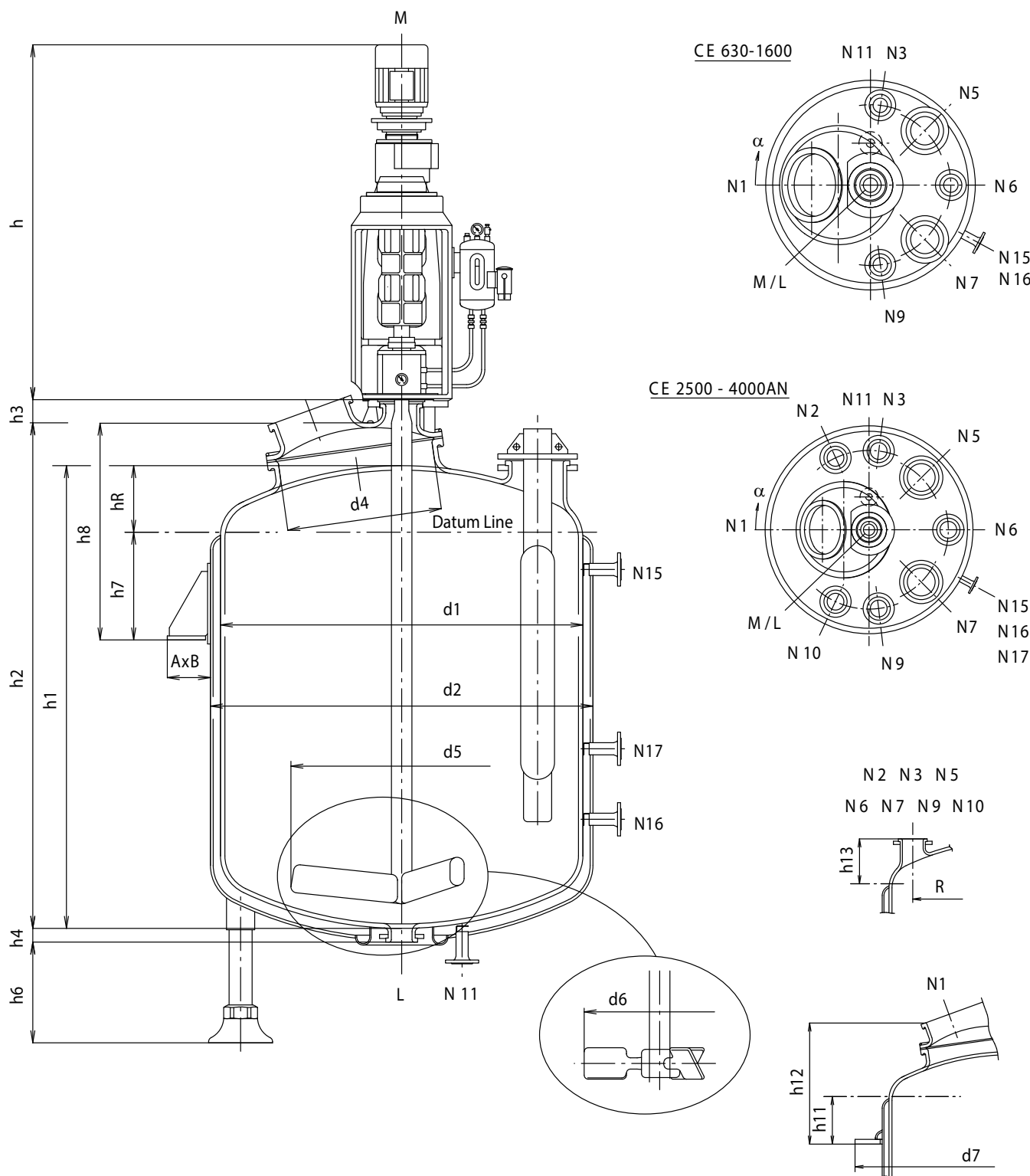
Allocation of Nozzles	
N1	Manhole with sight glass
N4 or N9*	Beavertail baffle
N6	Light glass
N2/N3/N5/N7 N8/N10	Free

			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 h4	4 700	4 700	4 700	6 700	6 700	6 700	6 700	6 700
	Support lugs	A x B h5 min. h6 min.	200 x 320 540 870	250 x 360 605 955	250 x 360 605 955	250 x 360 620 1015	250 x 360 620 1035	320 x 450 735 1170	320 x 450 750 1285	320 x 450 750 1285
	Support ring	d7 h9 min. h10 min.	2710 285 615	2910 295 645	2910 295 645	3120 300 695	3350 310 725	3550 310 740	4000 335 870	4000 335 870
	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 / 150 800 / 30°	600 / 150 850 / 30°	600 / 150 850 / 30°	600 / 150 900 / 30°	600 / 150 1000 / 30°	600 / 150 1100 / 30°	600 / 150 1250 / 25°	600 / 150 1250 / 25°
Nozzles on Vessel	N2	DN / h13 R / α	150 / 480 840 / 50°	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		150 / 480 840 / 77,5°	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		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		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 / 480 840 / 180°	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 / 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 / 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		150 / 480 840 / 282,5°	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		150 / 480 840 / 310°	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°
	N11		80 / 90°	80 / 90°	80 / 90°	80 / 90°	80 / 90°	80 / 90°	100 / 90°	100 / 90°
Jacket Nozzles	N15	DN / α	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°
			-	-	-	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



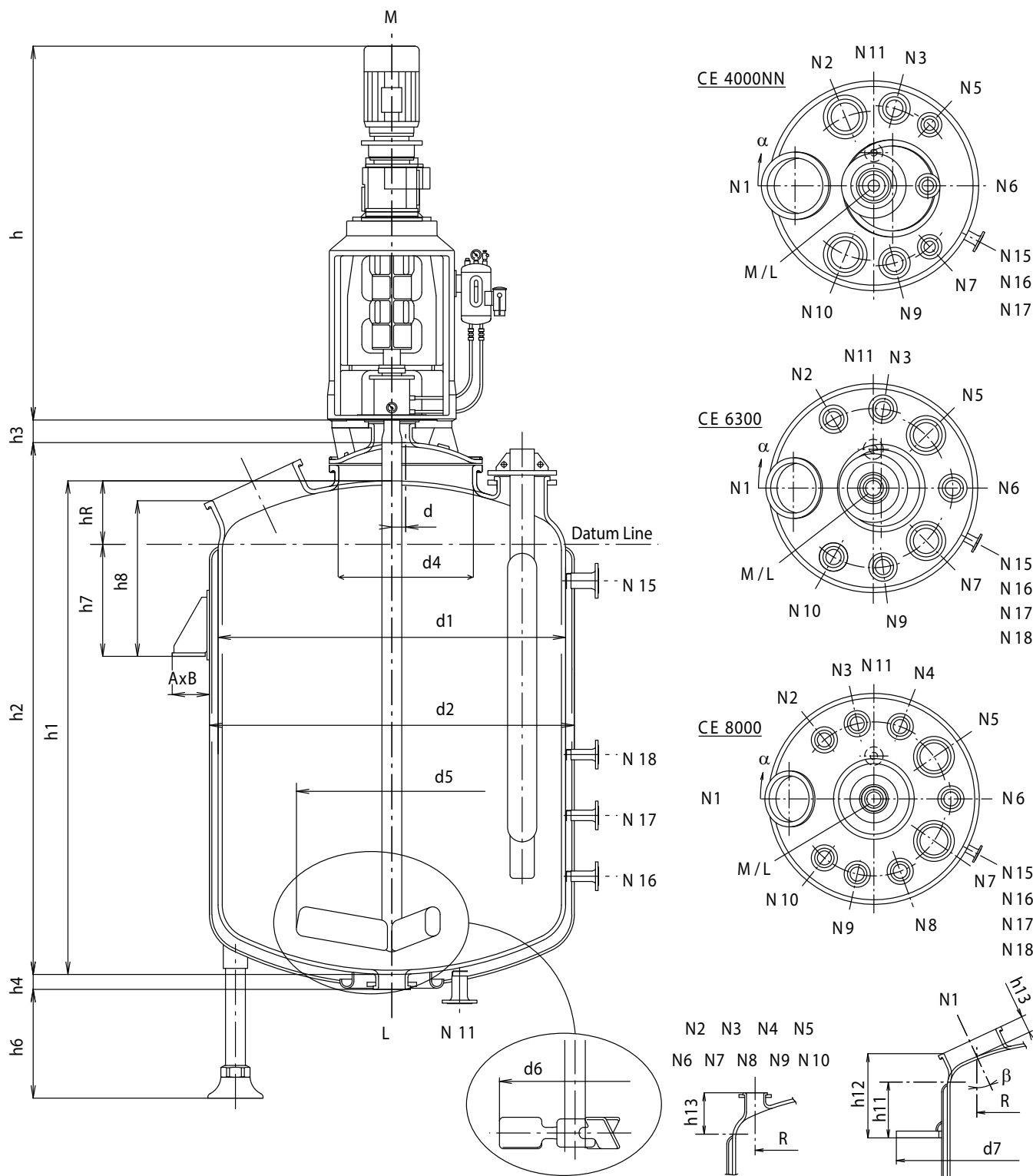
	Design pressure	Design temperature
Inside	-1/+6 bar	-25/+200° C
Jacket	-1/+6 bar	-25/+200° C
Half Coil	-1/+30 bar	-25/+235° C

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)	m ²	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	4 500	4 500	4 500	4 500
	Support lugs	160 x 160 340 720	180 x 220 380 830	180 x 220 380 885	200 x 320 545 1085
	Support ring	d7 1440 240 620	h6 min. 1890 240 690	h7 min. 2090 240 745	h8 min. 2290 250 795
Nozzles on vessel	M	125	150	150	150
	L	100	100	100	100
	N1	200	350 / 450	350 / 450	350 / 450
	N2	-	-	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	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

N1
N2 or N10*
N5 or N7**
N6
Other Nozzles

Allocation of Nozzles
Manhole with sight glass
Beavertail baffle
Light glass
Free

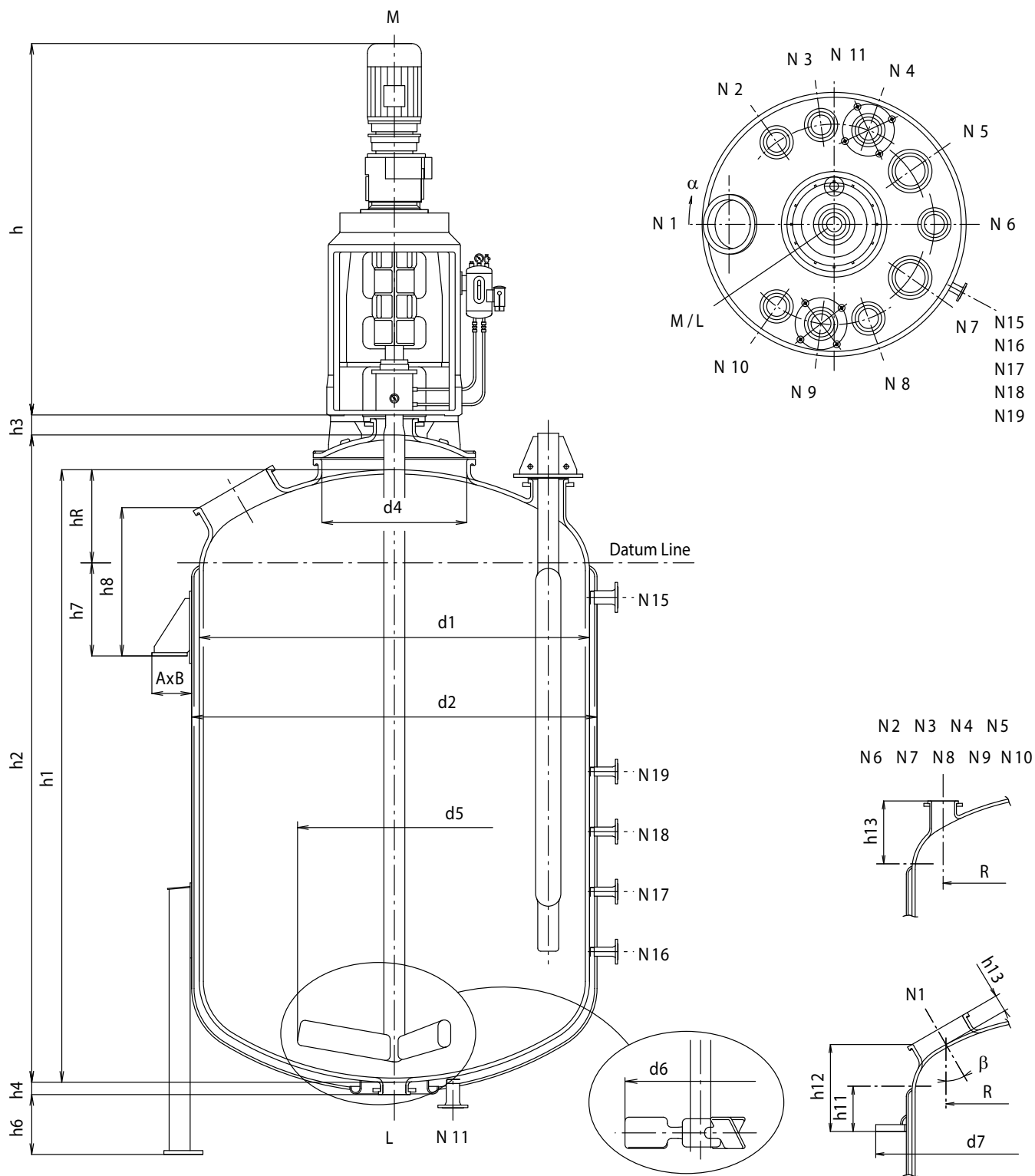
* For CE 4000NN
** For CE 6300 and 8000

		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)	m ²	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	4 500	4 700	4 700
	Support lugs	200 x 320 545 1085	200 x 320 535 785	200 x 320 540 845
	Support ring	2290 250 795	2510 270 520	2710 285 590
Nozzles on Vessel	M	200	200	200
	L	100	150	150
	N1	500 / 150 650 / 25°	500 / 150 740 / 25°	500 / 150 850 / 30°
	N2	250 / 355 675 / 67,5°	150 / 365 800 / 60°	150 / 480 840 / 50°
	N3	150 / 330 725 / 105°	150 / 365 800 / 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	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 Type	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

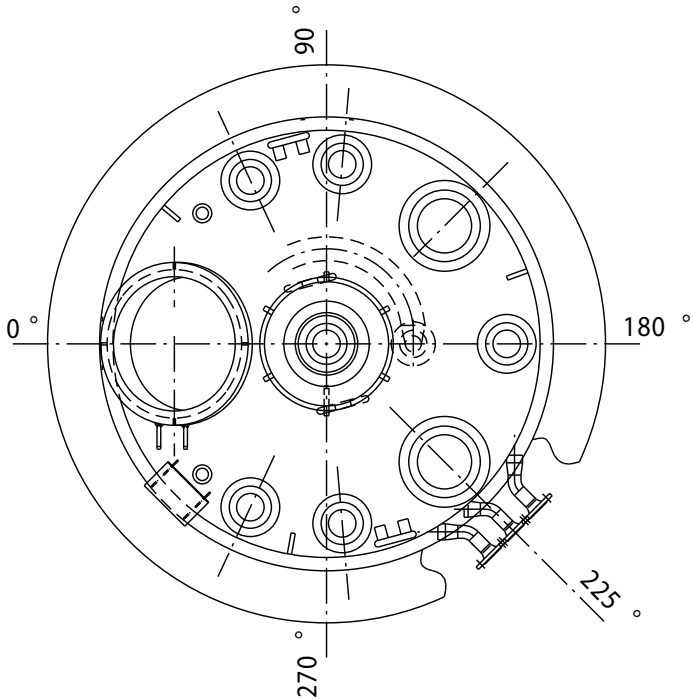
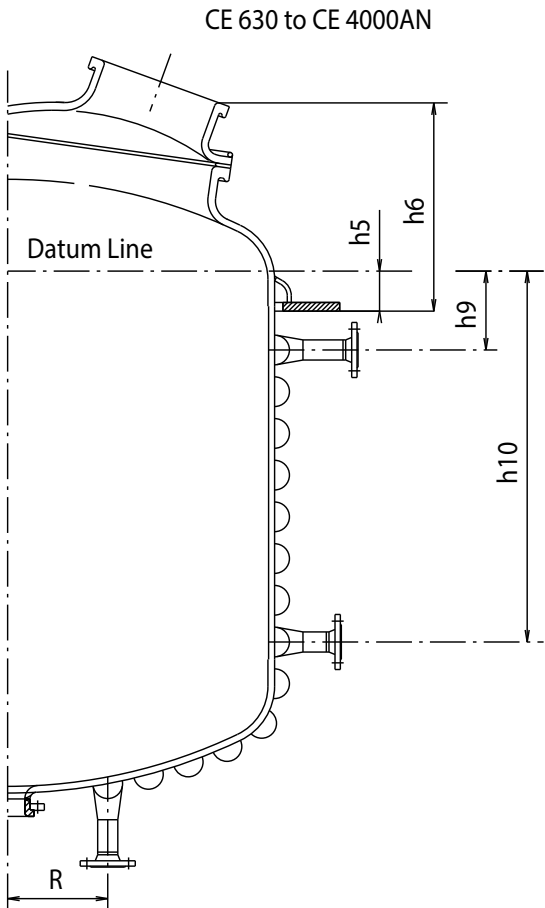
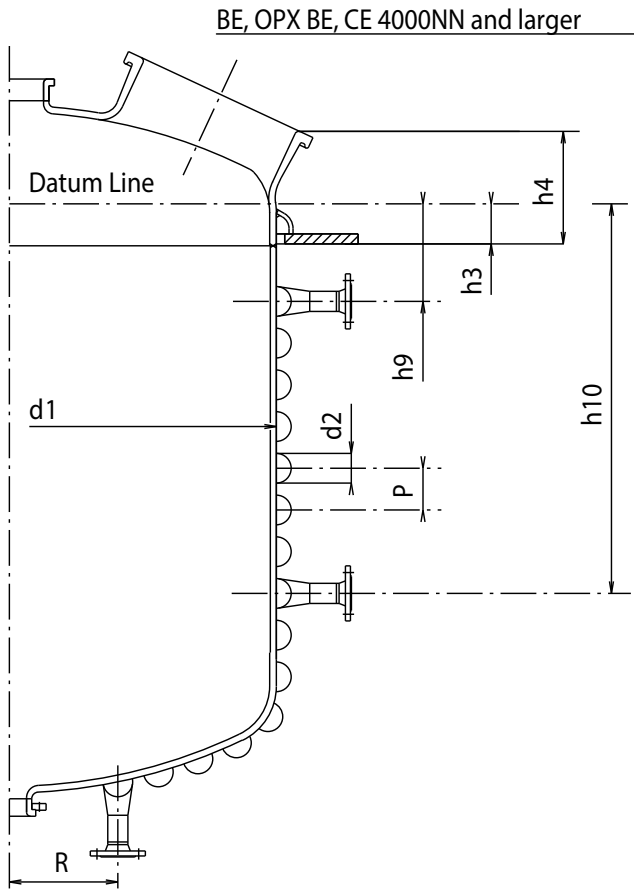
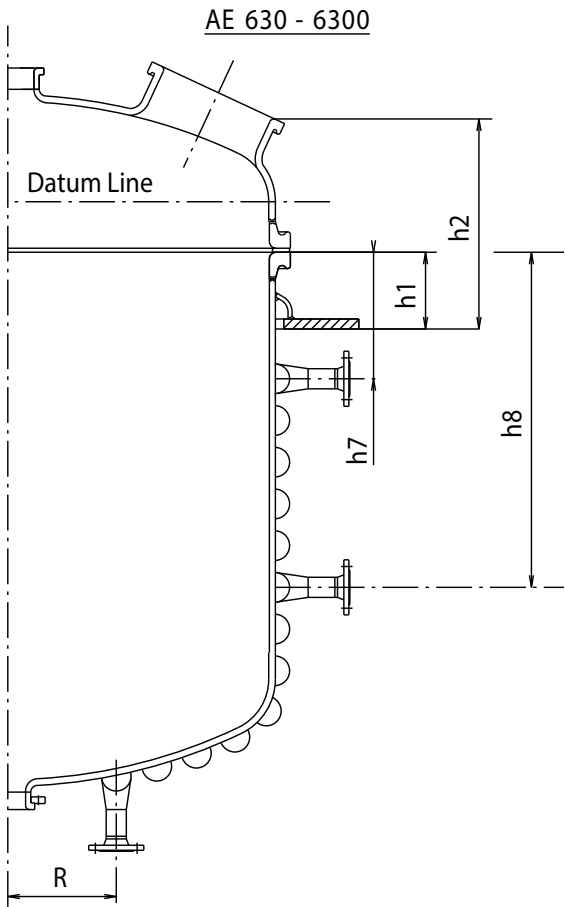
Allocation of Nozzles	
N1	Manhole with sight glass
N4 or N9	Beavertail baffle
N6	Light glass
N2/N3/N5/N7 N8/N10	Free

		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)	m ²	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	6080
	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 h6 min.	4 700	4 700	6 700	6 700	6 700	6 700
	Support lugs	A x B h7 min. h8 min.	250 x 360 605 930	250 x 360 605 930	250 x 360 620 990	250 x 360 620 980	320 x 450 735 1115	320 x 450 750 1260
	Support ring	d7 h11 min. h12 min.	2910 295 620	2910 295 620	3120 300 670	3350 310 670	3550 310 690	4000 335 845
Nozzles on vessel	M	DN	250	250	250	250	250	250
	L		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°
	N2		200 / 530 925 / 55°	200 / 530 925 / 55°	200 / 555 1025 / 55°	200 / 595 1100 / 50°	200 / 630 1175 / 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°
	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°
	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°
	N6	DN / h13 R / α	200 / 530 925 / 180°	200 / 530 925 / 180°	200 / 555 1025 / 180°	200 / 595 1100 / 180°	200 / 630 1175 / 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°
	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°
	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°
Jacket Nozzles	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°
	N11		80 / 90°	80 / 90°	80 / 90°	80 / 90°	80 / 90°	100 / 90°
	N15		80 / 208°	80 / 208°	80 / 208°	80 / 208°	80 / 208°	100 / 208°
	N16		50 / 208°	50 / 208°	50 / 208°	50 / 208°	50 / 208°	80 / 208°
	N17		50 / 208°	50 / 208°	50 / 208°	50 / 208°	50 / 208°	80 / 208°
	N18		50 / 208°	50 / 208°	50 / 208°	50 / 208°	50 / 208°	80 / 208°
Drive	MDL Type		125	125	125	140	140	160
	h*		2475	2475	2475	2680	2680	3100

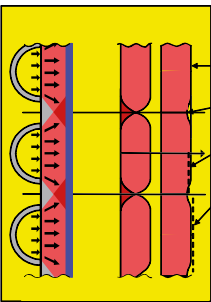
α: Orientation angle

β: Tilt angle

* with a standard motor



Nominal Capacity (Litres)	d1	Half-Coil		SUPPORT RING ON COLLAR															
		d2	P	AE					CE 630 to CE 4000AN					BE, OPX BE, CE 4000NN and larger					
				h1 min	h2 min	h7	h8	R	h5 min	h6 min	h9	h10	R	h3 min	h4 min	h9	h10	R	
630	1000	60,3	90	195	455	307	565	300	120	325	209	750	300	-	-	-	-	-	
1000	1200			200	510	314	842	300	-	-	-	-	-	110	300	299	840	300	
1600	1400			215	564	320	1028	300	113	616	317	1038	325	110	305	317	1038	325	
2500	1600	88,9	125	220	610	313	1048	325	120	623	307	1182	325	120	335	307	1182	325	
4000	1800			235	650	290	1398	325	130	730	288	1538	325	135	375	288	1538	325	
6300	2000			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	114,3	150											165	575	411	2400	350	
20000	2800													175	535	290	2515	400	
25000	3000													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

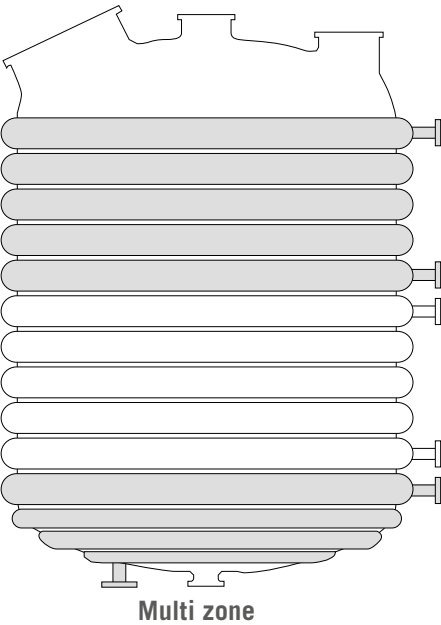
- Maxi: 27.4°C
- Mini: 26.4°C
- Average: 26.9°C
- Theoretical: 27.6°C (all the surface at 90°C)
- Temperature difference: -0.7°C

Thermal flux in the half coil

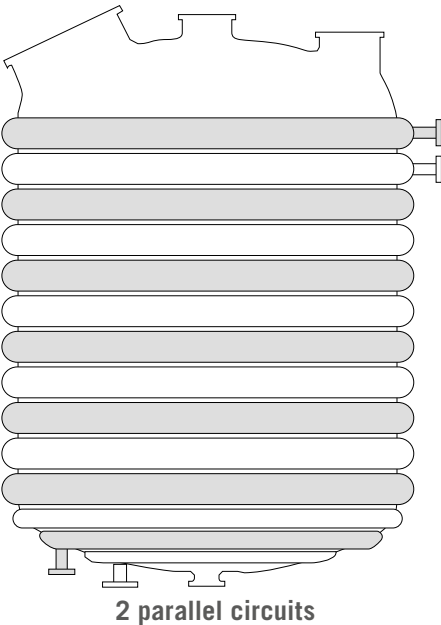


Automatized welding tool

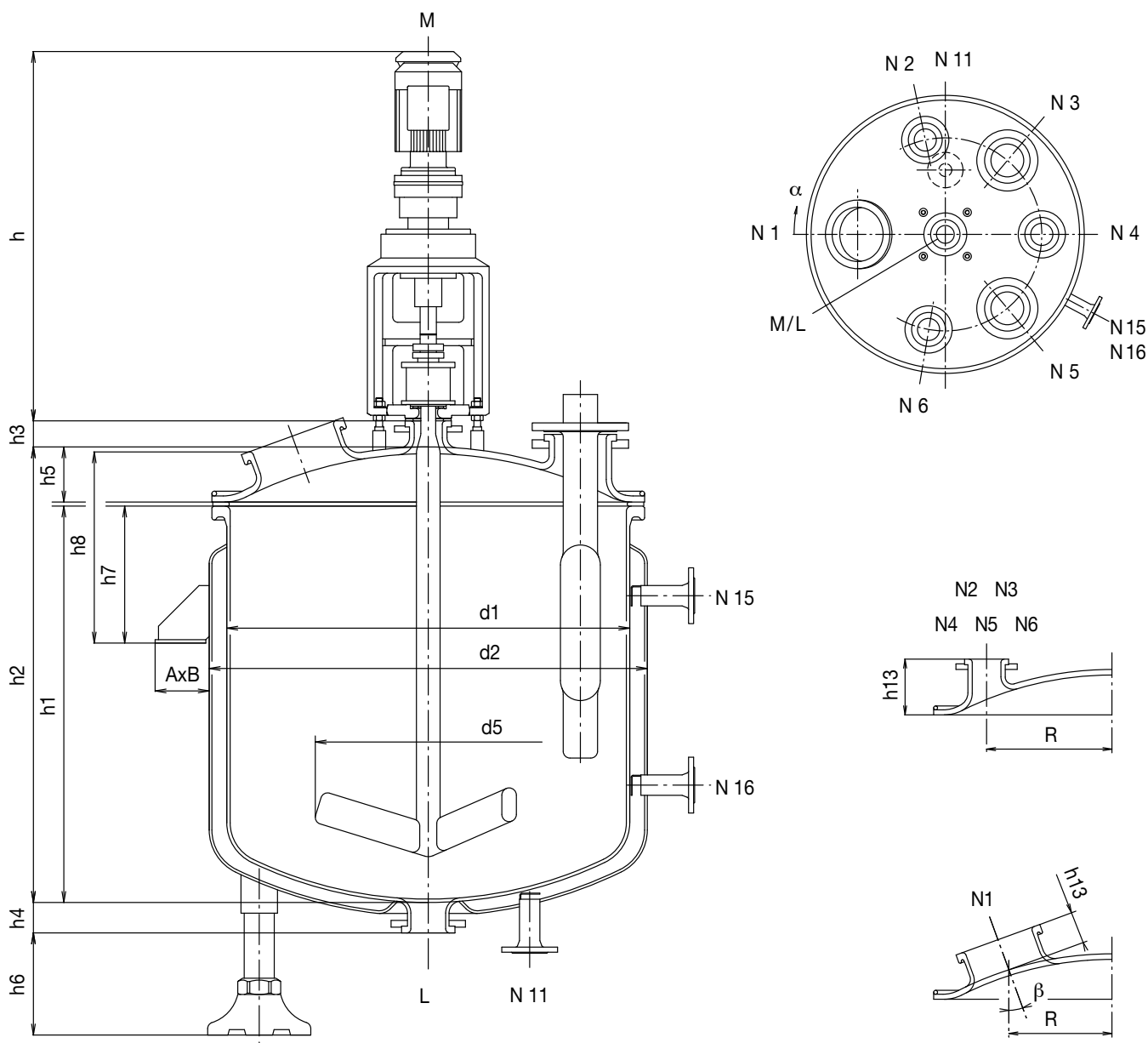
Large design flexibility



Multi zone



2 parallel circuits



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

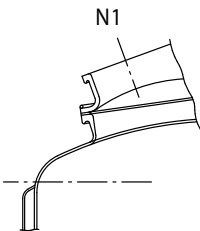
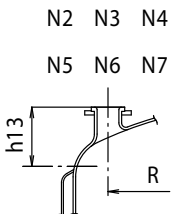
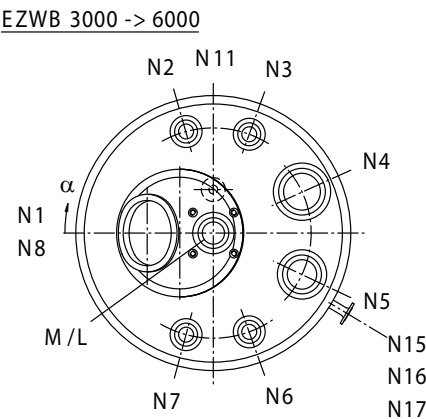
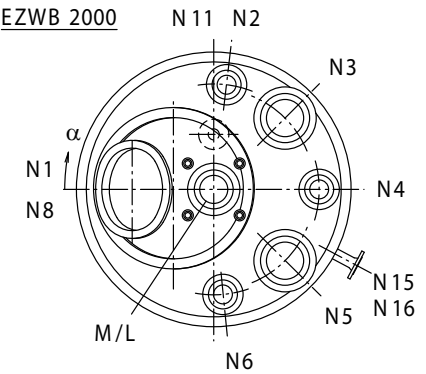
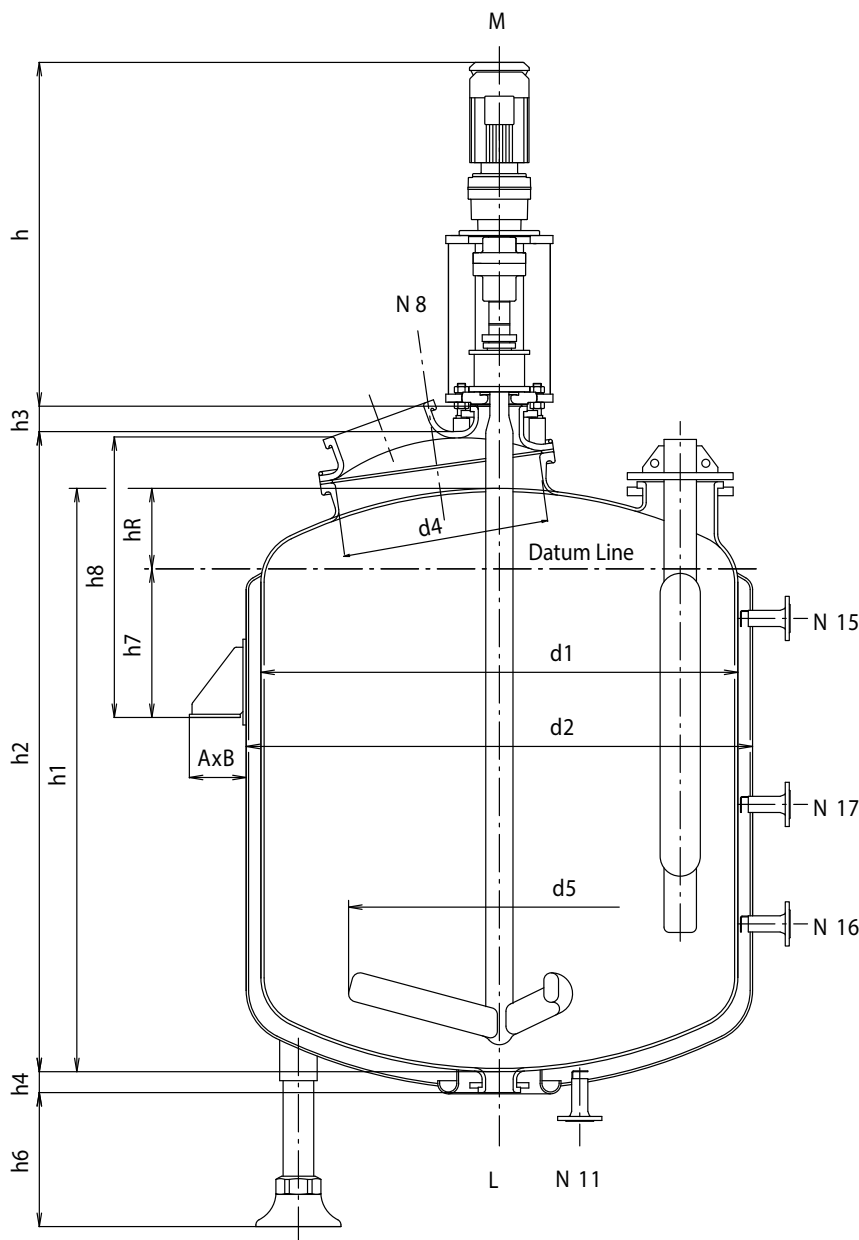
	Allocation of Nozzles
N1	Manhole with sight glass
N5 or N7	Beavertail baffle
N2/N3/N4 N5/N6	Free

		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	m ²	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	3 500	3 500	4 500
	Support lugs	160 x 160 450 625	160 x 160 405 585	160 x 170 500 860
Nozzles on Vessel	M	50	80	150
	L	50	100	100
	N1	200 / 115 280 / 20°	250 / 115 370 / 20 °	350x450/125 500 / 25°
	N2	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	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



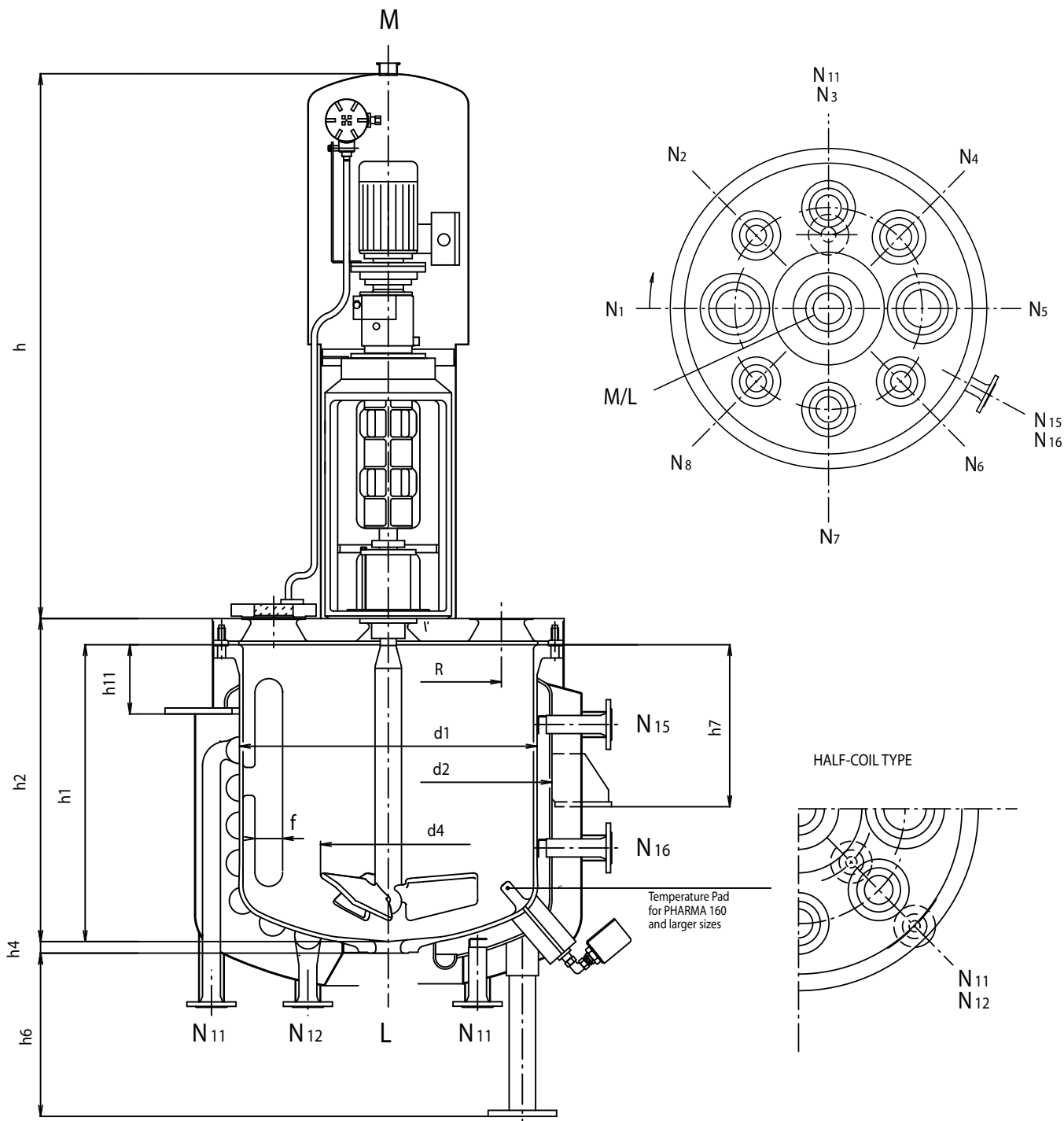
	Design pressure	Design temperature
Inside	-1/+3 bar	-10/+150° C
Jacket	0/+4 bar	-10/+150° C

	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	m ²	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
	L		100	100	100	100
	N1		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 / 325 800 / 75°
	N3		200 / 260 550 / 135°	100 / 260 675 / 115°	100 / 280 725 / 110°	100 / 325 800 / 110°
	N4		100 / 210 575 / 180°	200 / 310 625 / 155°	250 / 325 675 / 155°	250 / 370 750 / 155°
	N5		200 / 260 550 / 225°	200 / 310 625 / 205°	200 / 325 675 / 205°	250 / 370 750 / 205°
	N6		100 / 210 575 / 265°	100 / 260 675 / 245°	100 / 280 725 / 250°	100 / 325 800 / 250°
	N7		-	100 / 260 675 / 285°	100 / 280 725 / 285°	100 / 325 800 / 285°
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	MNS Type		60	60	80	80
	h*		1280	1280	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

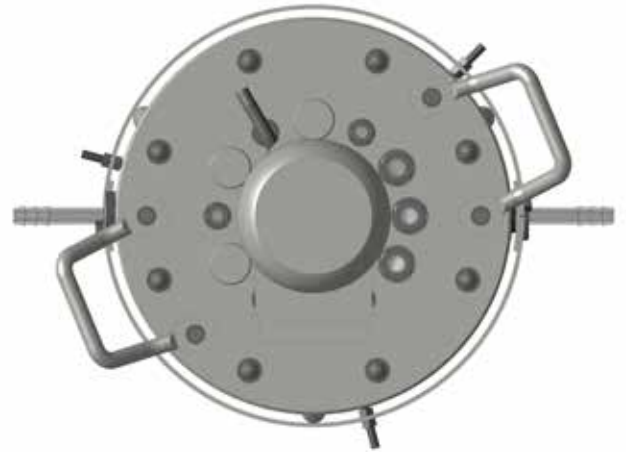
Allocation of Nozzles	
N1	Fused glass
N2 or N6*	Spray ball
N3 / N4 / N5 / N7 / N8	Free

* 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	m ²	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	4 500	4 500	4 500	4 500	4 500	4 500
	Support lugs	370	370	370	380	380	405
	Support ring	-	-	-	290	290	320
Nozzles	M	110	110	110	110	120	125
	L	50	50	50	50	80	80
	N1	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	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	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 DEVELOPMENT

- 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: $Ra \leq 0,6 \mu m$ electropolished
- Outside: $Ra \leq 1,2 \mu m$ 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

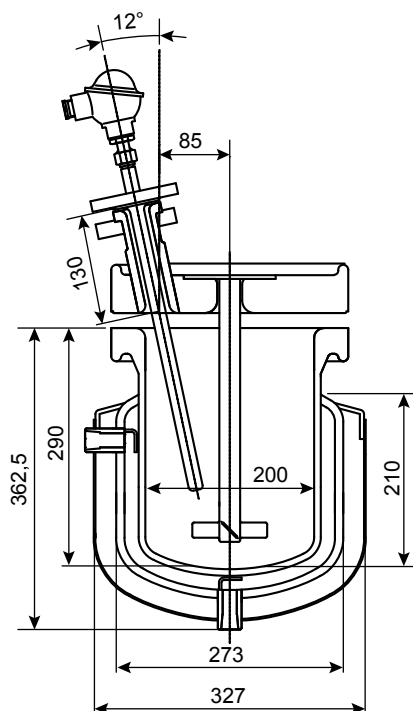
Nominal capacity (l)	5 liters	7 liters	15 liters	20 liters	30 liters
Nominal diameter (mm)	160	160	240	222	222
Height (mm)	270	375	470	670	780
Total capacity (l)	5	7	17	24	28
Heating surface (cm ²)	460	740	1500	-	-
Double jacket capacity (l)	1,8	2,8	6,5	-	-
Agitation power (k)	0,12 kW	0,12 kW	0,25 kW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

* M18 x 1,5 (6) - Ø 6 (8) - Ø 10 (4)

SPECIAL FEATURES:

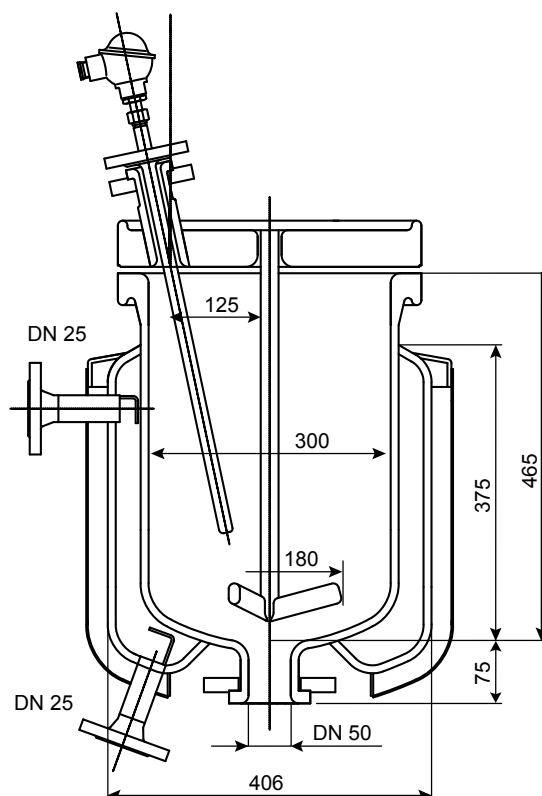
- **Agitation:** Thanks to our expertise in agitation, these reactors can be designed with different types of agitation offering high gassing, high agitation rate of high thermal transfer characteristics
- **Exhaust Cooler:** this range of reactors can be furnished with QVF® Borosilicate 3.3 glass exhaust 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



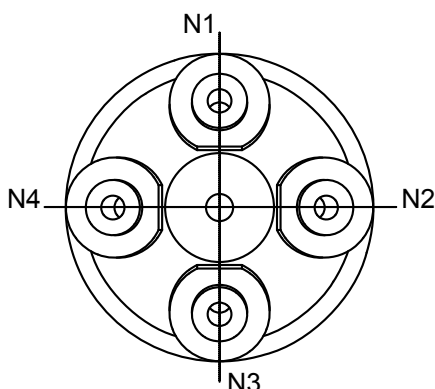
**Jacket nozzles
2 DN 1/2" NPT**

25 L

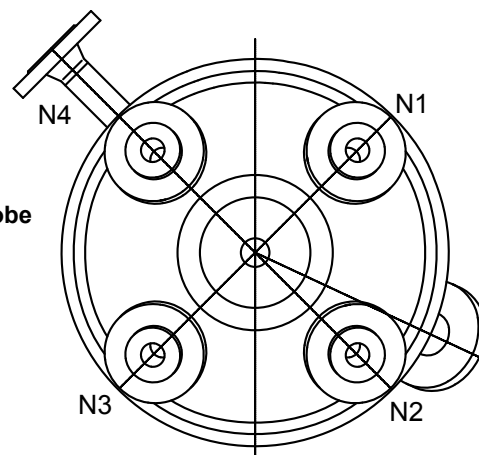


	Inner vessel	Jacket
Maximum allowable working pressure	-1 / +20 bar 40 bar optional	20 bar
Maximum allowable working temperature	-25 / +200°C	-25 / +200°C
Capacity	6.3 l	3 l
Heating area	0.15 m ²	
Weight (kg)	380 (total)	85 (reactor)

	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)

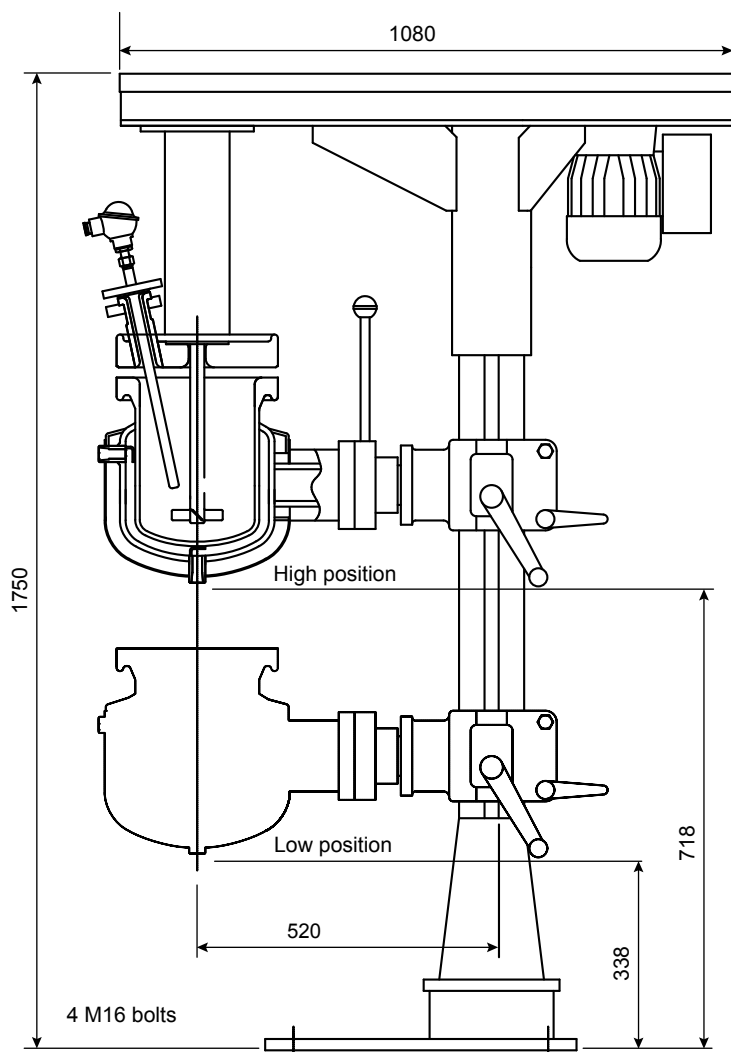


Temperature measurement: SVR probe
Assembly by clamps
Nozzles on inner vessel: 4 DN 20
(angle of inclination 12°)



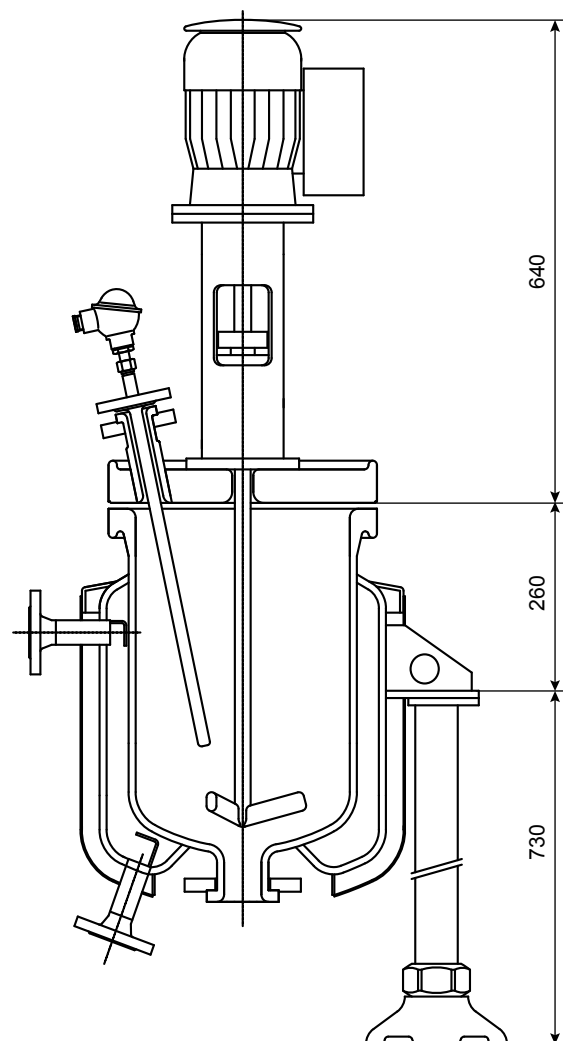
Various agitators:
Impeller from 70 to 650 RPM*
Anchor from 30 to 150 RPM*
Turbine from 70 to 700 RPM*

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



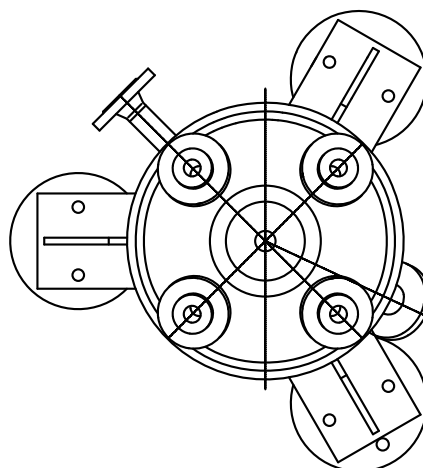
Support system: 3 legs

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





Stripper 60m³
Eccentric agitation



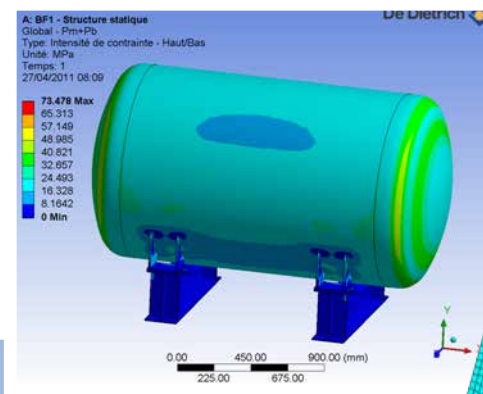
Reactor BE 80m³

4 reactors 110 m³
3 stages of
GlasLock® agitators

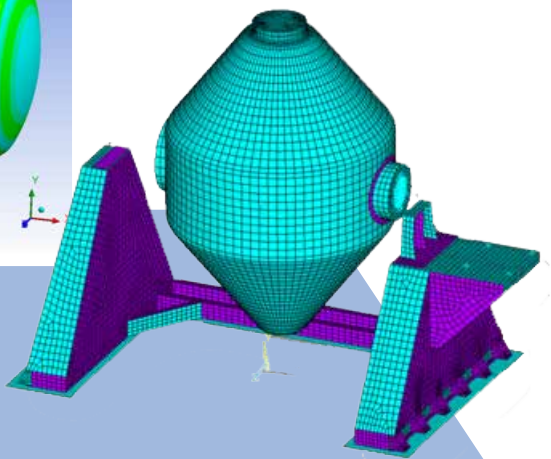


King size glass-lined reactor
Handling 75 tonnes

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

GlasLock® Selection guide _____ 54

GlasLock® Blade Data _____ 55

Agitated volumes _____ 56-57

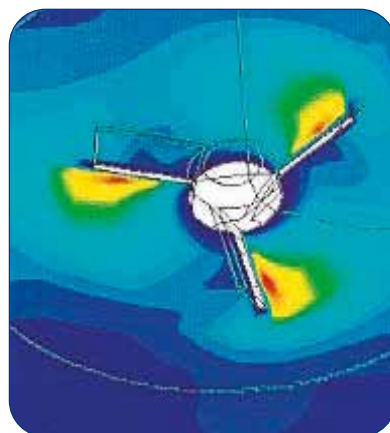
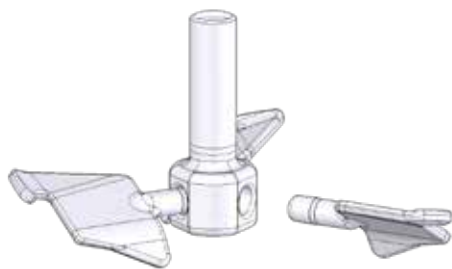
Drive unit _____ 58-61

COMPLETELY ADAPTABLE FOR YOUR PROCESS INTENSIFICATION

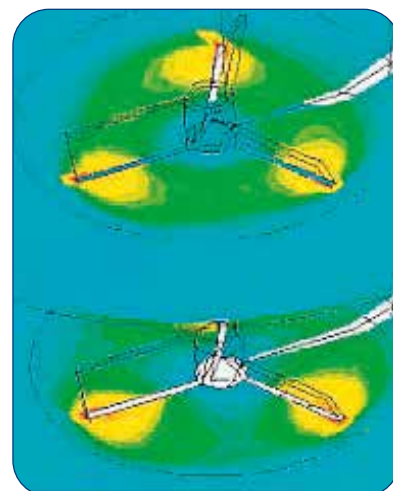
To improve process efficiency, De Dietrich® proposes a new experimental digital approach.

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.

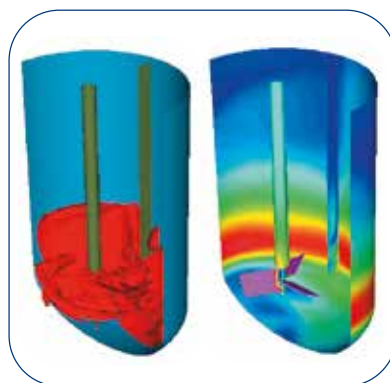
Digital simulation also finds an outlet in various applications: speed profile analysis around moving parts, primary run-off flows, turbulence studies, calculation of thermal data.



TURBULENCE STUDIES



SPEED PROFILE ANALYSIS AROUND MOVING PARTS



FLOW MODELLING

GlasLock® system with removable blades									
	STANDARD PROFILES							NON STANDARD PROFILES	
	Flat Blade 30°	Flat Blade 45°	Flat Blade 60°	Flat Blade 90°	Trapezoidal Blade	Hydrofoil	Optifoil	ViscoFoil	Rushton Turbine
Design									
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
Generated Flow	Axial	Axial Radial	Axial Radial	Radial	Axial Radial	Axial Radial	Axial Radial	Axial Radial	Radial
Flow Model	Turbulent	Turbulent Laminar	Turbulent Laminar	Turbulent Laminar	Turbulent Laminar	Turbulent Laminar	Turbulent Laminar	Laminar	Turbulent
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
Viscosity Range (cP = mPa.s)	3 000	4 000	6 000	6 000	6 000	6 000	8 000	120 000	3 000
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
Homogenization	-	+	++	+	+	++	++	++	-
Suspension	-	+	++	++	++	++	+++	+	-
Dispersion	-	+	+	++	++	+	+	-	++
Gas / Liquid	-	-	+	+++	+++	-	-	-	+++
Heat Transfer	-	+	++	++	++	++	++	+++	+
Cristallization	++	++	+	-	-	++	+++	++	-

+: suitable

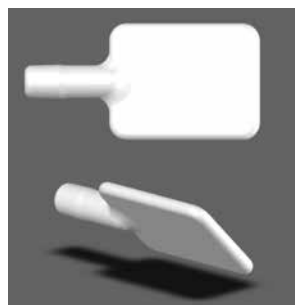
++: suit well

+++ : suit perfectly

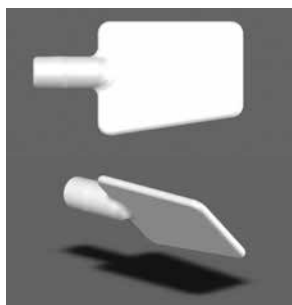
-: not advisable

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								

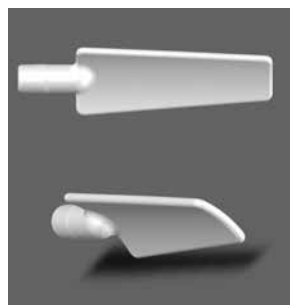
Reactor		Hydrofoil					Optifoil				
Nominal Volume Litres	ø mm	Blade ø (mm)	Tail ø (mm)	Hub ø (mm)	Weight (kg)	Article Code	Blade ø (mm)	Tail ø (mm)	Hub ø (mm)	Weight (kg)	Article Code
1 000	1 200	720	58	190	7	7 614 444	740	58	190	10	7 617 083
1 600	1 400	720			7	7 614 444	740			10	7 617 083
2 500	1 600	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



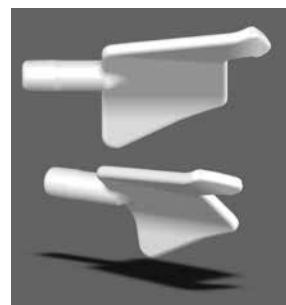
Flat Blade



Trapezoidal Blade



Hydrofoil Blade



Optifoil Blade

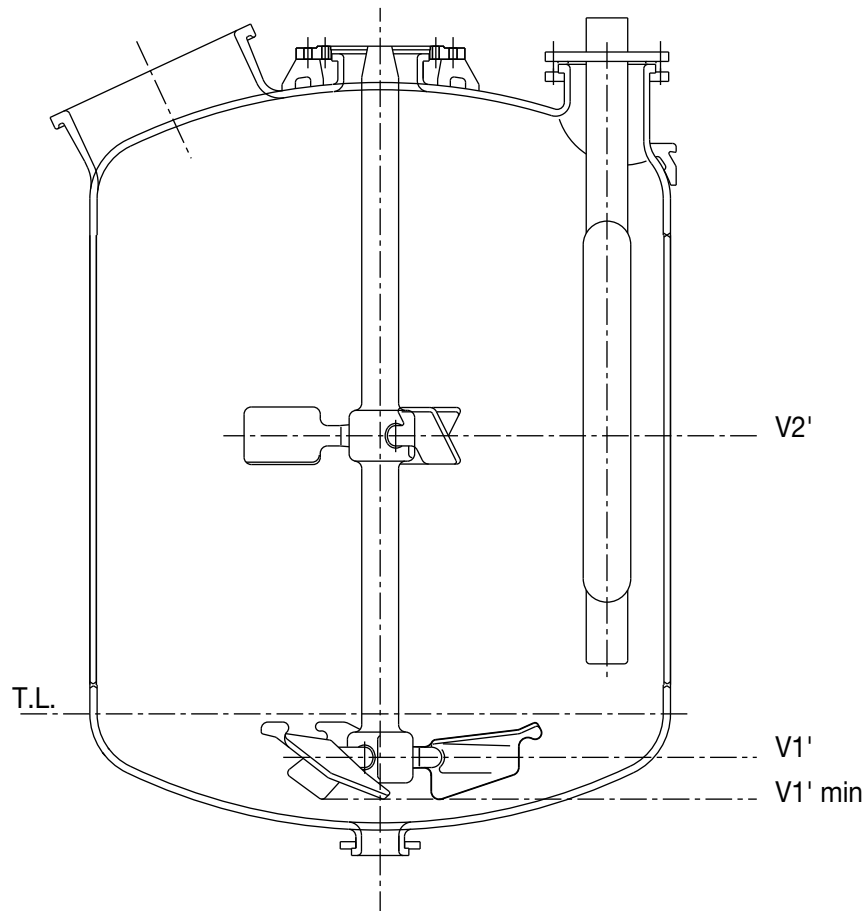
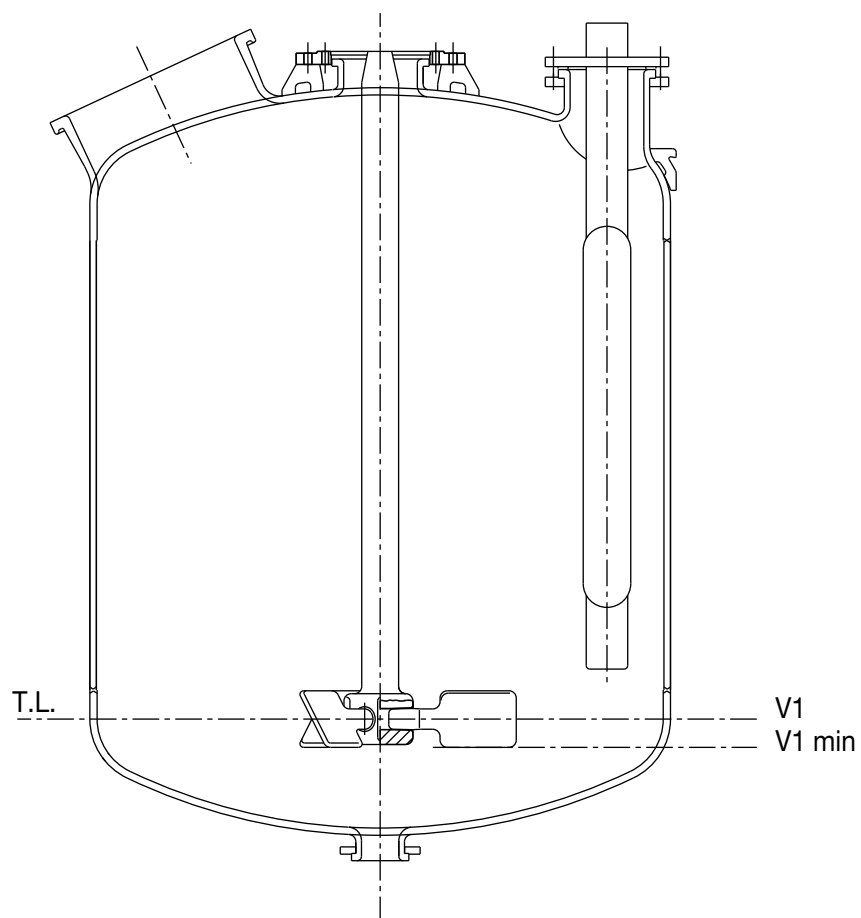
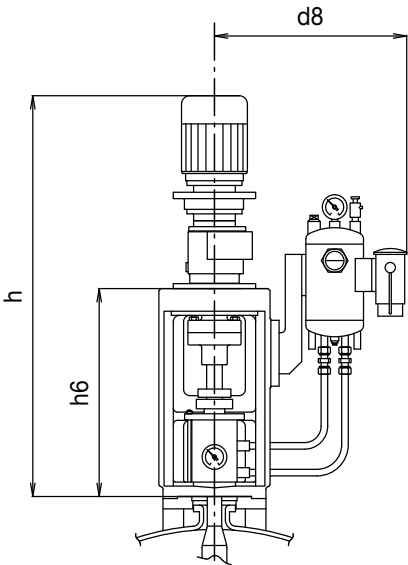
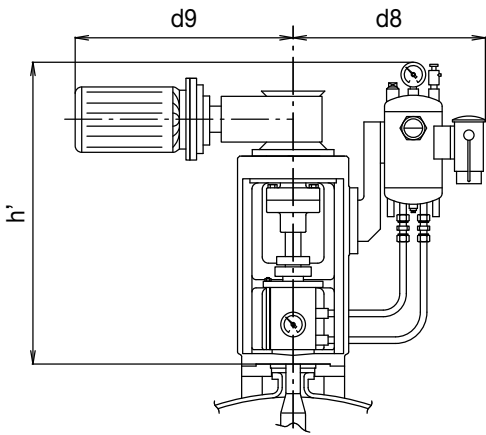


TABLE A STANDARD LENGTH		AGITATED VOLUMES	Minimum NON AGITATED VOLUMES (lower point of the lower blades)										
Reactor		(on blade axis)	Optifoil		Standard Flat Blade					Trapezoidal		Hydrofoil	
Nominal Volume Litres	ø mm	one level	Blade ø	V1 min	Blade ø	90°	60°	45°	30°	90°	60°	Blade ø	45°
		V1				V1 min	V1 min	V1 min	V1 min	V1 min	V1 min		
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	330	900	129	750	165	183	203	289	140	168	850	215
4 000	1 800	515	950	233	750	326	326	353	431	237	275	850	337
6 300	2 000	705	1 050	283	850	441	448	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

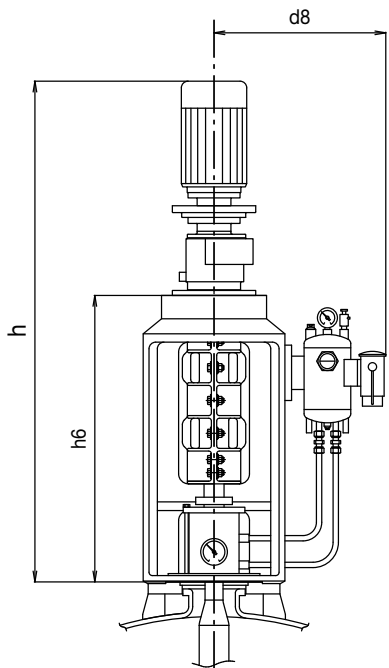
TABLE B EXTENDED LENGTH		AGITATED VOLUMES		Minimum NON AGITATED VOLUMES (lower point of the lower blades)										
Reactor		(on blade axis)		Optifoil		Standard Flat Blade					Trapezoidal		Hydrofoil	
Nominal Volume Litres	ø mm	1st level	2nd level	Blade ø	V1' min	Blade ø	90°	60°	45°	30°	90°	60°	Blade 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



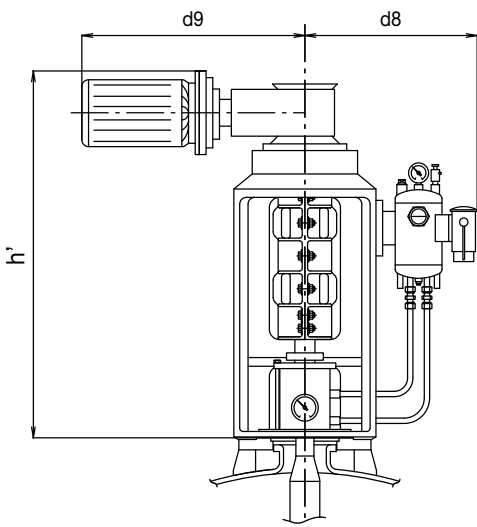
MDL 40-50



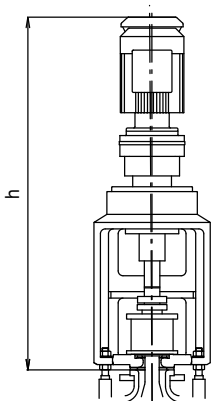
MDL 40-50



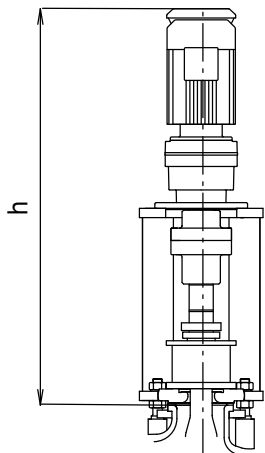
MDL 60-160



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	32/184	1,1
	400	50 (E200)	166	32/166	32/184	1,5
AE/OPX/CE	630	60 (E250)	143	29/143	29/166	1,5
AE	1000	60 (E250)	143 169	29/143 29/169		2,2
BE/OPX	1000	80 (E300)	110	21/110	29/150	3
AE/BE/CE OPX	1600	80 (E300)	110 111	21/110 21/111	21/125	3
	2500	80 (E300)	111 114	21/111 21/125	21/125	4
CE	4000 AN	80 (E300)	114	30/114	30/120	4
AE/BE/CE OPX	4000	100 (E400)	99	20/99	20/115	5,5
	6300	100 (E500)	99	20/99	20/115	5,5
BE/CE/OPX	8000	100 (E500)	99	20/99	20/110	7,5
	10000 12500 16000	125 (E700)	79	25/79	25/100	7,5
			91			11
BE/CE	20000 25000	140 (E700)	73 86	20/73	20/90	7,5
	32000 40000	160 (E900/1)	73	20/73	20/90	11
						15
						15
						18,5
						22
						30
						37
						37
						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	15/93	1,1
	400	50 (E200)	79	15/79	15/93	1,5
	630	60 (E250)	55	12/55	12/65	1,5 (max viscosity = 8 000 cP)
	1000	60 (E250)	55	12/55	12/65	2,2
	1600 2500	80 (E300)	38 40	8/38	8/45	3
	4000	100 (E400)	30	6/30	6/36	3
	6300	100 (E500)	30	6/30	6/36	4
						4
						5,5
						7,5
						7,5
						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 *	1100	1190	1190	1610	1610	1660	1860	1940	2010	2150	2190	2330	2330	2680	2680	2830	2890	3100
h' *	710	745	745	1105	1105	1105	1305	1315	1315	1340	1515	1520	1520	1750	1750	1810	1835	-
h6	510	535		865			1015				1150			1350		1350		1390
d8	470	515		510			580				690			770		770		800
d9 *	585	640	640	715	715	760	825	905	980	1120	995	1135	1135	1315	1315	1440	1505	-
Max. torque (Nm) **	50	150		320			800				1750			3200		5800		11800
Average Weight (daN) *	122	183		291			577				963			1519		1722		2600

Agitator drive MNS	40	50	60	80
Motor Power kW	1,1	2,2	4	5,5
h	1155	1275	1350	1510
Agitator speed (RPM)	121	120	113	92

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

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 lubricification 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



Turnkey chemical unit



Heat Exchanger



Heated tank



Mixer Settler

EQUIPMENT

Clamped top Receiver RS/RD _____ 64

Closed Receiver RFS/RFD _____ 65

Storage Tank _____ 66-67

Column _____ 68

Conical Dryer SR _____ 69

Condenser EC _____ 70

Heat Exchanger ED _____ 71

Shell and Tube Heat Exchanger _____ 72-73

Condensation and Separation Unit _____ 74

Accessories _____ 75-79

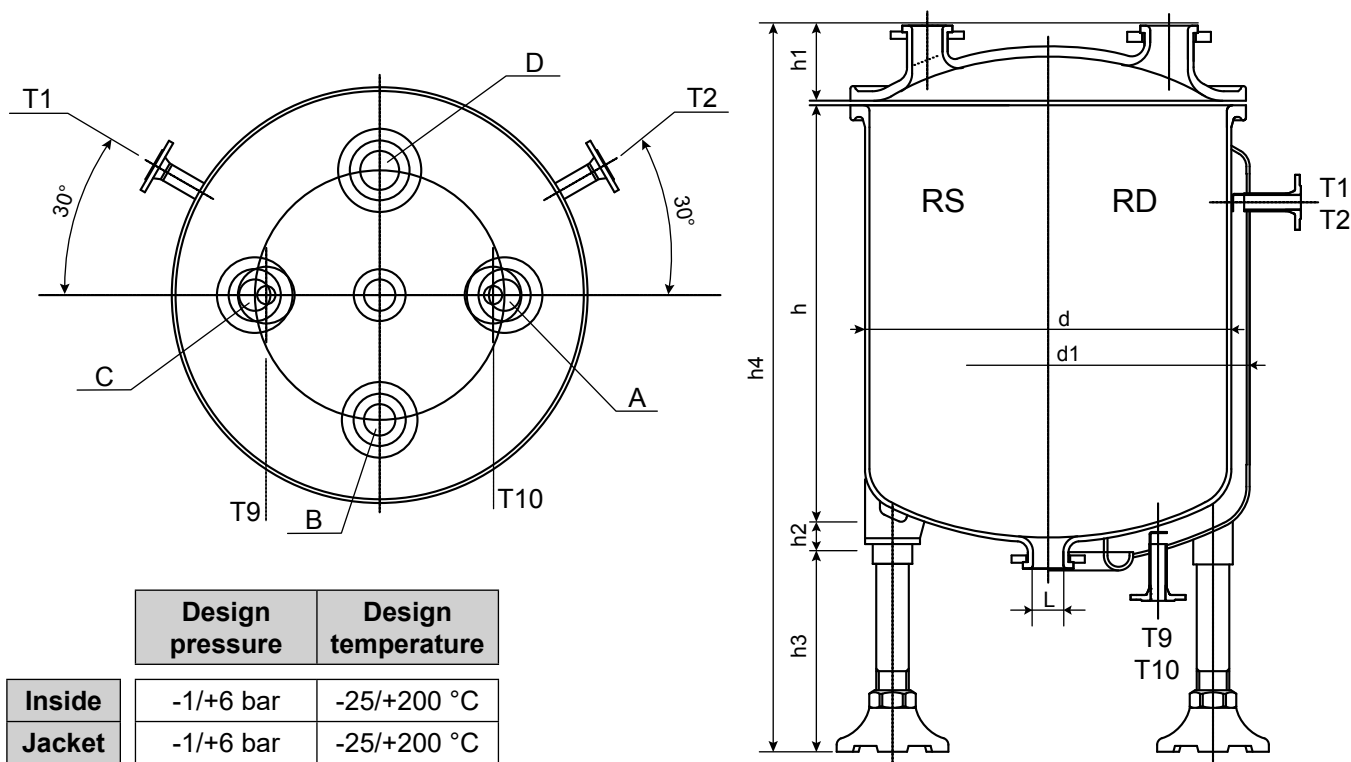
 Loose Flange _____ 75

 Gasket _____ 76

 Clamp _____ 77

 Fused Glass Quick & Easy _____ 78

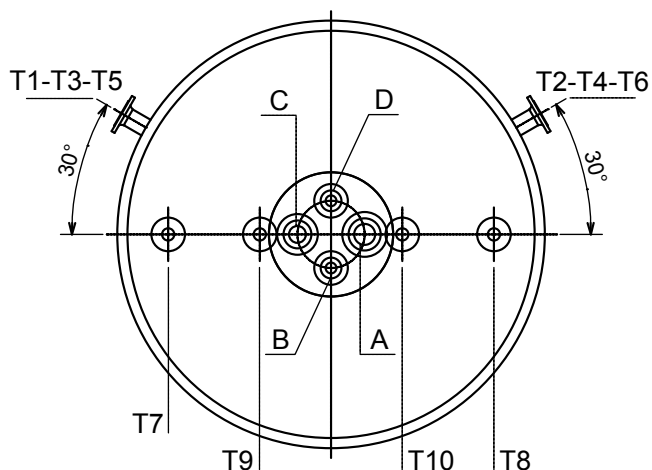
 Nickel Coating _____ 79



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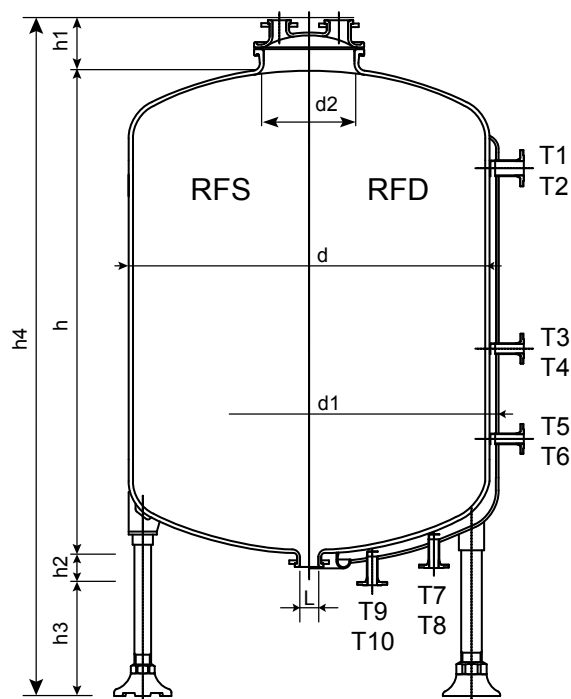
Inside	-1/+6 bar	-25/+200 °C
Jacket	-1/+6 bar	-25/+200 °C

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		m ²	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



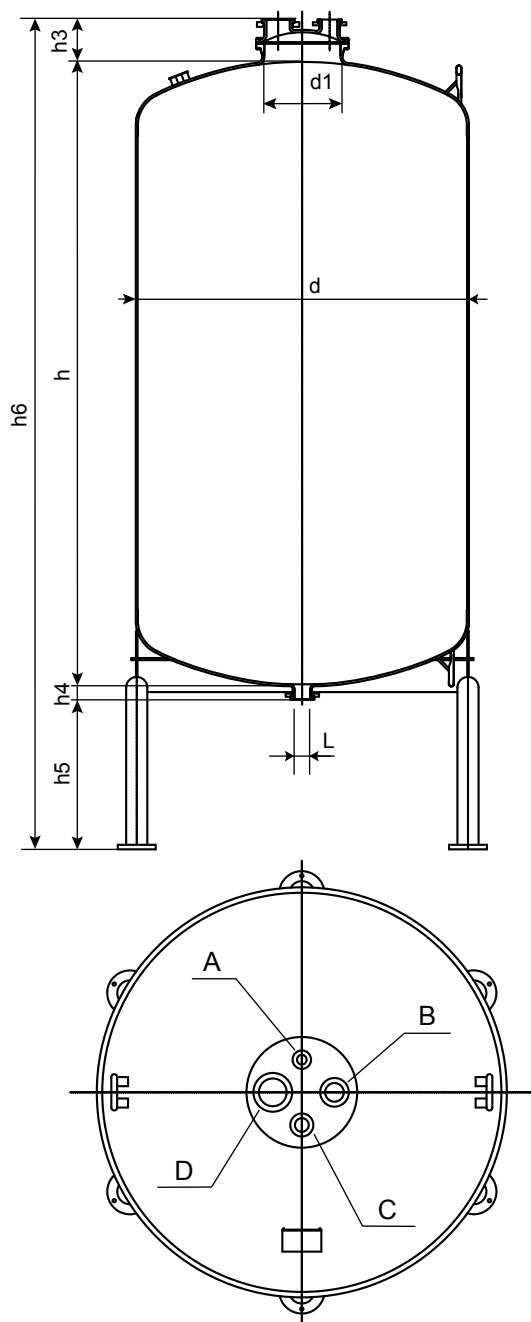
	Design pressure	Design temperature
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Inside	-1/+6 bar	-25/+200 °C
Jacket	-1/+6 bar	-25/+200 °C

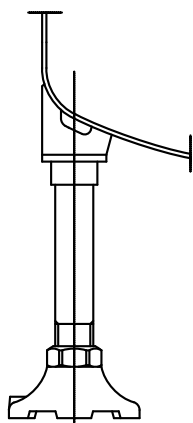


Nominal capacity		Litres	1200	2000	3000	4000	6000
Total capacity		Litres	1325	2200	3325	4500	7125
Jacket capacity		Litres	250	320	400	475	625
Heating area		m²	4,45	6,3	8,3	10	14
Main dimensions		d	1200	1400	1600	1800	2000
		h	1400	1700	1950	2100	2650
		d1	1300	1500	1700	1900	2100
		d2	500	500	500	500	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

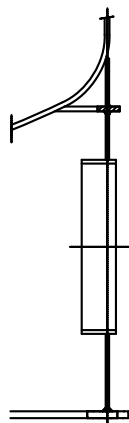
VERTICAL CSV



$\varnothing \leq 1800$
Removable
support legs

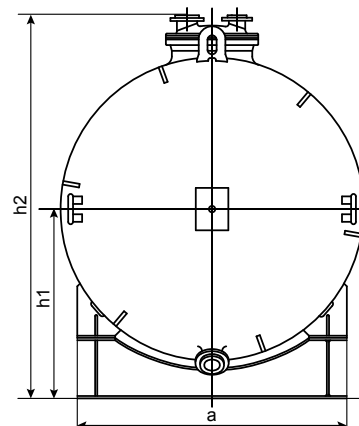


$\varnothing \geq 2000$
Skirt support

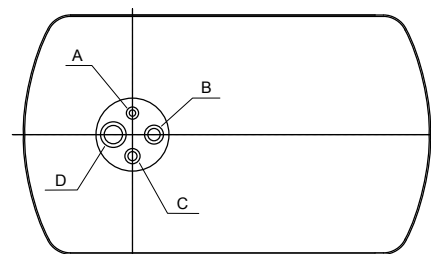
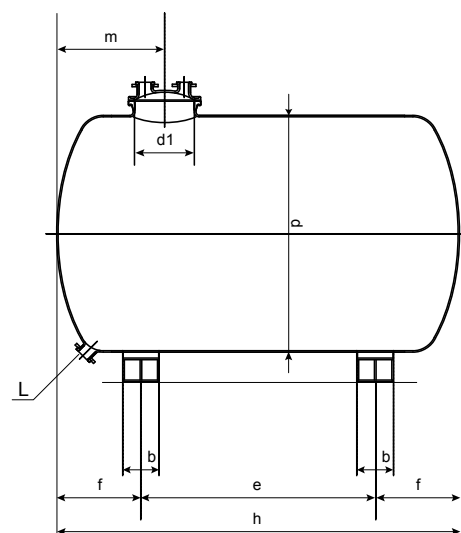
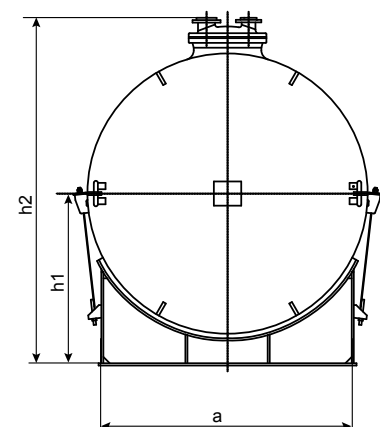


HORIZONTAL CSH

Tanks $\varnothing \leq 2000$



Tanks $\varnothing \geq 2200$



Option: -1/+6 bar

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

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															

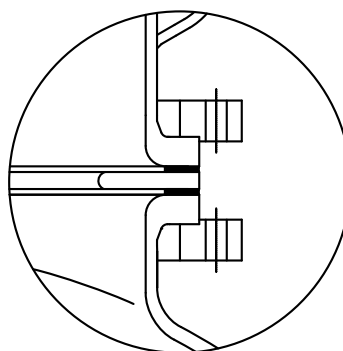
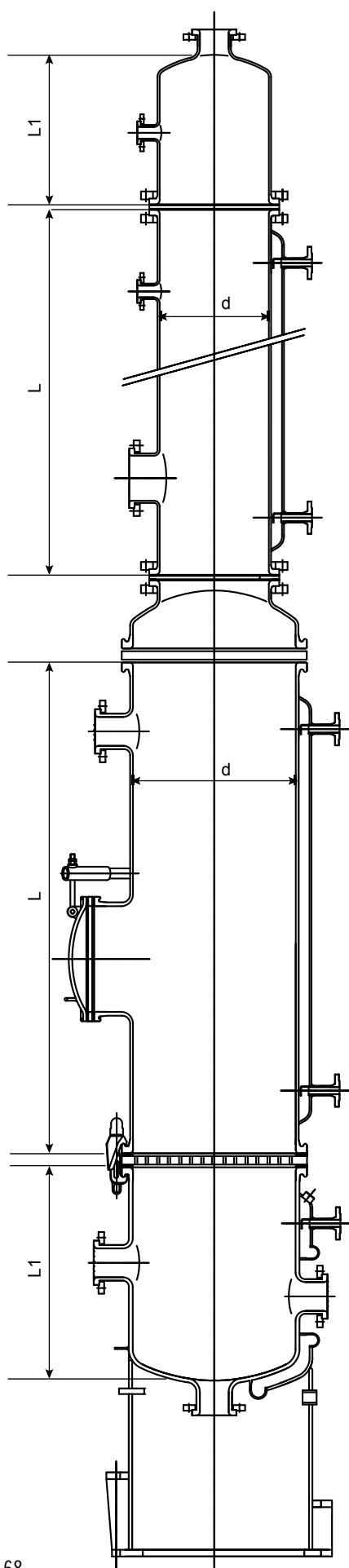
Main dimensions	d	1200	1200	1600	1800	2000	2000	2200	2400	2600	2800	2800	3000	3200	3400	3800	4000
	h	1700	2500	2300	2800	3600	4400	4700	4900	5300	5800	7100	7800	8500	9600	9600	10400
	d1	500	500	500	600	600	600	600	600	600	600	600	600	600	600	600	600
	a	1070	1070	1400	1600	1780	1780	2025	2200	2375	2550	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	50	50	50	80	80	80	80	80	80	80	80	80	80	80	80	80
	B	80	80	80	100	100	100	100	100	100	100	100	100	100	100	100	100
	C	50	50	50	80	80	80	80	80	80	80	80	80	80	80	80	80
	D	100	100	100	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
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Dimensions and weight for guidance only
Capacity: up to 140m³ upon request

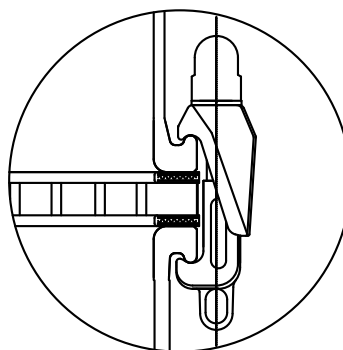


Assembling
with donut

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	



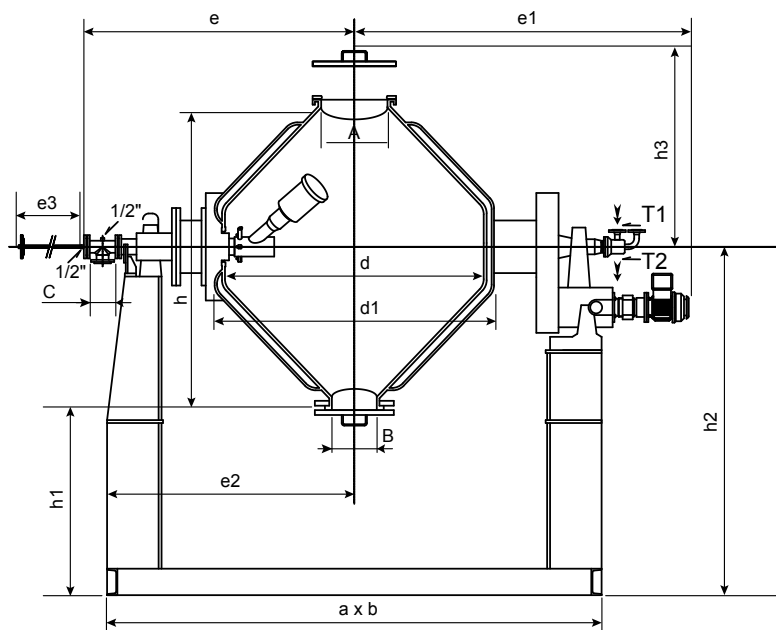
Assembling
with perforated or
slotted grid

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

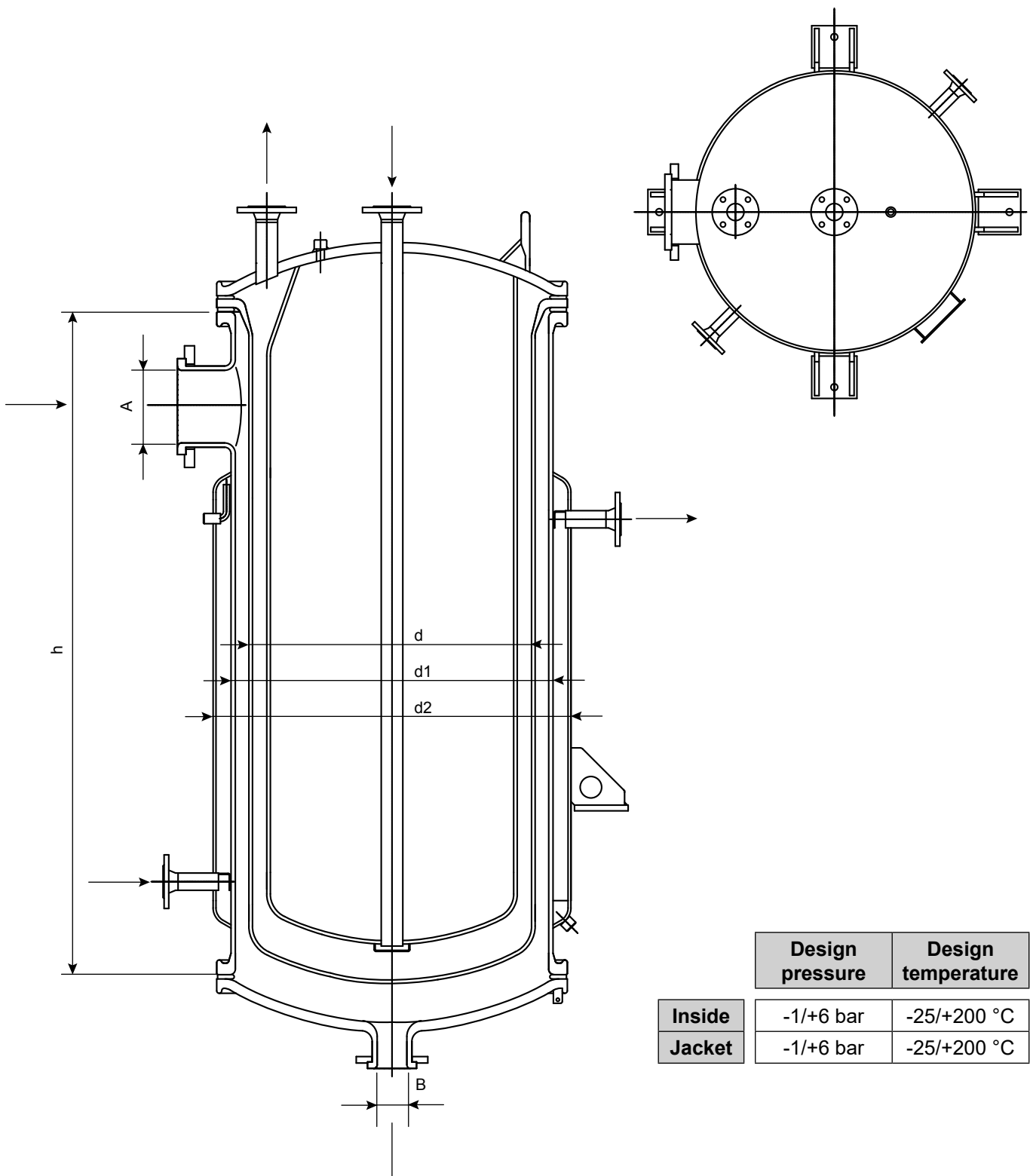
e3 :
dismantling of the
thermometer pocket



Options:

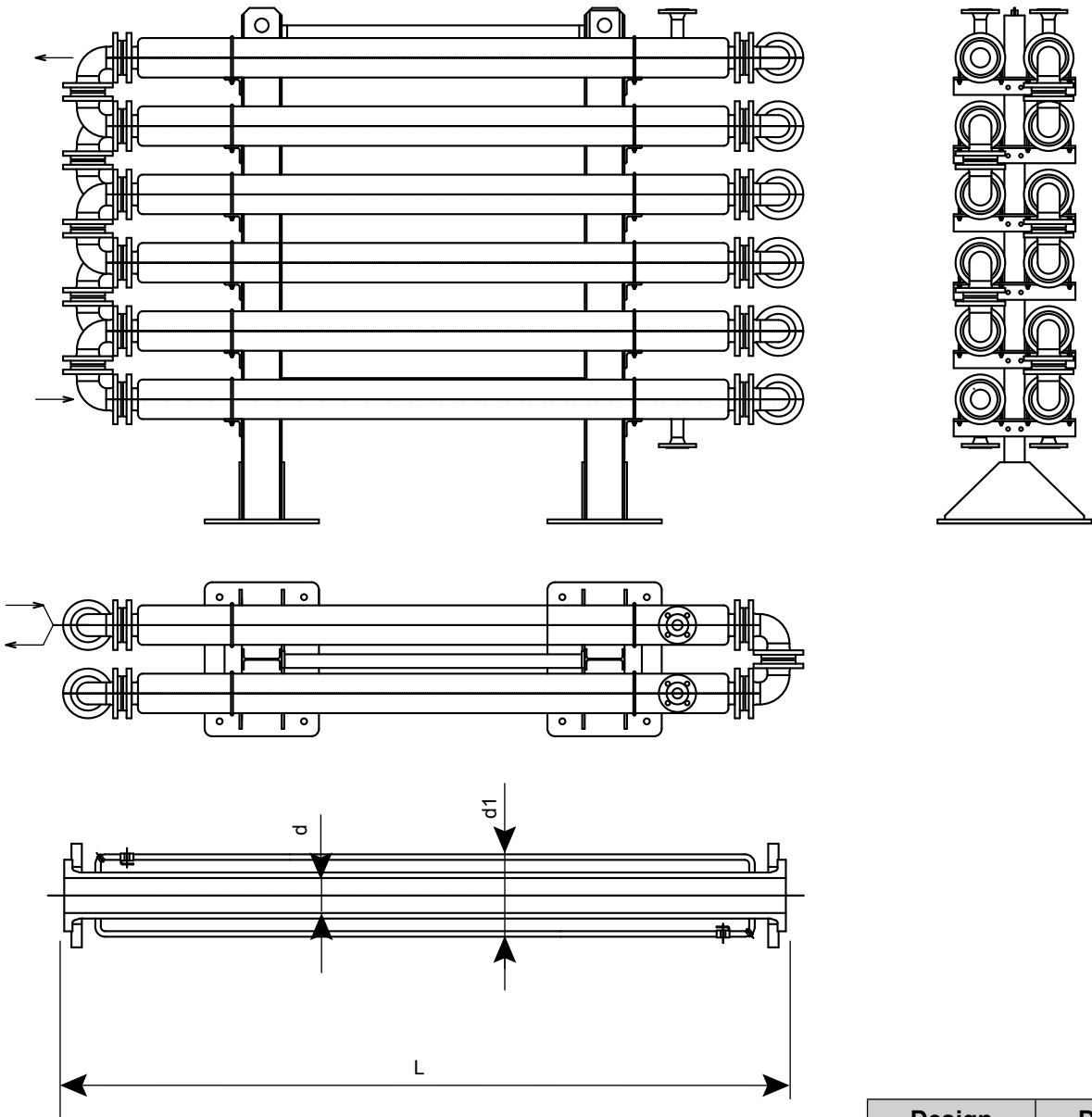
- Material: Stainless steel - Hastelloy
- Size up to 16m³ on request

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	m ²	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 frequency inverter	kW	2.2	3	4	5.5	7.5	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	1,2 - 6,3	1,2 - 6,3
Weight	Total	1900	2100	3300	4300	5800	8300	11000
	Vessel only			1380	1895	3100	4900	6600



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

Exchange area (m²)	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. (m²)	0,16	0,262	0,511	0,782	1,00	1,48	1,93	2,4
Inner cross section cm²	4,3	11	19	44	77	179	313	497
Jacket cross section cm²	30	52	61	115	159	200	376	320
Weight for L maxi. kg	23	34	57	96	114	211	313	462

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 across 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 high operating pressure – 1 / + 10 bar and large temperature range of – 10 / + 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 meet 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.

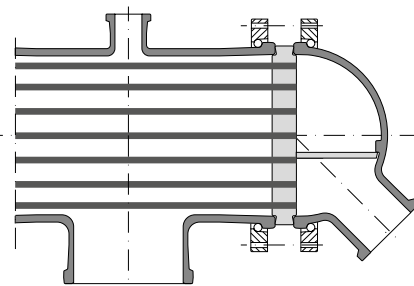
Because of the corrosion resistance of the heat exchange tubes and the shell the service and product sides can be selected to suit the particular operating requirements. Only the standard stainless steel headers need replacing with special corrosion-resistant headers in case of corrosive request on both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



Liquid/liquid heat transfer

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

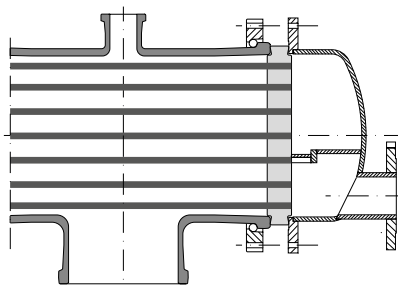
Type 1	Shell	Tubes	Header
Fluid	Product		Product
Material	Glass	Glass / SiC	Glass
Working pressure bar g	-1/+1(*)	-1/+3	-1/+3
Working temperature °C	-20/+150	-20/+150	-20/+150



Condensation

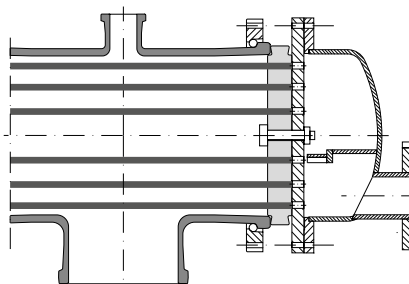
In condensation processes, the cooling water side is generally non corrosive.
For higher pressures, the PTFE tube sheet is reinforced with a stainless steel plate on the cooling water side.

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

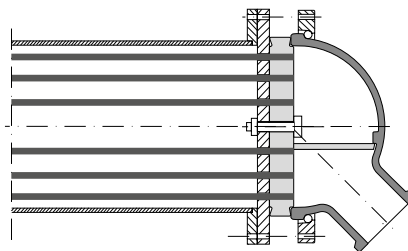


Type 3	Shell	Tubes	Header
Fluid	Product		Service
Material	Glass	Glass / SiC	Steel
Working pressure bar g	-1/+1(*)	-1/+6	-1/+6
Working temperature °C	-20/+150	-20/+150	-20/+150

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



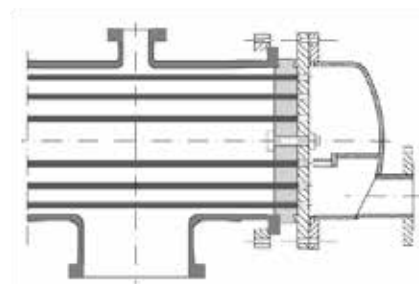
Type 4	Shell	Tubes	Header
Fluid	Service		Product
Material	Steel	Glass / SiC	Glass
Working pressure bar g	-1/+6	-1/+3	-1/+3
Working temperature °C	-20/+150	-20/+150	-20/+150



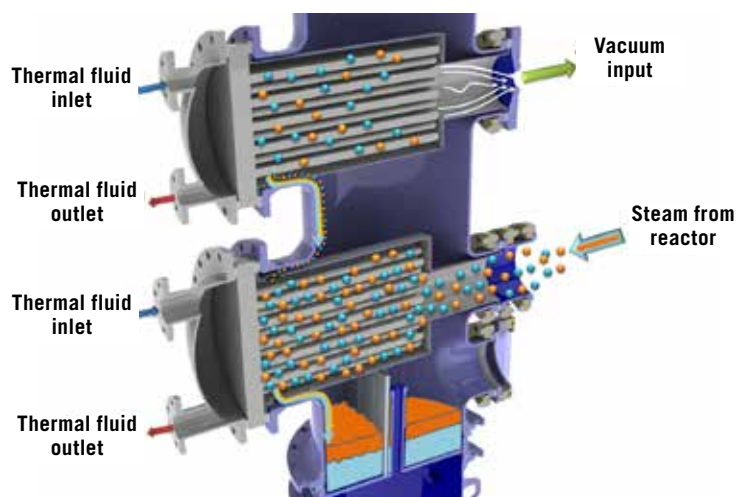
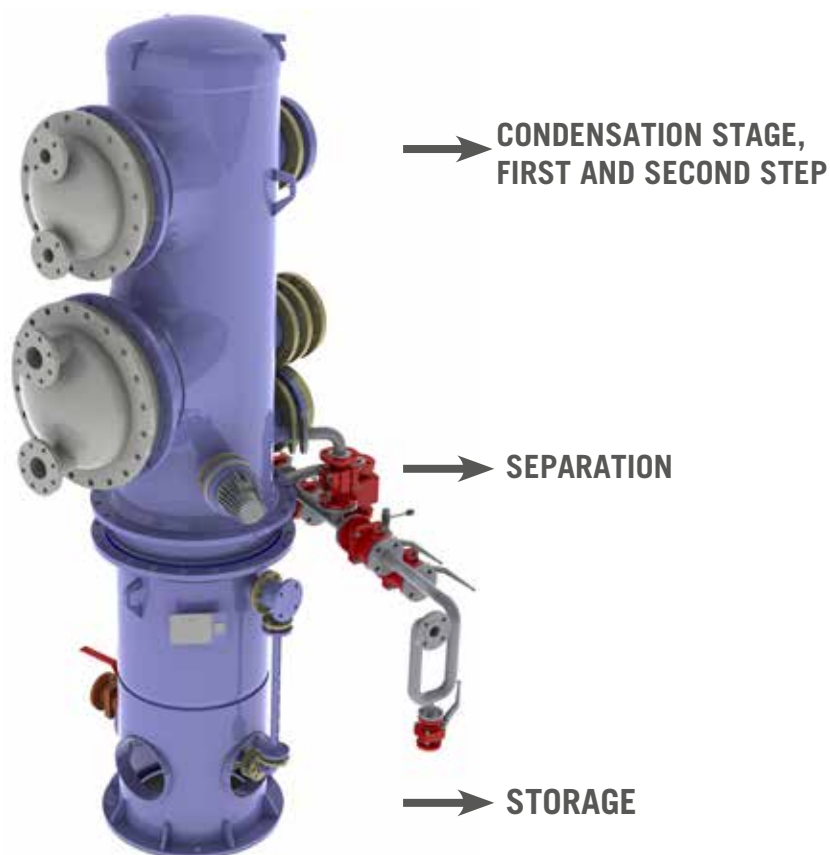
Type 5 & 6

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



- **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**

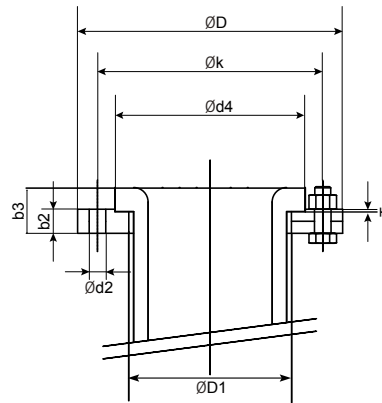


REACTOR RANGE		Thermipack® Range	CONDENSER				STORAGE
			ALLOY		SILICON CARBIDE		
Volume min.	Volume max.	DN - Ø	Primary	Trap	Primary	Trap	
(liter)	(liter)	(mm)	(m²)	(m²)	(m²)	(m²)	(liter)
	< 2500	DN600-600	9	3	6	2	115
≥ 2500	< 6300	DN700-700	12	6	9	4	190
≥ 6300	16000	DN900-850	24	12	17	9	340

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

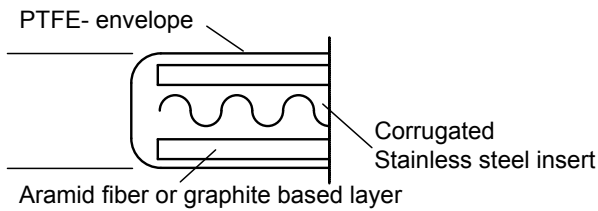


LOOSE FLANGES PN 10

DN	D	D1	d4	k	d2	b2	b3	T	daN
25	115	48	69	85	4 x Ø14	14	25	2	0.8
32	140	60	79	100	4 x Ø18	14	25	2	1.2
40	150	66	89	110	4 x Ø18	14	25	2	1.4
50	165	80	103	125	4 x Ø18	16	29	2	1.9
65	185	94	123	145	4 x Ø18	17	30	2	2.4
80	200	114	139	160	8 x Ø18	18	32	2	2.6
100	220	136	159	180	8 x Ø18	20	35	2	3.3
125	250	162	188	210	8 x Ø18	22	38	3	4.3
150	285	188	215	240	8 x Ø22	25	41	3	6.2
200	340	238	270	295	8 x Ø22	28	46	3	9.1
250	395	294	323	350	12 x Ø22	32	52	3	12.1
300	445	344	371	400	12 x Ø22	34	56	3	15
350	505	396	431	460	16 x Ø22	36	60	3	19.4
400	565	446	483	515	16 x Ø27	40	64	3	25.9

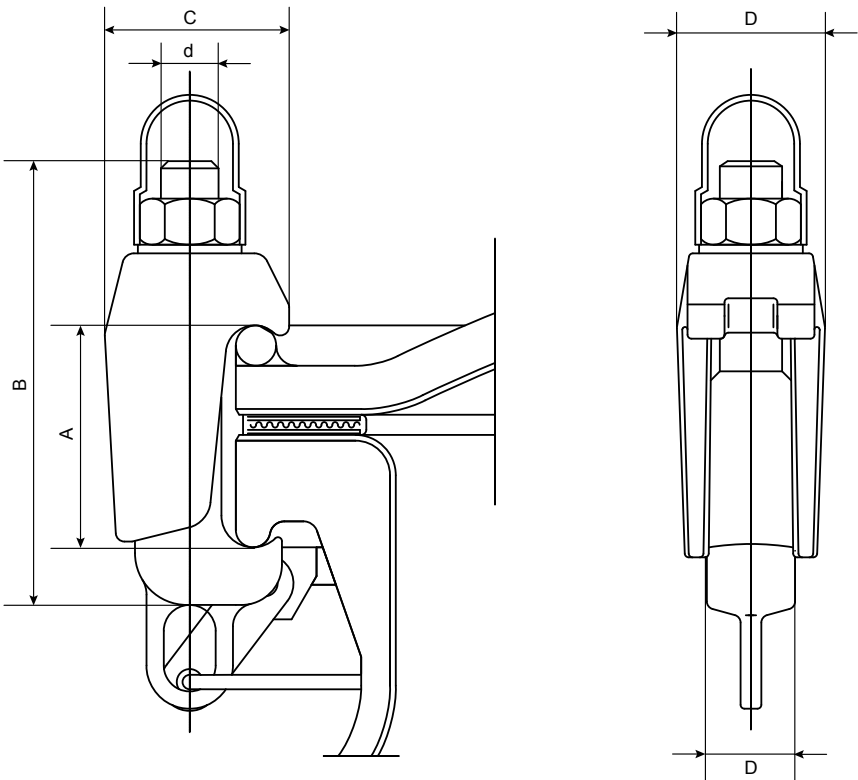
LOOSE FLANGES ANSI 150 LBS

DN	D	D1	d4	k	d2	b2	b3	T	daN
1"	108	46	63	79	4 x Ø15	14	25	2	0.7
1 1/4"	117.3	60	72	88.9	4 x Ø15.9	17.5	28.5	2	0.8
1 1/2"	127	63	82.5	98.5	4 x Ø15	14	25	2	0.9
2"	153	79	104	120.5	4 x Ø18	16	29	2	1.5
2 1/2"	177.8	90	107.9	139.7	4 x Ø19	24	37	2	3.2
3"	190	112	137	152.5	4 x Ø18	18	39	2	2.4
4"	229	136	160	190.5	8 x Ø18	20	35	2	3.8
4 3/8"	228.6	146	168.2	190.5	8 x Ø19	26.2	35	2	4.5
5"	254	165	193.3	215.9	8 x Ø18	33.3	47.5	4.8	7.6
6"	280	189	218	241	8 x Ø22	25	41	3	5.3
8"	343	238	273	298	12 x Ø25	28	46	3	8.5
10"	406	294	327	362	12 x Ø25	32	52	3	13.1
12"	383	357	384	432	16 x Ø25	35	58	3	21
14"	533.4			476.2	16 x Ø28.6	50	77		9.1
16"	596.9	447.7	474	539.7	20 x Ø28.6	50	72	5	43.2



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
		RFS / RFD CSH / CSV	500	605	522	16	M20	180
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
		80	140	89	8	M16	40	30
	Pipes	100	162	113	8	M16	50	40
		125	190	138	8	M16	60	50
		150	212	163	8	M20	70	60
		200	270	213	8	M20	110	90
	Valves	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

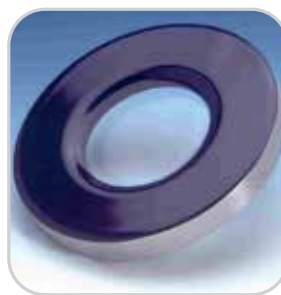
Type	d	A		B	C	D	E	Weight	Maxi. allowable load at		
		Mini.	Maxi.						+ 20° C	+ 200° C	+ 250° C
M 20 B	20	60	85	154	64	48	30	1,6 kg	33 342 N	31 185 N	29 714 N
M 24 BC	24	76	96	175	72	56	34	2,5 kg	52 858 N	49 327 N	46 974 N
M 24 BM	24	95	115	194	72	56	34	2,6 kg	52 858 N	49 327 N	46 974 N
M 24 BL	24	115	135	214	72	56	34	2,8 kg	52 858 N	49 327 N	46 974 N
M 27 BC	27	100	130	220	88	61	40	4,1 kg	75 000 N	70 000 N	66 000 N
M 27 BL	27	125	175	265	88	61	40	4,4 kg	75 000 N	70 000 N	66 000 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



- 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



Specific design upon request

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/+200°C

In pressure: -1/+6 bar



External protection of glass-lined parts by Nickel Coating

For pharmaceutical or fine chemical companies which are concerned about the risk of contaminating their products, particularly with paint chips

Outstanding properties of Nickel Coating:

- Bonds perfectly with the base material
- Impact resistant
- Suitable for applications in the food and pharmaceutical industries
- Easy to clean due to a specific surface preparation (roughness $Ra < 1,6 \mu m$)
- Good corrosion resistance
- Makes it possible to apply surface coating to components with complex geometries
- Very good homogenous distribution of the coating layer

Typical parts to be nickel coated:

- Manhole cover
- Manhole protection ring
- Sight glass flange
- Piping
- Seal housing flange
- Small AE cover
($< \varnothing 900$, larger dimensions on request)

NEW: Glass-lined covers and manhole covers with **fused sight glass "Fused Glass"** are now available with this external coating.





BOTTOM OUTLET VALVE

CleanValve _____ **82-85**

THE CLEANVALVE RANGE:

AVAILABLE IN ENAMEL DD3009, STAINLESS STEEL & NICKEL ALLOY (ALLOY 2.6402)

BENEFITS

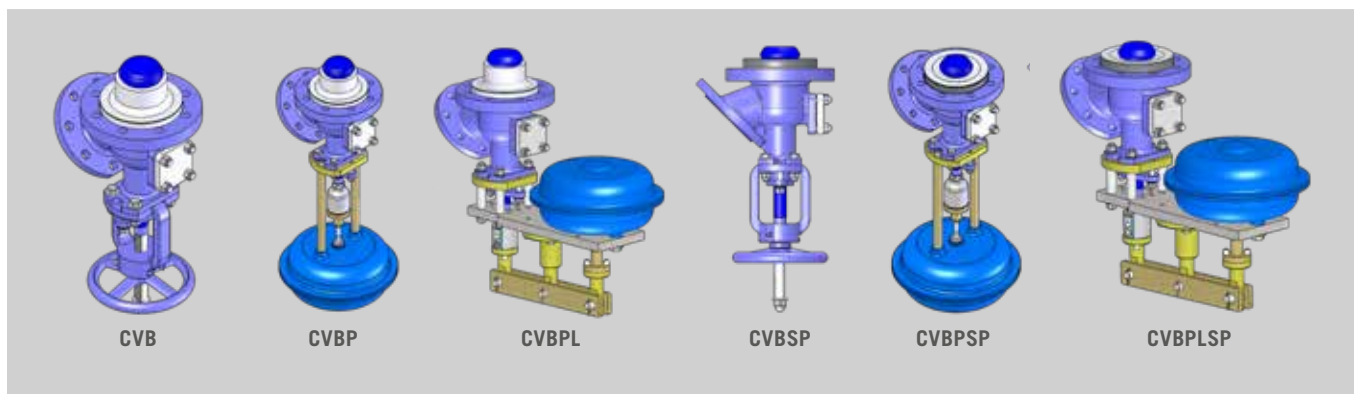
- Draining design, elimination of dead space, easy to clean to avoid cross contamination
- No need to dismantle valve between batches, reduces production costs
- Safe and reliable



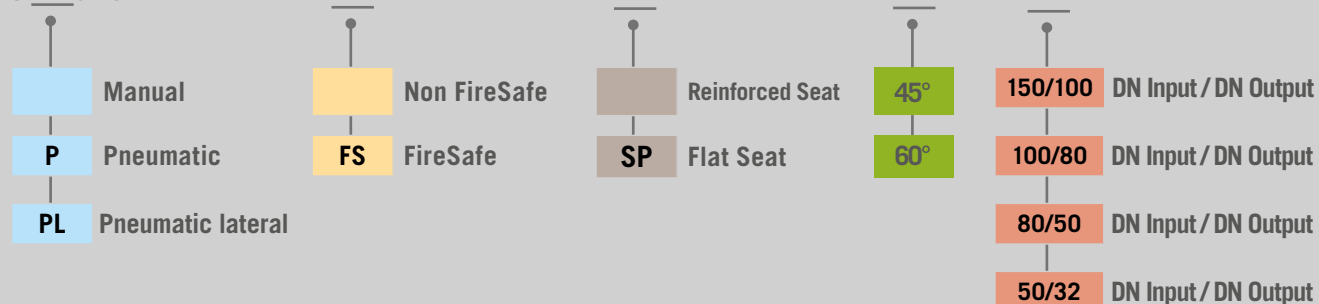
ADVANTAGES

- Patented flat seat to avoid collection or build-up of materials in the annular area between the valve seat and nozzle wall
- Self draining design of the internal components and body
- Cleanvalve is able to accommodate temperature measurement sensors, measurement electrodes at the lowest point in the vessel for a more accurate and reliable temperature measurement
- Lateral dismantling of the temperature probe
- All De Dietrich Process Systems glass-lined valves are made of cast steel coated with our standard DD3009 enamel identical to the reactors on which they are installed. Wetted parts feature the same characteristics of all other glass-lined equipment including resistance to corrosion, thermal and mechanical shock

THE RANGE



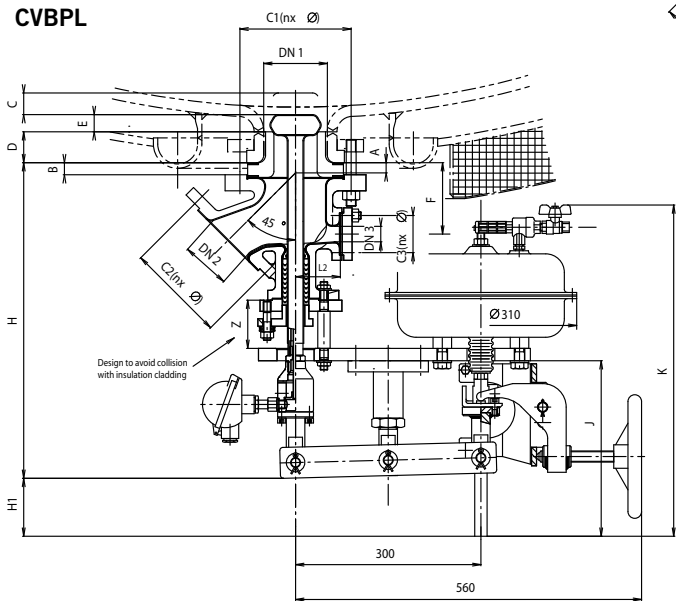
CVB Valve



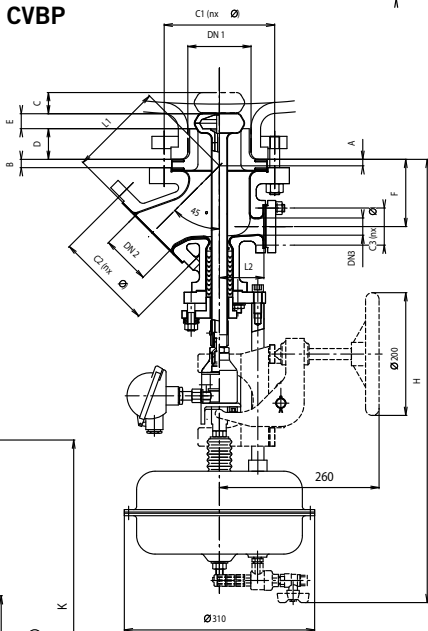
Example: Valve CVBPLSP 60° 100/80 - CVB Body - Pneumatic lateral - Flat seat - 60° - 100/80



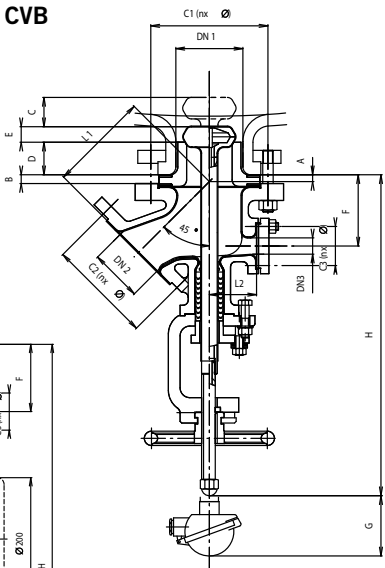
CVBPL



CVBP



CVB



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

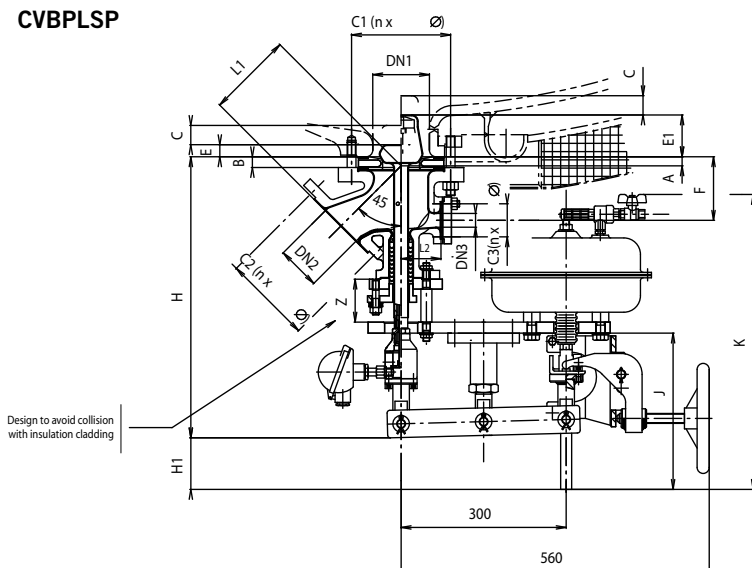
ANSI 150 LBS

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

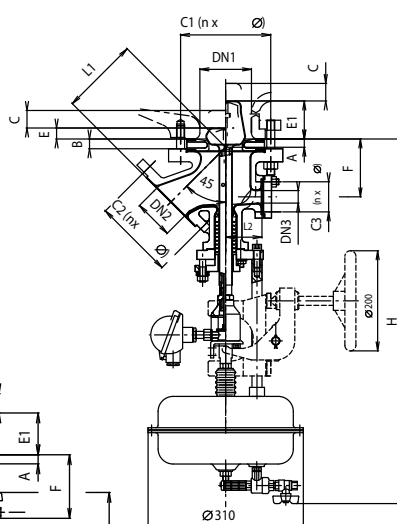
Size	Sizes common to all models												Sizes specific to each model															
DN1/ DN2	DN3			L1		L2	A		B	D	E	F	CVB				CVBP				CVBPL							
	DN	C3	n x Ø	45°	60°		45°	60°					C	H	bar	daN	C	H	bar	daN	C	H	H1	J	K	bar	daN	
50/32	20	75	2xM12	100	120	42	8	42	12	42	17	68	35	355	-1/25	10	35	645	-1/25	26	35	425	95	285	535	-1/25	35	
80/50	20	75	4xM12	115	145	57	45	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	180	72	11	64	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	200	92	12	68	16	60	29	128	55	515	-1/16	40	55	790	-1/16	54	55	550	65	285	560	-1/16	63	



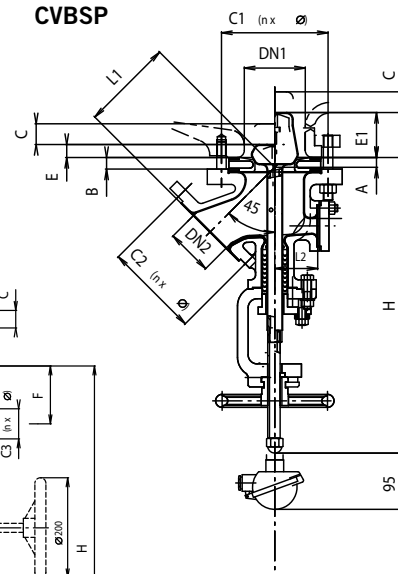
CVBPLSP



CVBPSP



CVBSP

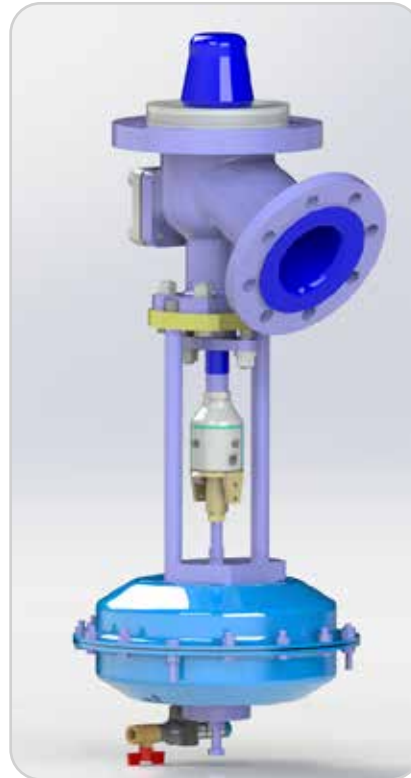
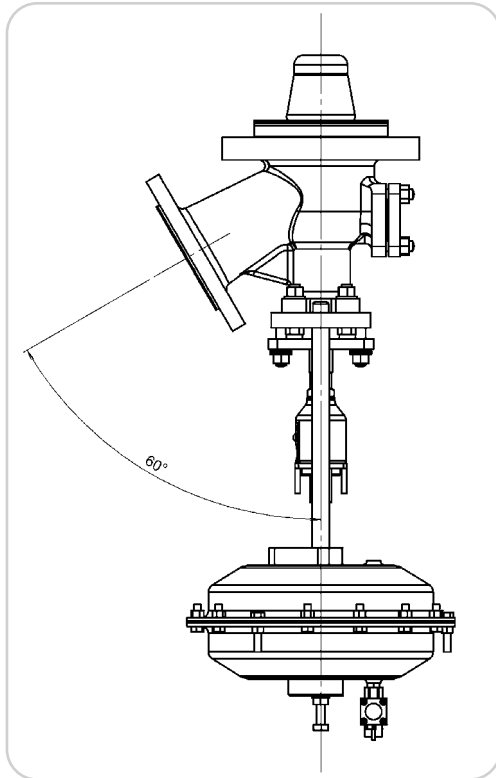


Flanges drilling tables
(PN 10/16 - JIS 10K - ANSI 150LBS)
remain the same as page 83

Size	Sizes common to all models												
DN1/ DN2	DN3			L1		L2	A		B	D	E	E1	F
	DN	C3	n x Ø	45°	60°		45°	60°					
50/32	20	75	2xM12	100	120	42	16	50	20	-	13	59	76
80/50	20	75	4xM12	115	145	57	55	55	23	-	19	65	122
100/80	25	85	4xM12	155	180	72	17	70	20	-	21	75	116
150/100	25	85	4xM12	175	200	92	19	75	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	645	-1/25	26	35	435	65	285	510	-1/25	35
80/50	35	430	-1/25	16	35	705	-1/25	32	35	500	65	285	510	-1/25	41
100/80	45	500	-1/16	29	35	720	-1/16	41	35	510	65	285	510	-1/16	50
150/100	55	530	-1/16	40	55	790	-1/16	54	55	540	70	285	560	-1/16	63

Cleanvalve available with 60° outlet nozzle according to DIN 28140-1

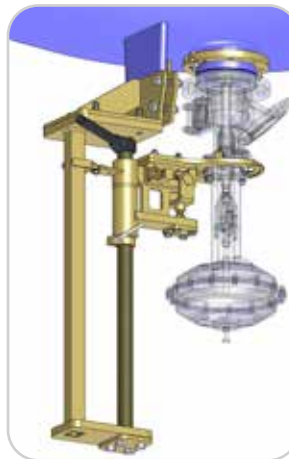


Dimensions as per table pages 83 & 84

ASSEMBLY AND DISMANTLING TOOL FOR VALVE



Dismantling kit for forklift



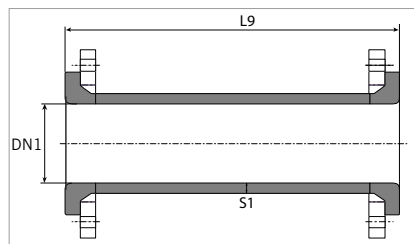
Alternative tool: fixed on the lifting lug



PIPES & FITTINGS

Pipes & Fittings _____ 88-91

STRAIGHT PIPES

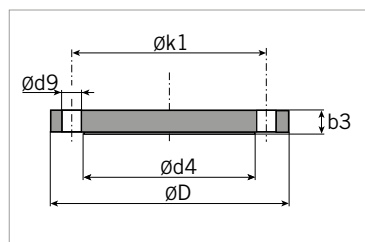


According to DIN2873 PN10

Weight without loose flanges (daN)

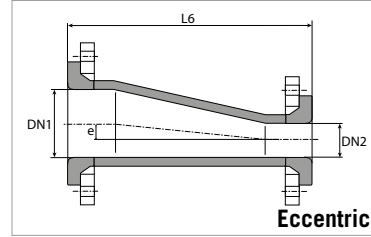
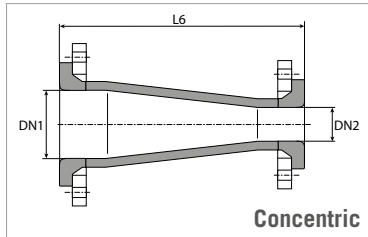
L9	DN1													
	25	32	40	50	65	80	100	125	150	200	250	300	350	400
S1	3.6	3.6	3.6	4	5.16	5.6	6.3	6.55	7.1	8	10	10	10	10
100	1.1	1.4	1.6	1.8	2.5	3.4	4	6.2	6.7	10.4	13.9	20.2	27.7	32.1
150	0.9	1.4	1.5	2	2.9	3.9	4.8	6.9	8.1	12.5	17.2	21.5	31.5	37.9
200	1.1	1.5	1.6	2.3	3.3	4.5	5.7	7.9	9.5	14.5	20.4	25.4	35.9	43
250	1.2	1.7	1.8	2.6	3.7	5.1	6.5	8.9	10.9	16.6	23.7	29.3	40.4	48.2
300	1.3	2.1	2.2	2.9	4.1	5.7	7.4	10	12.3	18.7	27	33.2	44.9	53.3
400	1.5	2.4	2.6	3.4	4.9	6.8	9.1	12.1	15.1	22.8	33.5	40.8	53.8	63.5
500	1.7	2.7	2.8	3.9	5.7	7.9	10.7	14.1	18	27	40	48.6	62.7	73.8
600	1.9	3.1	3.2	4.5	6.5	9.1	12.4	16.2	20.8	31.2	46.4	56.4	71.6	84
700	2.2	3.4	3.6	5.1	7.3	10.3	14.1	18.3	23.6	35.3	52.9	64.9	80.6	94.2
750	2.4	3.6	3.8	5.3	7.7	10.8	14.9	19.3	25	37.4	56.2	67.9	85	99.3
800	2.5	3.8	4	5.6	8.1	11.4	15.8	20.3	26.4	39.5	59.4	71.8	89.5	104.5
1000	3	4.4	4.8	6.7	9.6	13.7	19.1	24.5	32.1	47.8	72.4	87.3	107.3	124.9
1500	4.2	6.1	6.8	9.5	13.6	19.4	27.5	34.8	46.2	68.6	104.8	126.1	151.9	176.1
1800	4.9	7.2	7.9	11.2	16.1	22.9	32.5	41.1	54.6	81.1	124.3	149.2	178.7	206.8
2000	5.4	7.9	8.8	12.3	17.6	25.2	35.9	45.2	60.2	89.5	137.3	164.7	196.5	227.3
2500				15.1	21.6	31	44.3	55.5	74.4	110.2	169.7	203.4	241.2	278.5
3000				17.8	25.6	36.7	52.7	65.9	88.5	131.1	202.2	242.1	285.8	329.6

BLIND FLANGES



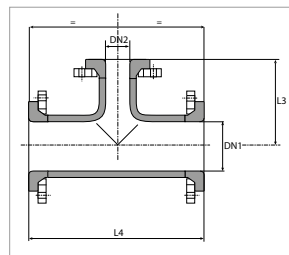
DN	25	32	40	50	65	80	100	125	150	200	250	300	350	400
b3	16	18	18	20	20	20	22	24	26	24	26	26	30	26
d4	68	78	88	102	122	138	158	188	212	268	320	370	430	482
D	115	140	150	165	185	200	220	250	285	340	395	445	505	565
d9	4xØ14	4xØ18	4xØ18	4xØ18	4xØ18	8xØ18	8xØ18	8xØ18	8xØ22	8xØ22	12xØ22	12xØ22	16xØ22	16xØ27
k1	85	100	110	125	145	160	180	210	240	295	350	400	460	515
daN	1.3	1.8	2.2	3	4	5	6	8.5	11	17	25	28.5	46.3	49.6

REDUCERS



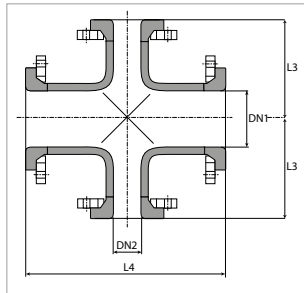
	DN2																																							
	25			32			40			50			65			80			100			125			150			200			250			300			350			
DN1	L6	e	daN	L6	e	daN	L6	e	daN	L6	e	daN	L6	e	daN	L6	e	daN	L6	e	daN	L6	e	daN	L6	e	daN	L6	e	daN	L6	e	daN	L6	e	daN				
32	140	4	1.2																																					
40	140	7	1.4	140	3	1.5																																		
50	140	13	2	140	9	2.1	140	6	2.2																															
65	150	21	2.2	150	17	2.3	150	14	2.4	150	8	2.5																												
80	160	26	2.8	160	23	2.9	160	20	3.4	160	14	3.5	160	6	3.6																									
100	175	38	4.1	175	33	4.2	175	33	4.3	175	27	5	175	19	5.1	175	13	5.4																						
125	200	52	5.6	200	47	5.9	200	45	6.4	200	40	6.8	200	32	6.9	200	25	7.4	200	13	8.8																			
150	225	66	6.8	225	62	7.1	225	59	7.4	225	53	8.4	225	46	8.7	225	40	8.5	225	27	10	225	14	10.5																
200							250	83	11.5	250	78	12.8	250	70	13.7	250	65	14.4	250	52	15.4	250	40	15.8	250	25	16.9													
250										300	100	19.6	300	94	20.8	300	88	22.2	300	79	22.5	300	67	22.8	300	52	23.6	300	27	25.9										
300										325	129	22.7	325	121	23.9	325	115	25.1	325	103	28.3	325	90	28.7	325	76	29.6	325	51	32	325	28	35.6							
350																								420	96	37	420	72	41.2	420	48	47.2	420	21	51					
400																											440	91	48	440	65	54	440	38	58.5	440	17	64.3		

EQUAL TEES / REDUCING TEES



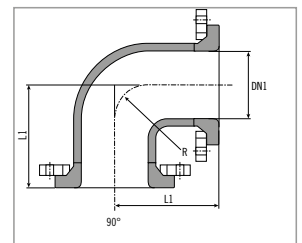
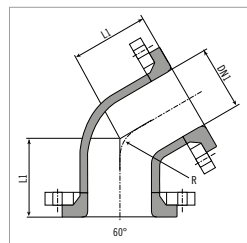
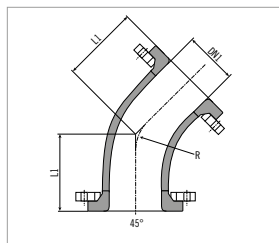
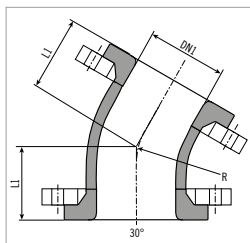
	DN2																																											
	25			32			40			50			65			80			100			125			150			200			250			300			350			400				
DN1	L4	L3	daN	L4	L3	daN	L4	L3	daN	L4	L3	daN	L4	L3	daN	L4	L3	daN	L4	L3	daN	L4	L3	daN	L4	L3	daN	L4	L3	daN	L4	L3	daN	L4	L3	daN	L4	L3	daN					
25	180	90	1.7																																									
32	200	95	1.8	200	100	1.9																																						
40	210	95	2.3	210	100	2.4	210	105	2.8																																			
50	230	100	3.2	230	105	3.7	230	110	3.5	230	115	3.9																																
65	240	105	4.2	240	110	4.3	240	115	5.1	240	120	5.5	240	120	5.9																													
80	270	115	6.1	270	120	6.7	270	125	6.8	270	130	7.2	270	135	7.5	270	135	7.7																										
100	310	125	8.4	310	130	8.8	310	135	9.3	310	140	9.4	310	145	10	310	150	10.4	310	155	10.8																							
125	350	140	12	350	145	12.6	350	150	13.1	350	155	13.5	350	160	14.5	350	165	14.9	350	170	15.6	350	175	17.5																				
150	390	155	15.9	390	160	16	390	165	16.6	390	170	17.1	390	175	18.1	390	180	20	390	185	21	390	190	22.9	390	195	23																	
200	520	185	26	520	190	27.5	520	195	29.7	520	200	30.1	520	205	31.4	520	210	32.8	520	215	33.3	520	220	35.2	520	225	37.5	520	260	38														
250	630	230	45	630	235	46	630	240	48.4	630	245	50.8	630	250	51.5	630	255	52.2	630	260	54	630	265	56.4	630	270	58.2	630	275	63.9	630	315	64.2											
300	700	290	67	700	295	68	700	300	68	700	305	69	700	310	69	700	315	70	700	320	71	700	325	72	700	330	73	700	335	75	700	340	78	700	350	82								
350																								800	355	91	800	360	96	800	365	100	800	370	110	800	400	117						
400																								900	365	116	900	375	121	900	380	138	900	385	145	900	390	160	900	450	182			

EQUAL / REDUCING CROSSES



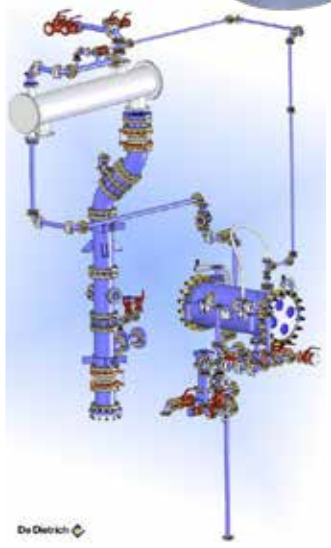
	DN2																																			
	25			32			40			50			65			80			100			125			150			200			250			300		
DN1	L4	L3	daN	L4	L3	daN	L4	L3	daN	L4	L3	daN	L4	L3	daN	L4	L3	daN	L4	L3	daN	L4	L3	daN	L4	L3	daN	L4	L3	daN	L4	L3	daN			
25	180	90	2.2																																	
32	200	95	1.8	200	100	2.4																														
40	210	95	2.3	210	100	2.4	210	105	3.6																											
50	230	100	3.2	230	105	3.7	230	110	3.5	230	115	5																								
65	240	105	4.2	240	110	4.3	240	115	5.1	240	120	5.5	240	120	7.4																					
80	270	115	6.1	270	120	6.7	270	125	6.8	270	130	7.2	270	135	7.5	270	135	9.9																		
100	310	125	8.4	310	130	8.8	310	135	9.3	310	140	9.4	310	145	10	310	150	10.4	310	155	13.3															
125	350	140	12	350	145	12.6	350	150	13.1	350	155	13.5	350	160	14.5	350	165	14.9	350	170	15.6	350	175	20												
150	390	155	15.9	390	160	16	390	165	16.6	390	170	17.1	390	175	18.1	390	180	20	390	185	21	390	190	22.9	390	195	26									
200	520	185	26	520	190	27.5	520	195	29.7	520	200	30.1	520	205	31.4	520	210	32.8	520	215	33.3	520	220	35.2	520	225	37.5	520	260	38						
250	630	230	45	630	235	46	630	240	48.4	630	245	50.8	630	250	51.5	630	255	52.2	630	260	54	630	265	56.4	630	270	58.2	630	275	63.9	630	315	64.2			
300	700	290	59.3	700	295	60.3	700	300	62.9	700	305	65.3	700	310	67.5	700	315	69.6	700	320	71.4	700	325	73.5	700	330	75	700	335	83.4	700	340	87	700	350	88

ELBOWS



α		DN1													
		25	32	40	50	65	80	100	125	150	200	250	300	350	400
30°	L1	50	60	65	70	70	80	85	90	100	120	140	160		
	R	38	47.6	57.2	76.2	95.2	76.2	101.6	127	152.4	203.2	254	304.8		
	daN	0.95	1.2	1.6	2.2	3.1	4.5	5.7	7.2	9	19	25.5	37		
45°	L1	60	65	70	80	85	95	105	125	150	180	220	260	270	300
	R	38	47.6	57.2	76.2	95.2	114.3	114.3	190.5	228.6	304.8	381	457.2	533.4	757
	daN	1	1.3	1.6	2.3	3.45	5	6.3	8.5	13	22	36	50	65	75
60°	L1	70	75	80	100	100	110	120	130	150	180	220	280		
	R	38	47.6	57.2	76.2	95.2	76.2	101.6	127	152.4	203.2	254	304.8		
	daN	1.4	1.6	2	2.5	4.3	5.2	6.7	10.3	13.5	21.6	35.9	59		
90°	L1	90	100	105	115	120	135	155	175	195	260	315	350	400	450
	R	38	47.6	57.2	76.2	95.2	76.2	101.6	127	152.4	203.2	254	304.8	355.6	406.4
	daN	1.1	1.8	1.6	3.5	3.7	5.5	7.4	12.5	14	26	43	65	75	95

Thanks to our experience, we have the capacity to manage complete project (drawing, stress calculations and analyses, isometric, supervision, installation, commissioning, maintenance).



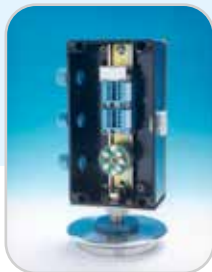
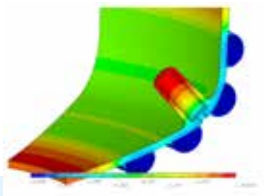
De Dietrich 



More than 12000 pieces on stock

For more information concerning our range of Pipes & Fittings, please consult our complete Piping Brochure or download it on our Website: www.dedietrich.com

For tailor made items and jacketed pipes, please take contact directly with your local De Dietrich Process Systems Salesman.



INTRUMENTATION

Sampling System

Multiprobe® _____ 94

Multiprobe® pH _____ 95

TSU _____ 96

Temperature probe

Electrode Holder Probe (GPE) _____ 97

Baffle _____ 98

Dip Pipe _____ 99

Temperature Probe _____ 100-101

Enamel Monitoring

GlasWatch _____ 102

Portable Glastest _____ 103

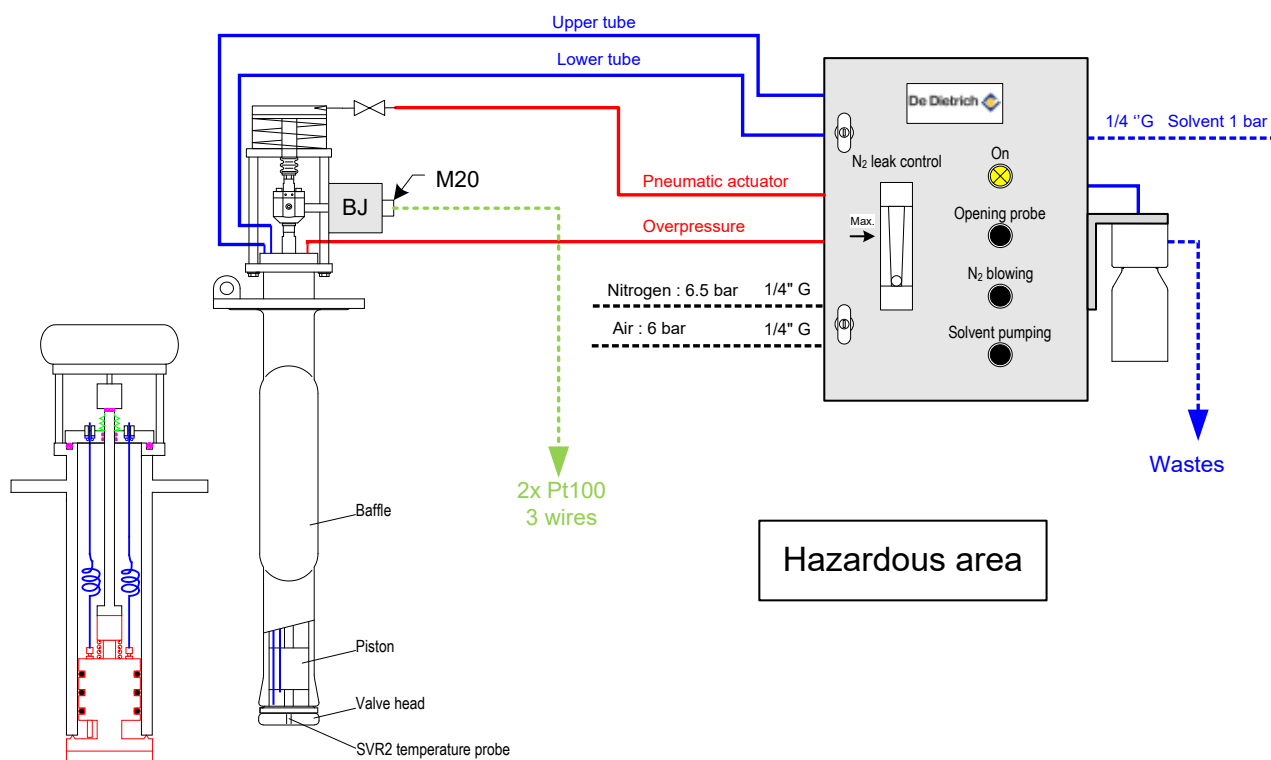
**THE ONLY SYSTEM FOR SAMPLING
EVEN UNDER FULL VACUUM & TOTALLY CIP**

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 2014/34/EU (ATEX)
classified in: CE  II 2 G
- Conformity with Directive 2014/68/EU (PED)



Assembling diagram

MULTIPROBE® pH

4 functions in a single probe:

→ Baffle effect does not need any other nozzle

→ Sampling

- Sample is blown out by N₂ 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 sampling 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:

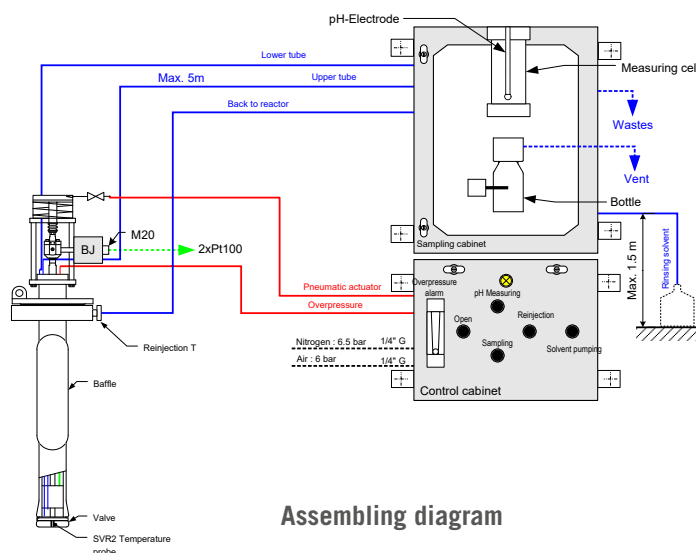
- Maximum temperature: 150° C
- Pressure range: -1 / +6 bar
- Maximum viscosity of product: 2,000 cp. for more viscous products (up to 10,000 cp.) ask for a test

SAFETIES:

- Overpressurization of the baffle compared to the process pressure
- Leak detection by monitoring this internal N₂- 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
Temperature: °C	-20 / +150	-25 / +150	-25 / +200	-5 / +130
Pressure: bar	-1 / 6			
Max. particles size: µm	200			
Viscosity: cP	500		1000	
T° measurement: Pt100 3 wires	1		2	
Max. electrode: Nbr				4



Assembling diagram

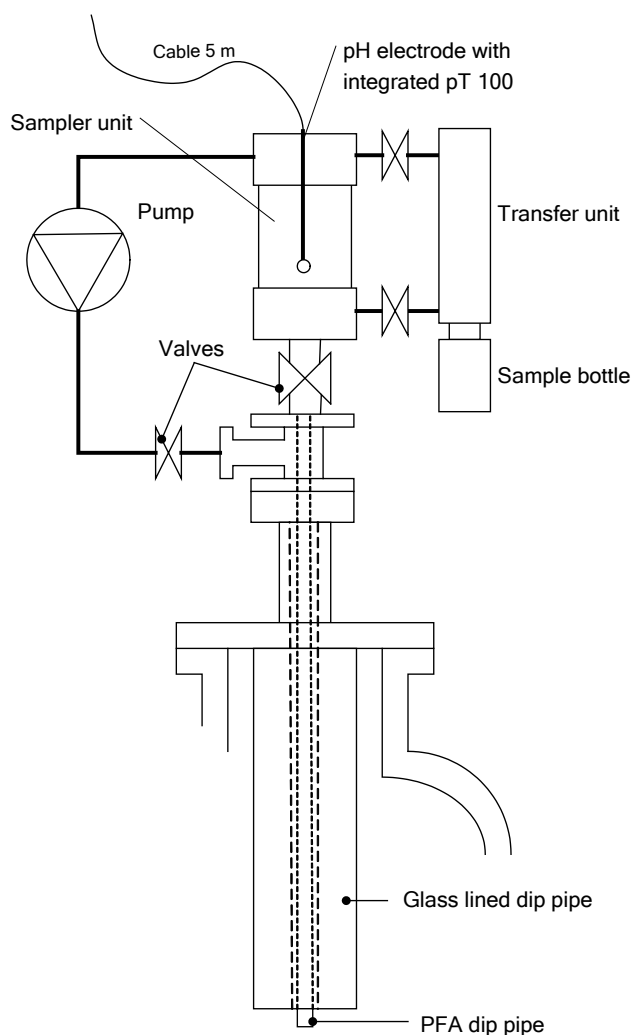
A COMPLETE VACUUM SAMPLING DEVICE

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)



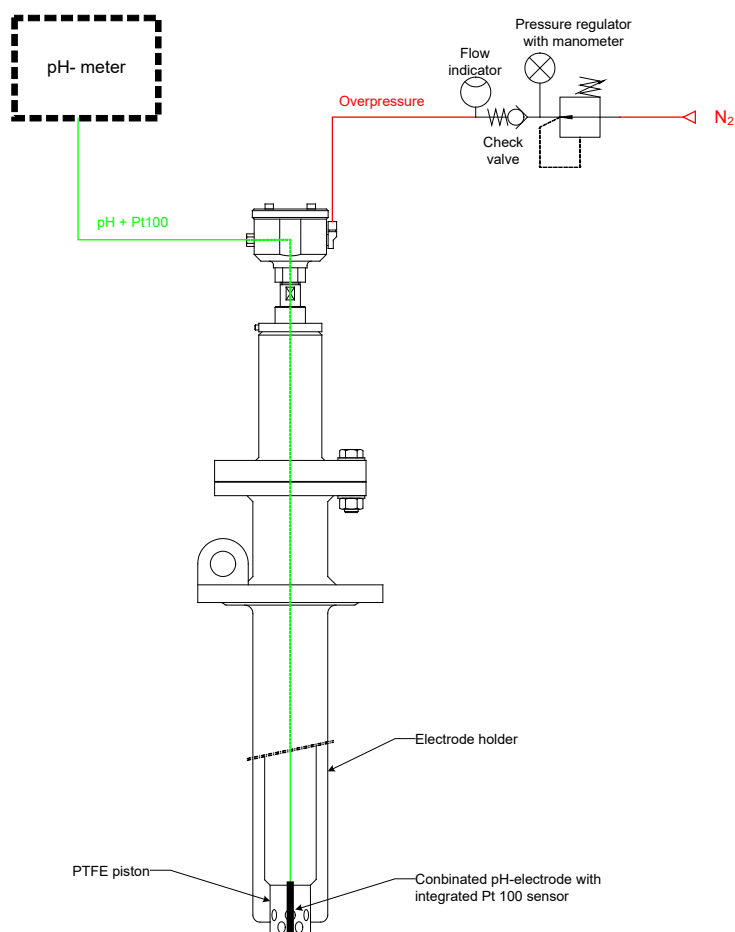
ELECTRODE HOLDER PROBE TYPE GPE

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

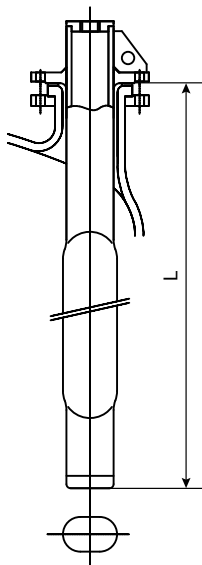
WORKING CONDITIONS:

- Pressure: -1 / +6 bar
- Temperature: -5 / +130° C
- Nozzle size: DN50 for alloy - DN80 mini for glass-lined
- In conformity with Directive 2014/34/EU (ATEX) classified in: CE  II 2 G
- In conformity with Directive 2014/68/EU (PED)

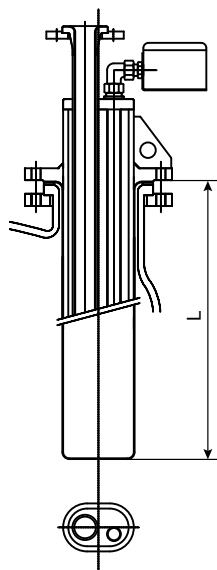
	GPE 50	GPE 80	GPE 100
Min. nozzle size: DN	50	80	100
Material	Alloy	Glass-lined / Alloy	
Temperature: °C	-5 / +130		
Pressure: bar	-1 / 6		
Max. electrode: Nbr	1	1	3



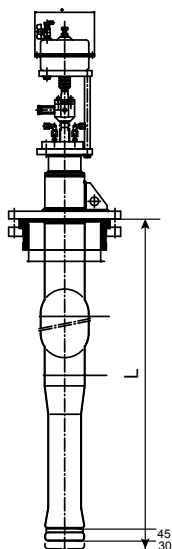
BEAVERTAIL BAFFLE



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	1653 / 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 / 640	1879 / 223
BE 4000	250	2030 / 883	2283 / 276
BE 6300	250	2530 / 1196	2814 / 357
BE 8000	300	2505 / 1100	2678 / 515
BE 10000	250	2500 / 1911	2766 / 684
BE 12500	250	3100 / 1911	3376 / 757
BE 16000	250	3400 / 2110	3665 / 848
BE 20000	300	3700 / 2483	3927 / 1209
BE 25000	300	4000 / 2996	4206 / 1655

CE 630	100	1040 / 178	1182 / 72
CE 1600	200	1200 / 524	1449 / 160
CE 2500	200	1420 / 715	1644 / 248
CE 4000	250	1800 / 949	*Imp.: 1939 / 611 Other: 2079 / 279***
CE 6300	250	2320 / 1196	2607 / 349
CE 8000	300	2505 / 1081	2678 / 563
CE 10000	250	2500 / 1911	2796 / 684
CE 12500	250	3100 / 1919	3376 / 761
CE 16000	250	3400 / 2119	3664 / 848

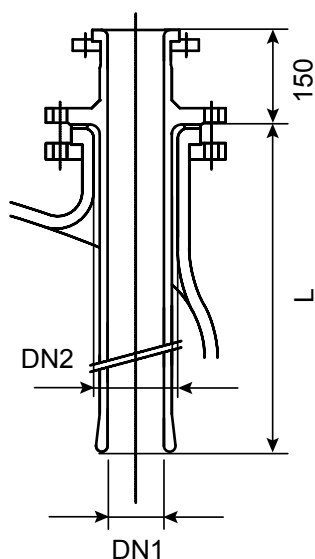
Remarks:

- 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



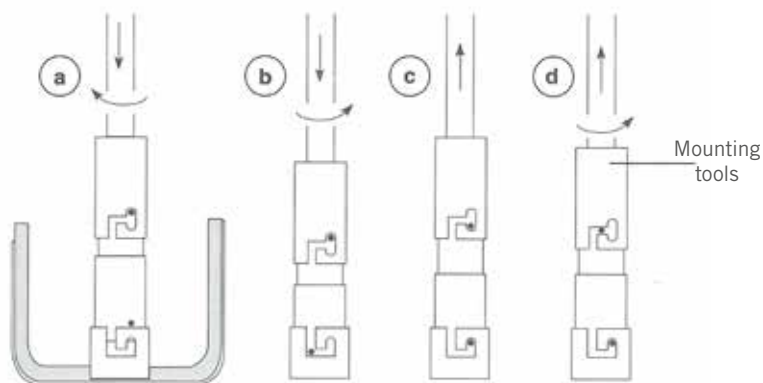
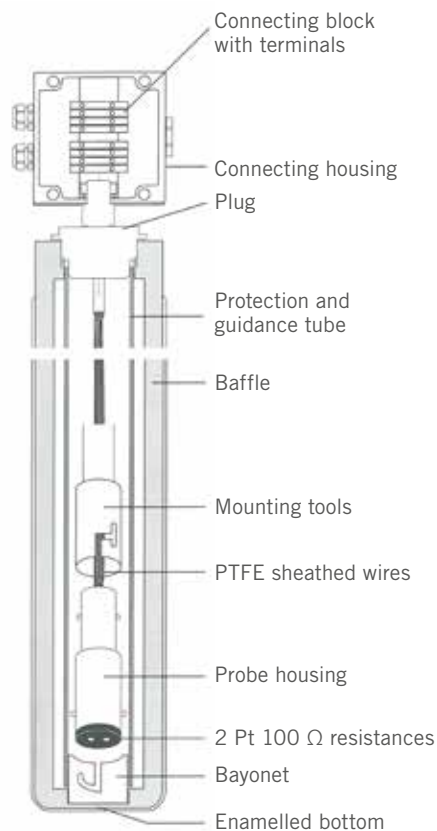
	Nozzle		Dip-pipe		Dipping length L / volume V (mm / litres)	
	DN1	DN2	Standard	Maxi		
AE 63	-	-	-	-		
AE 100	-	-	-	-		
AE 160	80	40	825 / 25	838 / 22		
AE 250	80	40	925 / 40	952 / 30		
AE 400	80	40	1150 / 51	1181 / 36		
AE 630	100	50	1175 / 87	1213 / 59		
AE 1000	100	50	1300 / 223	1390 / 126		
AE 1600	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



Assembly of a DR probe in a baffle

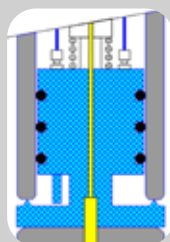


Easy assembly & disassembly

CLASSICAL APPLICATIONS



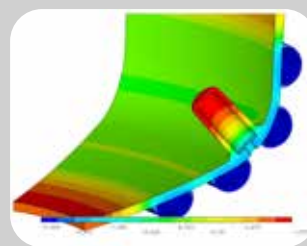
Combo dip pipe



Multiprobe®



Valve



Pad type



Baffle

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 platinum 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 100 Ω resistances with 3 wires.

This standard gives a accuracy of $\pm 1,5^{\circ}\text{C}$ in the range from -25°C up to $+200^{\circ}\text{C}$.

We deliver on request:

- A calibration certificate for three points: $+25^{\circ}\text{C}$, $+100^{\circ}\text{C}$ and $+150^{\circ}\text{C}$
- A high accuracy probe class A with calibration certificate according to DIN EN 60751.

Maintenance

Easy to replace externally, 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

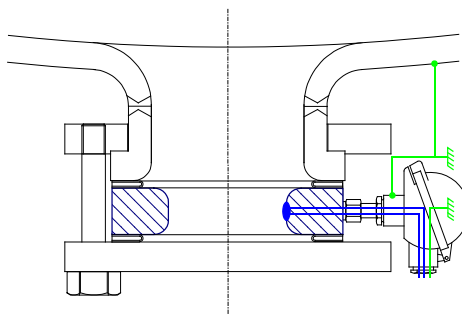
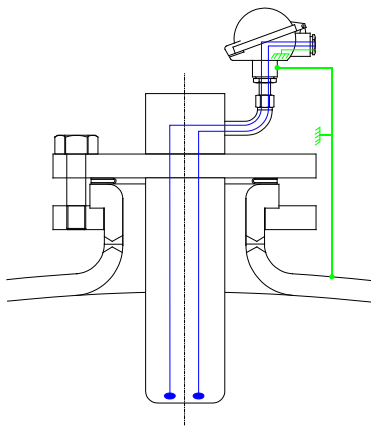
STANDARD

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



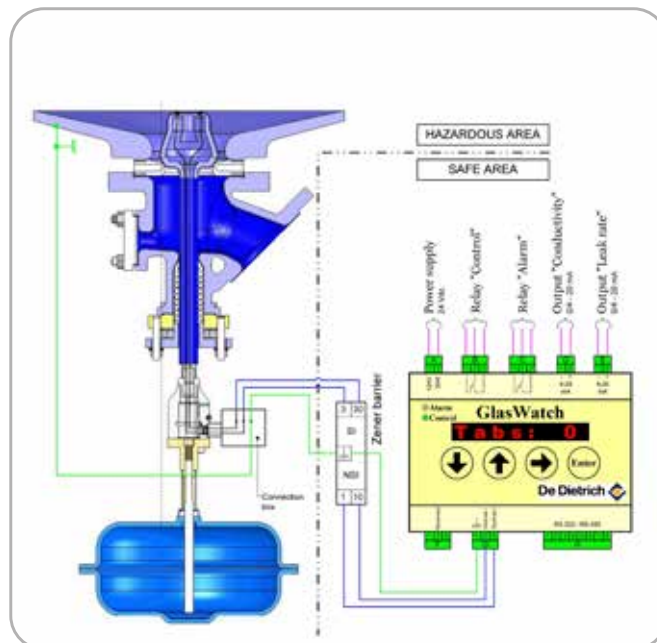
CONTINUOUS AND AUTOMATIC MONITORING OF THE LINING INTEGRITY

- Supervision through the input of the installed De Dietrich® probes
- Visual alarm and system control
- Alarm and control output relays
- 4-20 mA output signal for the conductivity and the leak defect



Description: Device for leak measurement on an enamelled vessel from a conductivity of **0.1 mS/cm**.

The device is also suitable for measuring the conductivity of solutions.

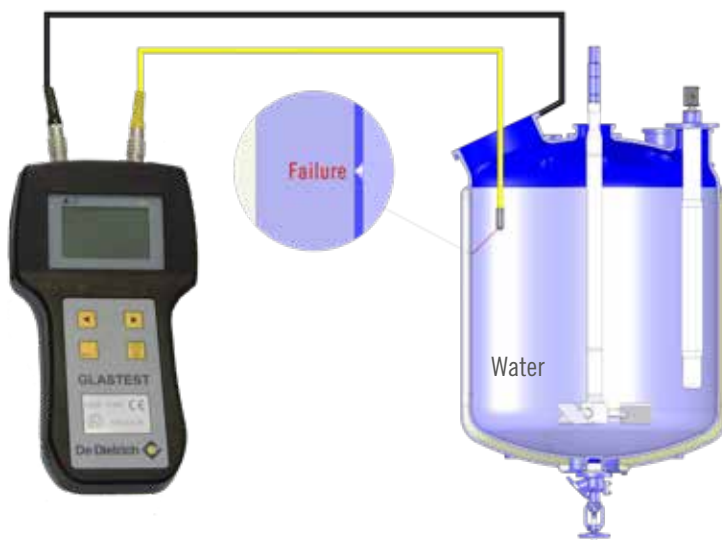


SELECTIVE AND PERIODICAL INSPECTIONS OF THE LINING INTEGRITY

- Punctual control
- Device easy to use
- For all capacities
- ATEX zone 3G IIB T5
- Additional 5 m extension cable
- Fixable by magnet on the equipment
- Delivered in a suitcase

Description:

Calculation and location of enamel failure
Conductivity of the water more than **2 mS/cm**.





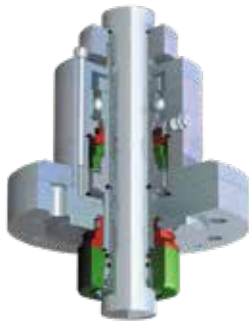
CLEANABILITY

Cleanability_____ 106-107

INTERNAL TECHNICAL SOLUTIONS

Inverted gas lubricated 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



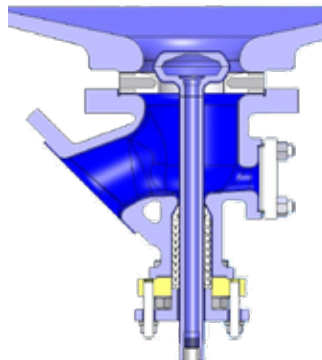
EXTERNAL TECHNICAL SOLUTIONS

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
- Up from DN50 to DN200
- -1 / +10 bar



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

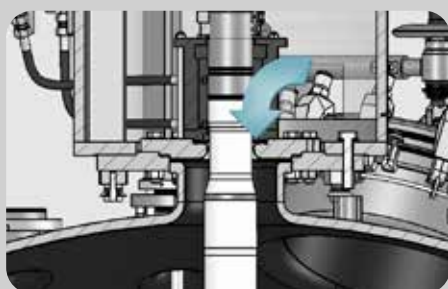
- The user-oriented report highlights the potential areas non-accessible to the cleaning system, in order to optimize the reactor design and guide the choice towards the different solutions.

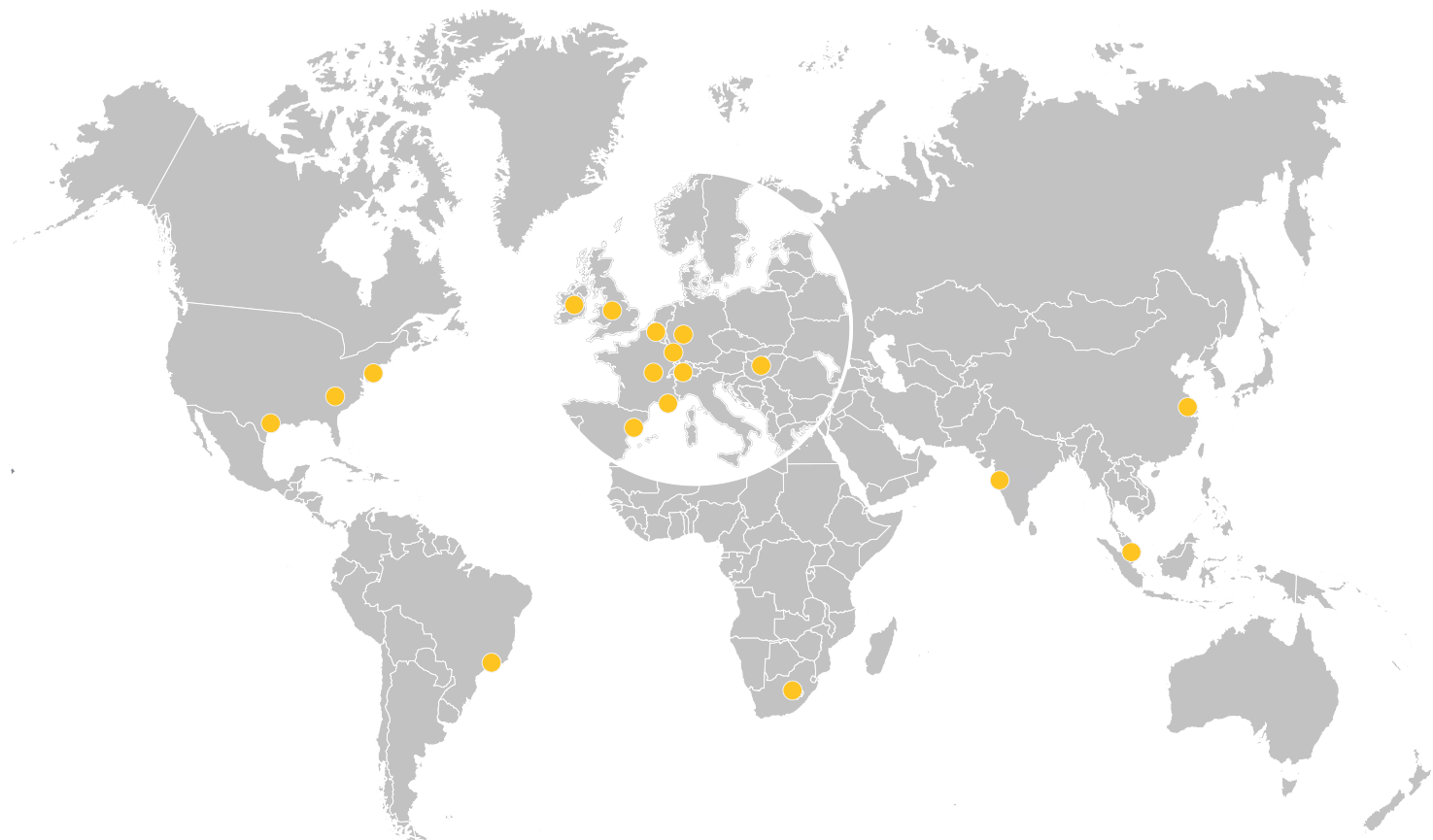
In red, areas non-accessible for the spray ball



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

Mechanical seal with spraying system





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