E.D.A
PHARMACEUTICAL & MEDICAL

GLASS LINED REACTORS

CAE Series

CBE Series

CCE Series

KGR Series

FGR Series

General Technical Data

Vessel Standard
Design basis for flanged reactor structure is DIN28136. The equipment will be fabricated, inspected and accepted in compliance with GB25025 also due to national mandated regulations

Design Pressure
FV/6 bar in the vessel, FV/6 bar in the jacket.

Design Temperature
-19/200 ºC in the vessel, -19/200 ºC in the jacket.

Flange Standard
Loose split flange for glass-lined nozzles. Jacket flange made acc. to HG20592 PN10 MPa (same as DIN std for 10bar). Other standards optional if required by customer.

Material
Carbon steel type Q245R lined with glass S605 according DIN 15159.

Manhole unit
Manhole cover according DIN 28153, with manhole protect ring and spring assisted opening device, and with quick open sight glass design is optional.

Gasket
GF 3000 PTFE enveloped gasket with stainless steel corrugated ring and special gasket insert made of NBR, graphite and aramid fiber. High compressibility, excellent to cover the unevenness of nozzles.

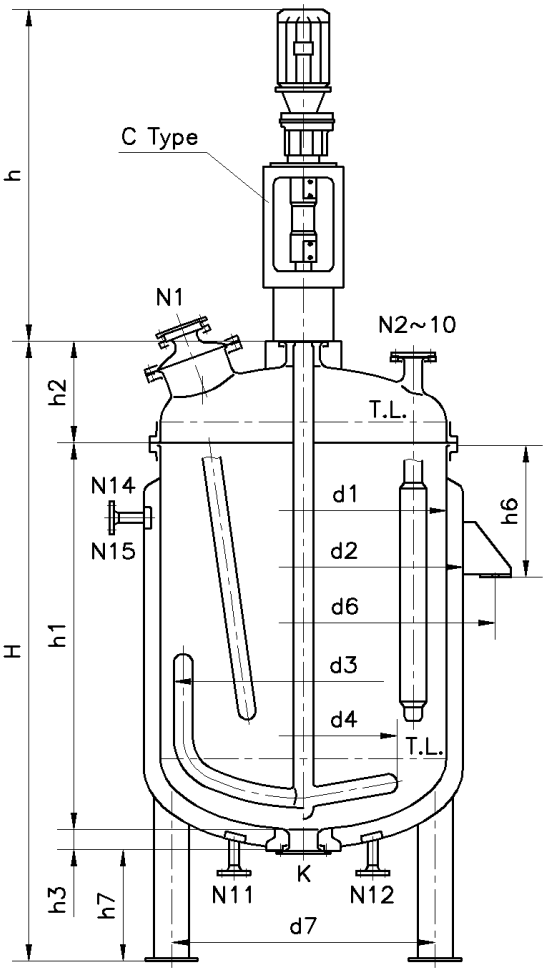
Clamp
35 CrMo , galvanized.

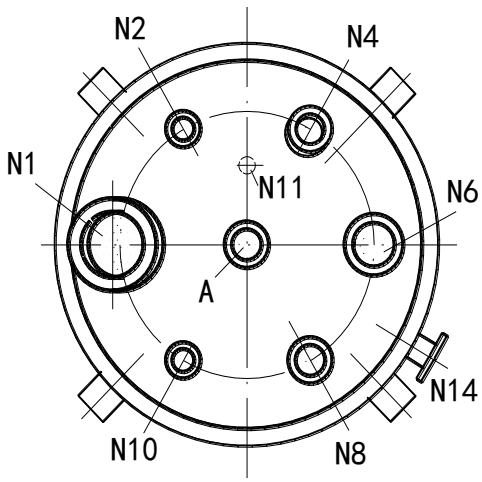
Vessel support
Legs, brackets and support ring are optional.

Jacket nozzles
With integrated agitating nozzle.

Painting
2 ground paint and 1 cover paint after sand blasting.

Flanged reactors CAE 63~6300 Liters





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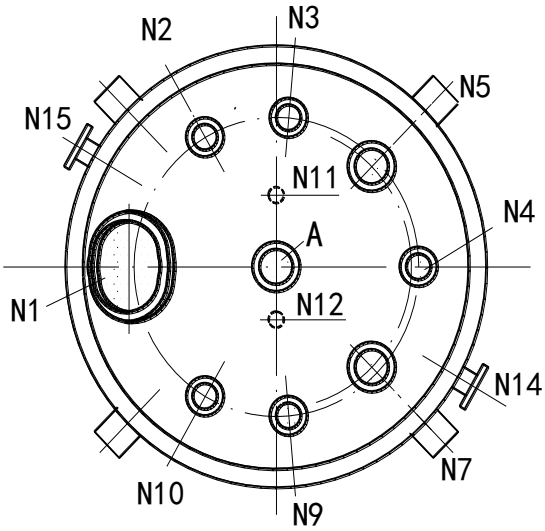

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Flanged reactors CAE 63~6300 Liters

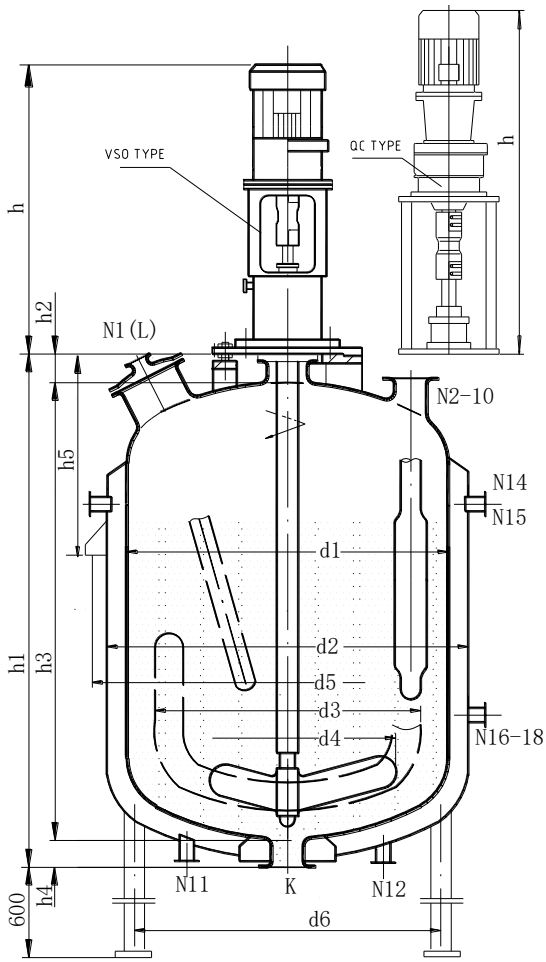
Nominal Cap.	Full Cap.	Jacket Cap.	Heat Tr. Area	Main Dimensions (mm)								Nom. dia of shaft	Drive		Total Weight
													Motor	Supp. No.	
Ltrs	Ltrs	Ltrs	m2	d1	d2	d3	d4	h1	h2	h3	~H	d	Kw	h	Kg
CAE 63	95	35	0.60	500	600	420	300	390	250	80	730	40	0.75	C40	430
CAE 100	135	55	0.80	500	600	420	300	590	250	80	930		1.1		500
CAE 160	220	80	1.30	600	700	520	360	690	270	80	1050		1.1		580
CAE 250	340	115	1.70	700	800	620	420	790	310	80	1190	50	1.5	C50	790
CAE 400	550	140	2.50	800	900	720	480	990	330	90	1420		2.2		960
CAE 630	880	170	3.20	1000	1100	880	600	990	390	90	1480	60	3	C60	1400
CAE 1000	1550	230	4.50	1200	1300	1080	720	1190	440	90	1730		4		2040
CAE 1600	2350	300	6.20	1400	1500	1180	840	1385	500	90	1985	80	5.5	C80	2900
CAE 2500	3550	350	8.40	1600	1700	1420	960	1600	545	90	2245		7.5		3650
CAE 4000	5400	700	11.40	1750	1900	1580	1100	2000	610	90	2710	100	11	K100A	5180
CAE 6300	8450	950	16.70	2000	2150	1800	1100	2500	660	110	3280		15	K100B	8400

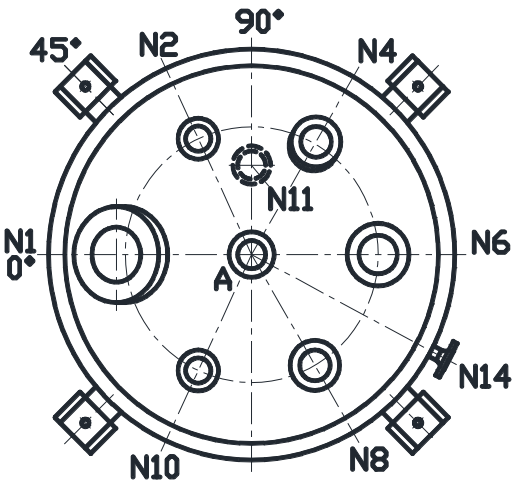
1.Detailed information according to reducer catalog;

2.Weight without drive.

Head Layout	Nom.cap.	Nozzles DN									Support			
		On Jacket		On Vessel							Lugs		Legs	
	Ltrs	N11 N14	N12 N15	K	N1	N2 N3 N9 N10	N4	N6	N5 N7	N8	~d6	~h6	~h7	~d7
1	CAE 63	40	-	80	100	40	80	80	-	50	728	300	600	480
	CAE 100	40	-	80	100	40	80	80	-	50	728	350	600	480
	CAE 160	40	-	80	100	50	80	80	-	80	830	350	600	560
	CAE 250	40	-	80	150	50	80	80	-	80	948	380	600	640
	CAE 400	40	-	100	200	80	80	100	-	80	1048	380	600	720
	CAE 630	50	-	100	200	100	100	150	-	100	1270	450	600	920
2	CAE 1000	50	-	100	350 × 450	100	-	100	200	-	1504	520	600	1080
	CAE 1600	50	50	100		100	-	100	200	-	1750	600	600	1250
	CAE 2500	50	50	100		100	-	100	200	-	1950	700	600	1400
	CAE 4000	50	50	100		150	-	150	250	-	2196	700	600	1600
	CAE 6300	80	80	150	500	150	-	150	250	-	2406	750	600	1800

Fully closed reactors CBE 630~20000 Liters





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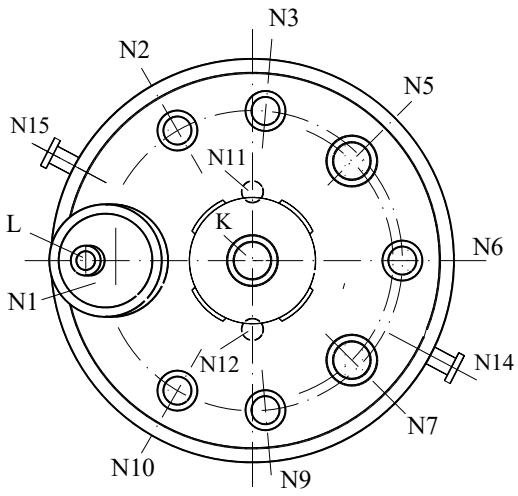

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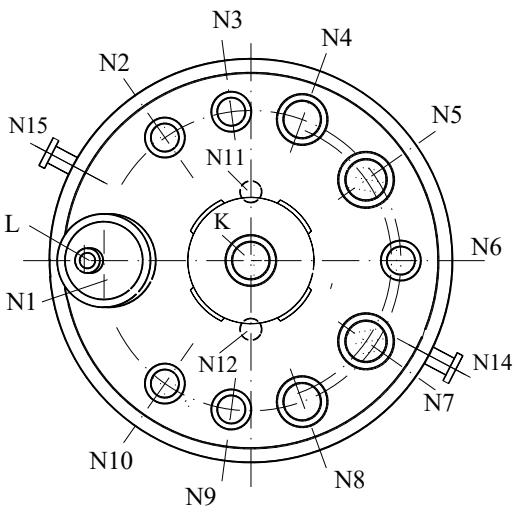

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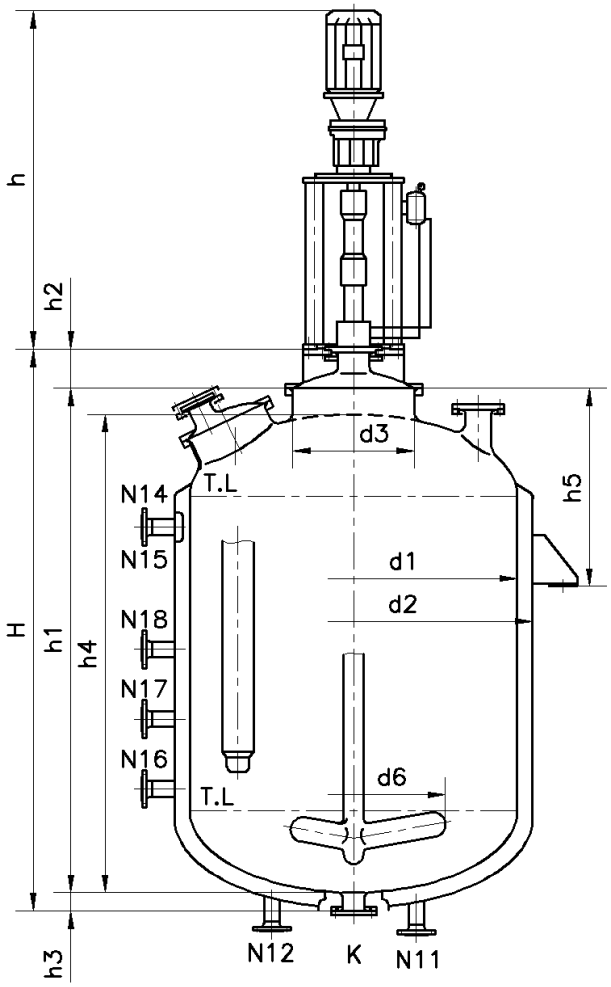
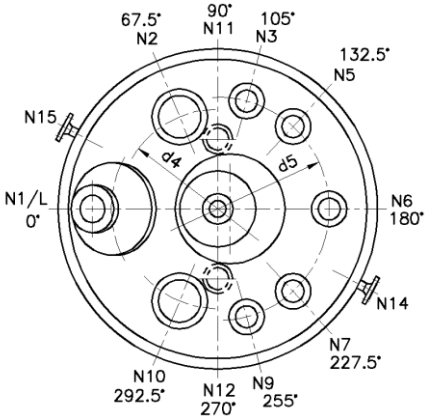
Fully closed reactors CBE 630~20000 Liters

Nominal Cap.	Full Cap.	Jacket Cap.	Heat Tr. Area	Main Dimensions (mm)								Nom. Dia. Shaft	Allowed Speed	Drive		Total Weight
														Motor Pow.	Supp. No.	
Ltrs	Ltrs	Ltrs	m2	d1	d2	d3	d4	h1	h2	h3	h4	d	rpm	Kw	h	Kg
CBE 630	880	240	3.9	1000	1100	880	600	1490	115	1280	90	60	125	3	E250	1700
CBE 1000	1520	290	5.6	1200	1300	1000	720	1740	115	1530	90		125	4		2000
CBE 1500	2080	435	6.9	1300	1450	-	720	1990	130	1770	90	80	125	4	E300	2700
CBE 2000	2390	310	7.5	1400	1500	1250	840	1990	130	1770	90		125	5.5		3000
CBE 3000	3580	370	9.8	1600	1700	1440	960	2245	130	2025	90		125	7.5		3870
CBE 5000	5560	500	13.4	1800	1900	1620	1100	2700	150	2460	90	100	125	11	E400	5900
CBE 6300	8350	1100	18.2	2000	2150	1800	1100	3270	150	3010	105		125	15	E500	7900
CBE 8000	9850	940	18.6	2200	2350	-	1100	3220	150	2960	105		125	15		8650
CBE 10000	11850	1200	20.9	2350	2500	-	1300	3400	160	3130	110	125	125	30	E600/E700	11700
CBE 12500	14450	1420	25.5	2350	2500	-	1300	4000	160	3730	110		125	30		12600
CBE 16000	18350	1600	29.7	2550	2700	-	1350	4300	160	4030	110		90	30		15200
CBE 16000	18850	1600	28.5	2750	2900	-	1500	3925	160	3655	110		90	37		16900
CBE 20000	22900	1900	34.4	2750	2900	-	1500	4605	160	4335	110	140	90	45	E700	19200

Head Layout	Nom.cap.	Nozzles DN										Support		
		On Jacket			On Vessel							Lugs		Legs
	Ltrs	N11 N12 N14 N15	N16 N17 N18	N19	K	N1	N2 N3 N6 N10	N4	N5 N7	N8	N9	~h5	~d5	~d6
1	CBE 630	50	-	-	100	400×300	100	100	-	100	-	680	1270	920
2	CBE 1000	50	-	-	100		100	-	200	-	100	720	1504	1080
	CBE 1500	50	-	-	100	400	100	-	200	-	100	-	-	1150
	CBE 2000	50	50	-	100	400	100	-	200	-	100	850	1750	1250
	CBE 3000	50	50	-	100	450	100	-	200	-	100	900	1950	1400
	CBE 5000	50	50	-	100	500	150	-	250	-	150	1060	2196	1600
	CBE 6300	80	50	-	150	500	150	-	250	-	150	1220	2406	-
3	CBE 8000	80	50	-	150	600	150	150	300	150	150	1300	2608	-
	CBE 10000	80	50	-	150	600	200	300	300	200	300	1450	2880	-
	CBE 12500	80	50	-	150	600	200	300	300	200	300	1450	2880	-
	CBE 16000	80	50	50	150	600	200	300	300	200	300	1550	3082	-
	CBE 16000	80	50	50	150	600	200	300	300	200	300	1700	3405	-
	CBE 20000	80	50	50	150	600	200	300	300	200	300	1700	3405	-

1 piece reactors CCE 2500~25000 Liters





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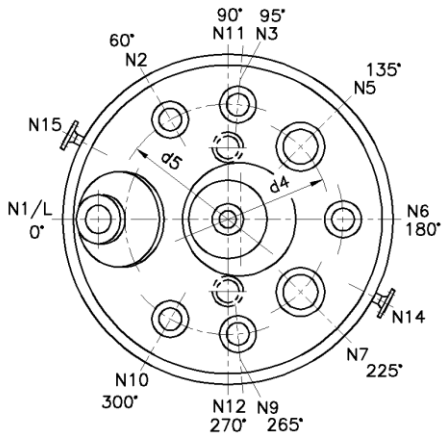

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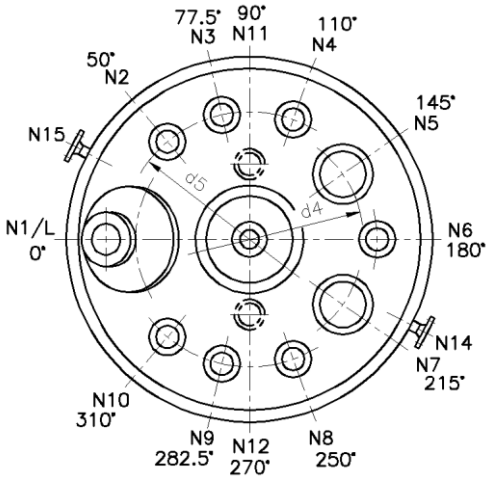

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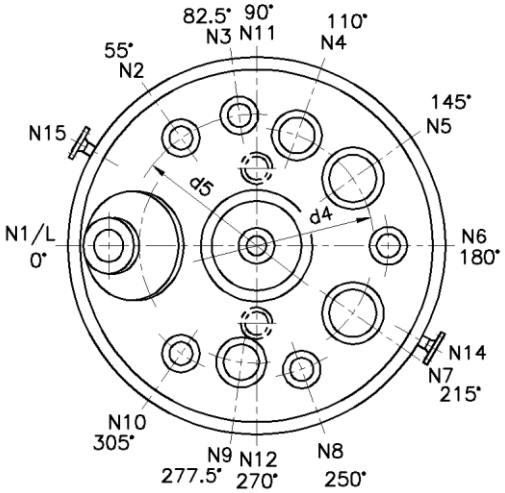

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1 piece reactors CCE 2500~25000 Liters

Nominal Cap.	Full Cap.	Jacket Cap.	Heat Tr. Area	Main Dimensions (mm)												Total Weight
Ltrs	Ltrs	Ltrs	m2	d1	d2	d3	~d4	~d5	d6	h1	h2	h3	~h4	~h5	~H	Kg
CCE 2500	3160	400	8.4	1600	1700	700	1250	1350	960	1950	240	90	1845	900	2290	3500
CCE 4000	4770	770	11.4	1750	1900	750	1350	1450	1100	2380	240	90	2275	1020	2720	5400
CCE 6300	7400	1000	16.1	1950	2100	750	1460	1560	1100	2920	240	110	2805	1080	3280	7500
CCE 8000	9440	1080	18.2	2150	2300	750	1600	1650	1100	3080	240	110	2960	1150	3440	8300
CCE 10000	11890	1200	21.1	2350	2500	950	1800	1850	1300	3250	280	110	3135	1300	3650	11000
CCE 12500	14490	1550	25.6	2350	2500	950	1800	1850	1300	3850	280	110	3735	1300	4250	12300
CCE 16000	18290	1800	26.2	2550	2700	950	1900	2050	1350	4140	280	110	4020	1350	4540	15000
CCE 20000	22980	2100	34.5	2750	2900	1150	2000	2200	1500	4435	300	110	4330	1450	4860	19000
CR 25000	27760	2350	39.5	2900	3050	1150	2100	2200	1550	4800	300	110	4690	1500	5220	21000

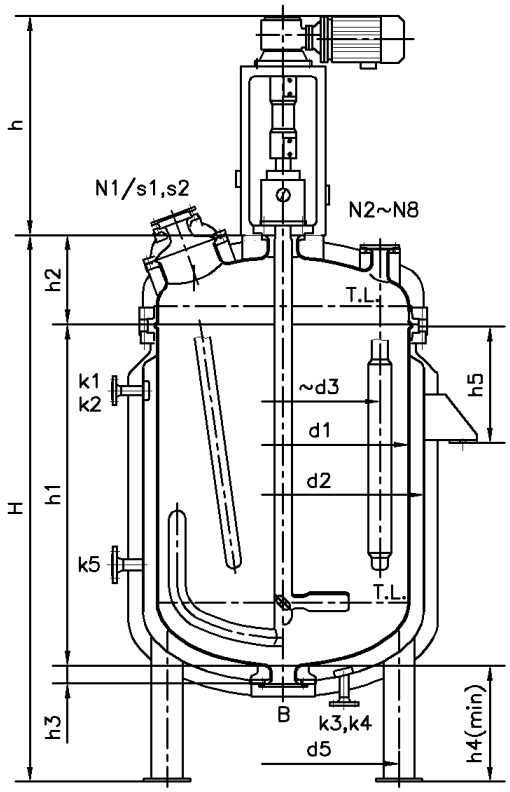
1. Total weight without drive.

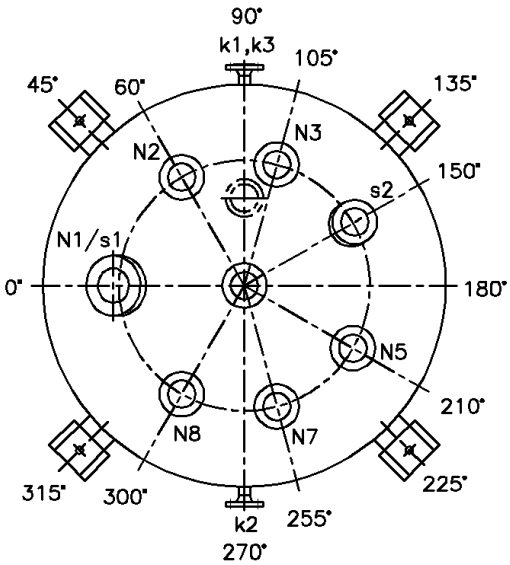
Head Layout	Nom. Cap.	Nozzles DN												Drive	
		On Jacket					On Vessel							Motor P.	Type
	Ltrs	N11 N12 N14 N15	N16	N17	N18	N19	N1	N2	N3	N6 N8 N10	N4 N9	N5 N7	K	Kw	No.
1	CCE 2500	50	50	-	-	-	350×450	200	100	100	100	100	100	7.5	K80
	CCE 4000	50	50	50	-	-		200	150	100	150	100	100	11	
2	CCE 6300	80	50	50	50	-	500	150	150	150	150	250	150	11	K100
3	CCE 8000	80	50	50	50	-	500	150	150	150	150	250	150	15	
4	CCE 10000	80	50	50	50	-	500	200	200	200	250	250	150	22	
	CCE 12500	80	50	50	50	-	500	200	200	200	250	250	150	22	K125
	CCE 16000	80	50	50	50	50	500	200	200	200	250	250	150	22	
	CCE 20000	80	50	50	50	50	500	200	200	200	300	300	150	30	140
	CR 25000	80	50	50	50	50	500	200	200	200	300	300	150	37	

1. N4, N9 for baffle;

2. L for sight glass.

GMP design reactors KGR160~2000 Liters





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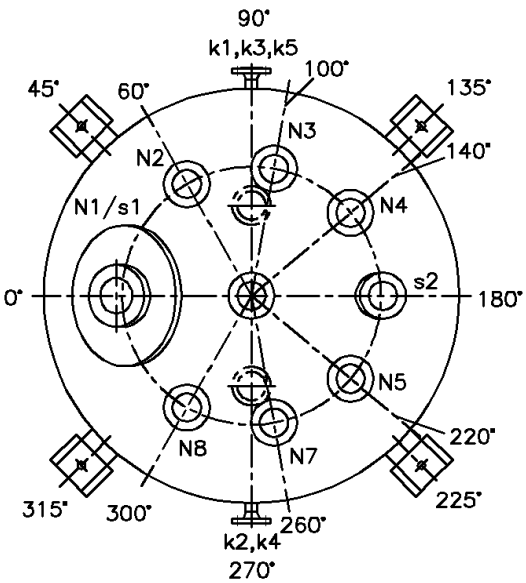

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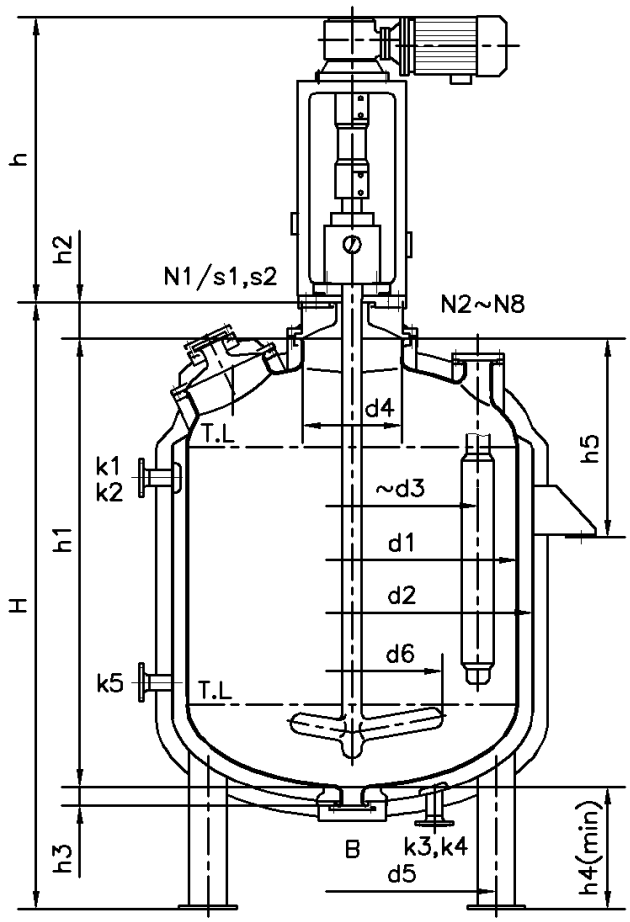
GMP design reactors KGR160~2000 Liters

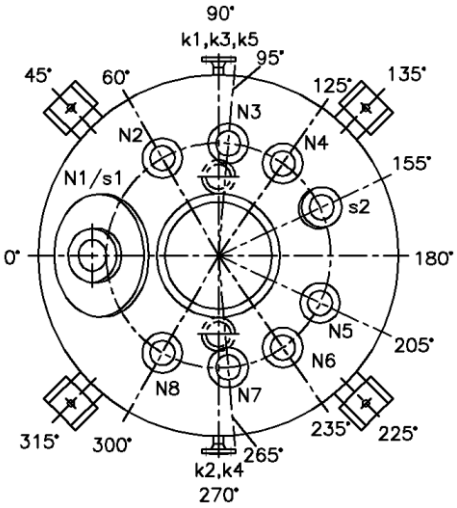
Nominal Cap.	Full Cap.	Jacket Cap.	Heat Tr. Area	Main Dimensions (mm)										Drive		Total Weight
														Motor	Type	
Ltrs	Ltrs	Ltrs	m2	d1	d2	~d3	d5	h1	h2	h3	~h4	~h5	~H	Kw	No.	Kg
KGR 160	228	75	1.3	600	700	480	560	690	290	80	350	380	1340	1.1	CG40	700
KGR 250	350	110	1.7	700	800	560	660	790	320	80	350	380	1470	1.5	CG/SG50	950
KGR 400	565	140	2.4	800	900	620	750	990	350	90	400	380	1750	2.2	CG/SG50	1150
KGR 500	720	160	2.6	900	1000	660	830	1000	370	90	400	480	1780	3.0	CG60,SG65	1300
KGR 630	930	170	3.1	1000	1100	760	920	1000	390	90	400	480	1800	3.0	CG60,SG65	1550
KGR 1000	1520	195	4.5	1200	1300	920	1100	1200	430	90	400	520	2040	4.0	CG/KCG/SG80	2000
KGR 1500	2055	380	5.1	1300	1450	1000	1220	1400	450	90	400	520	2260	4.0	CG/KCG/SG80	2700
KGR 2000	2520	470	7.1	1300	1450	1000	1220	1750	450	90	400	520	2610	4.0	CG/KCG/SG80	3000

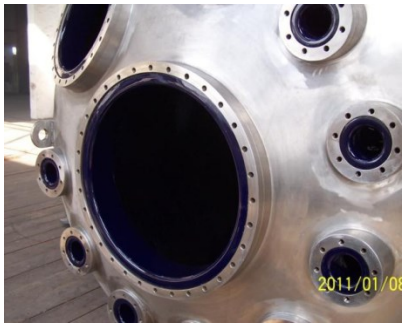
* Total weight without drive.

Head Layout	Nom. Cap.	Nozzles DN												Spec. Spary
		On Jacket				On Vessel								
	Ltrs	K1 K2	K3	K4	K5	N1	N2	N3 N5 N7	N4	N8	S1	S2	B	DN/G
1	KGR 160	40	40	-	-	80	80	50	-	50	80	80	80	80/G1/2
	KGR 250	40	40	-	-	100	80	50	-	50	100	80	80	80/G1/2
	KGR 400	40	40	-	-	125	100	80	-	80	125	100	100	80/G1
	KGR 500	40	40	-	-	125	100	80	-	80	125	100	100	80/G1
	KGR 630	50	50	-	-	150	100	80	-	80	150	100	100	80/G1
2	KGR 1000	50	50	-	-	300×400	125	80	80	80	100	125	100	80/G1
	KGR 1500	50	50	50	-		150	80	80	80	100	150	100	80/G1
	KGR 2000	50	50	50	50		150	80	80	80	100	150	100	80/G1

GMP design reactors FGR 2000~10000 Liters







Design of Cleaning Device

PTFE or PVDF dip pipe with 360° rotating spary ball made by PTFE, will be installed for cleaning the reactor

Stainless steel Gear Stool

The reducer support stool made of stainless steel is closed structure and with sight glass. Operator can observe the pressure and temperature value of seal by the sight glass when it is operating .The whole seals system will be monitored

GMP design reactors FGR2000~10000 Liters

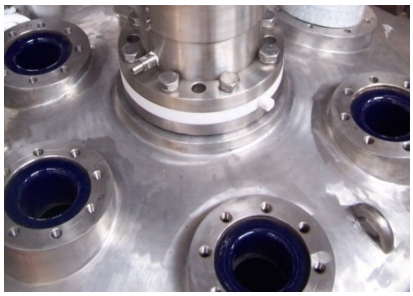
Nominal Cap.	Full Cap.	Jacket Cap.	Heat Tr. Area	Main Dimensions (mm)												Total Weight
Ltrs	Ltrs	Ltrs	m2	d1	d2	~d3	d4	d5	d6	h1	h2	h3	~h4	~h5	~H	Kg
FGR 2000	2560	345	7.4	1500	1620	1130	500	1400	700	1800	190	90	400	900	2400	3100
FGR 3000	3585	585	9.4	1600	1750	1220	600	1480	900	2170	190	90	400	900	2770	3680
FGR 4000	4685	695	11.6	1700	1850	1300	600	1560	900	2470	190	90	400	1000	3070	4550
FGR 4000B	4750	680	11.3	1750	1900	1350	700	1560	1000	2370	200	90	400	1000	2980	4780
FGR 5000	5690	765	13.2	1800	1950	1400	700	1650	1000	2630	200	90	400	1020	3240	5600
FGR 5000B	5760	750	12.4	1900	2050	1450	700	1740	1000	2430	200	90	400	1020	3040	5850
FGR 6300	6890	875	14.8	1900	2050	1450	700	1740	1000	2830	200	110	500	1020	3540	6700
FGR 6300B	7230	880	15.1	2000	2150	1500	800	1800	1200	2730	210	110	500	1100	3450	7200
FGR 8000	9060	1080	18.7	2000	2150	1500	800	1800	1200	3300	210	110	500	1100	4020	8500
FGR 8000B	9260	1020	18.0	2100	2250	1550	800	1860	1200	3080	210	110	500	1100	3800	8800
FGR 10000	11660	1220	21.4	2200	2350	1600	900	1900	1300	3470	220	110	500	1200	4200	11200
FGR 10000B	11670	1140	20.6	2300	2450	1650	900	1950	1300	3230	220	110	500	1200	3960	11400
FGR 10000C	11910	1085	20.4	2400	2550	1750	900	2000	1300	3060	220	110	500	1200	3790	11600

Nom. Cap.	Nozzles DN										Drive		Spec. Spary
	On Jacket				On Vessel						Motor P.	Type	
Ltrs	K1 K2	K3 K4	K5	K6	N1	N2	N3 N4 N5 N6 N7	N8	S1 S2	B	Kw	No.	DN/G
FGR 2000	50	50	50	-	300×400	150	80	125	100	100	4.0	CG/KCG/SG80	80/G1
FGR 3000	65	50	50	-	400	150	80	125	100	100	5.5	KCG/SG80B	80/G1
FGR 4000	65	50	50	-	400	200	80	125	100	100	7.5	KCG100,SG95	80/G1
FGR 4000B	65	50	50	-	400	200	100	150	100	100	7.5		100/G1
FGR 5000	65	50	50	50	400	200	100	150	100	100	7.5		100/G1
FGR 5000B	65	50	50	50	400	200	100	150	100	100	7.5		100/G1
FGR 6300	65	50	50	50	400	200	100	150	100	150	11.0	KCG100B,SG95B	100/G1
FGR 6300B	80	50	50	50	400	200	100	150	100	150	15.0	KCG100C	100/G1
FGR 8000	80	50	50	50	400	200	100	150	100	150	15.0		100/G1
FGR 8000B	80	50	50	50	400	200	100	150	100	150	15.0		100/G1
FGR 10000	80	50	50	50	400	250	100	150	100	150	15.0	KCG110	100/G1
FGR 10000B	80	50	50	50	400	250	100	150	100	150	15.0	KCG110,KCG125	100/G1
FGR 10000C	80	50	50	50	400	250	100	150	100	150	18.5		100/G1

Specifications of GMP design reactor

Stainless Steel Cladding

The outside surface of carbon steel is covered and cladded by stainless steel. It can meet the requirement of GMP after mechanical polished or electropolished .The triple wall with full rock wool or polyurethane for heating or cooling insulation.



Special Seal- Contamination Free DRS mechanical seal

Supplied by Xieli, dry running type with receiver plate of wearing. It can prevent wear particles or sealing liquid fall and contamination. You can select gas seal (contact-less and gas film lubrication) made by John Crane or Burgmann. The demands of pharmaceutical applications (FDA/GMP requirements) can be easily met.

CMC Manhole cover

CMC design manhole cover is a special constriction. It is much easy Cleaning because it is a flat plate. And it has a quick open sight nozzle for easy checking and opening.

Bottom Valves

Handle or pneumatically bottom valves with clean nozzle will be selected.

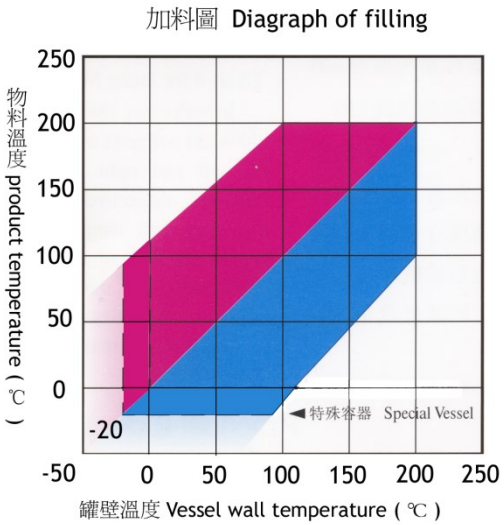
KCG Driving System

KCG driving system will be used for large reactor and allows for quick change of mechanical seal without moved agitator or gear stool.

Thermal shock of glass lined reactor

The upper temperature limit for applications is usually determined by the chemical aggressiveness of the product concerned. As nearly all situations involve the use of PTFE as a seal material, the upper limit is about 230 ℃. Higher limits are also possible if seals resistant to these temperatures are used. The lower limit for applications in the low temperature range is substantially determined by the steel material.

Filling a glass-lined unit with a hot or cold medium



Thermal shock

on glass-lined side (Tp>Tw)

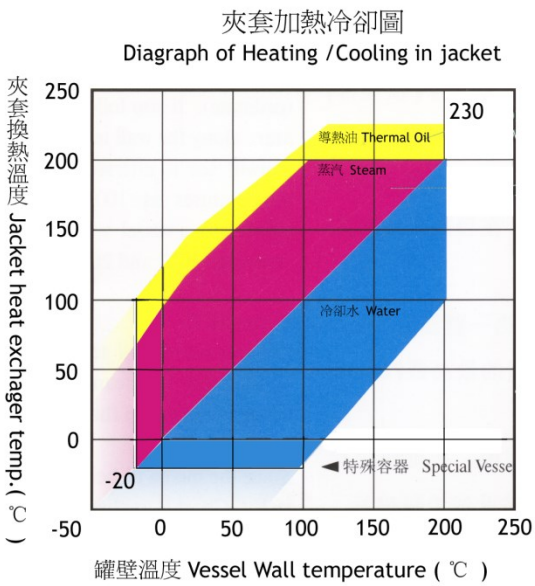
Example: A vessel with a wall temperature of 50 ℃ should not be filled with a medium hotter than 155 ℃.

Cold shock

on glass-lined side (Tp<Tw)

Example: A vessel with a wall temperature of 160 ℃ should not be filled with a medium colder than 55 ℃.

Heating or cooling of a glass-lined unit



Thermal shock

On metal side (heating)

Example: A heating medium applied to a vessel with a wall temperature (product temperature) of 50 ℃ should not be hotter than 170 ℃ (Thermel oil) , or 150 ℃ (steam).

Cold shock

on metal side (cooling)

Example: A cooling medium applied to a vessel with a wall temperature (product temperature) of 150 ℃ should not be colder than 45 ℃.