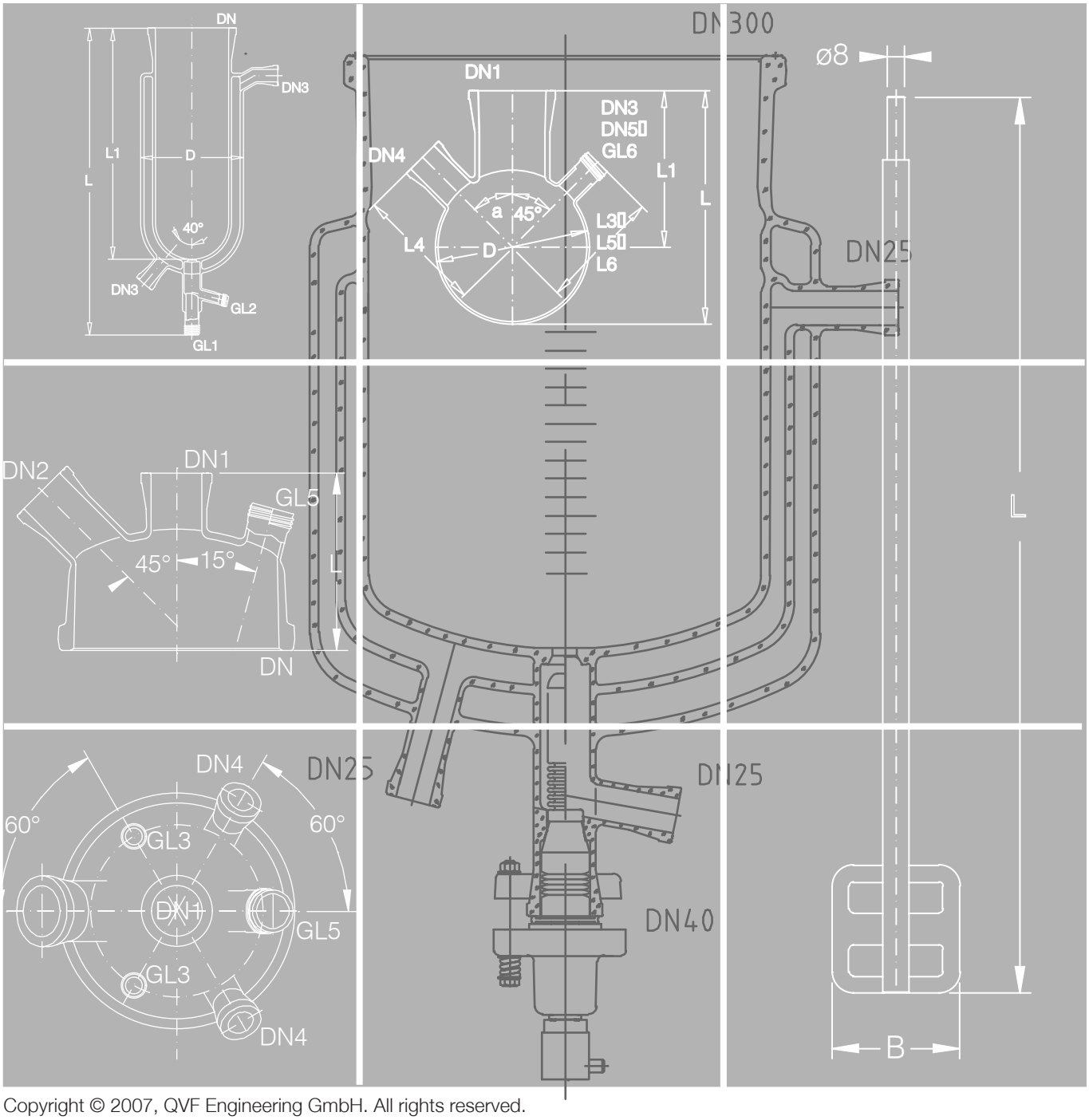


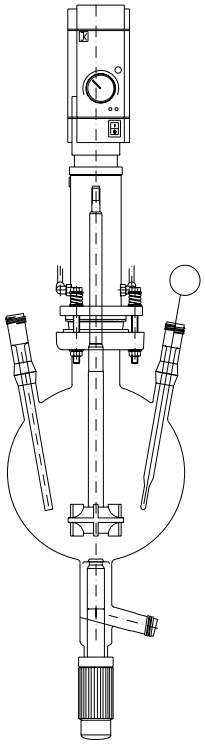
SPHERICAL VESSELS

Spherical vessels are suitable as receivers or as reaction vessels. Through their low height to volume ratio, the equipment can also be adapted to low spaces. Receivers and reaction vessels differ in that reaction vessels have a neck nozzle, through which the stirring device must normally be installed. The adjacent figure shows a typical installation. In addition to the standard vessels of the following pages, the 10° nozzles shown here are also possible.

A vessel can be used with bottom drain nozzles to avoid the dead space in the bottom nozzle. With this design, a valve seals the bottom. A spindle valve or bellows valve is used, depending on the volume of the vessel.

Reaction vessels made of glass can be heated with a jacket that is fused to the vessel perimeter and bottom nozzle and designed for an excess operating pressure of 0.5 bar. To avoid cold bridges, the jacket can be pulled up to the flange and equipped with a deflector so that the flange area is also rinsed with heat transfer medium.

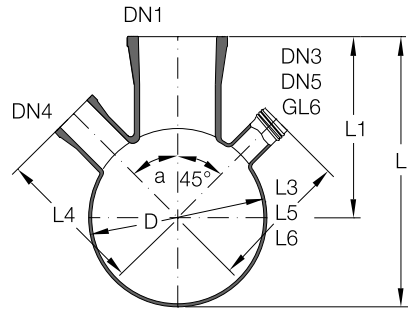
With low temperature reactions, temperatures in the jacket frequently run below the freezing point, so ice can form on the jacket, obstructing vision. Cylindrical triple-wall vessels in which the jacket is surrounded by an additional isolating jacket are suitable for this use. Standardized covers are available for all cylindrical vessels.

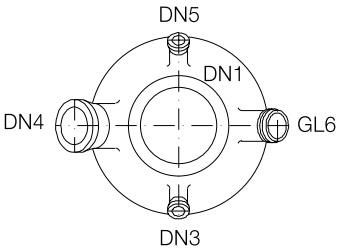


SPHERICAL VESSELS

Vessels without bottom nozzles

Nominal capacity(l)	D	DN1	DN3 DN5	DN4	GL6	L	L1	L3 L5	L4	L6	a	Reference
2	166	50	15	25	45	243	160	125	145	145	45°	**M-VSH2/50**
4	207	50	15	40	45	284	180	145	170	170	45°	**M-VSH4/50**
4	207	80	15	40	45	304	200	145	170	170	45°	**M-VSH4/80**
5	223	50	15	40	45	302	190	150	175	175	45°	**M-VSH5/50**
5	223	80	15	40	45	327	215	150	175	175	45°	**M-VSH5/80**
5	223	100	15	40	45	342	230	150	175	175	50°	**M-VSH5/100**
6	236	50	15	50	45	318	200	160	195	185	45°	**M-VSH6/50**
6	236	80	15	50	45	338	220	160	195	185	45°	**M-VSH6/80**
6	236	100	15	50	45	358	240	160	195	185	50°	**M-VSH6/100**
10	280	100	15	50	45	390	250	180	215	205	45°	**M-VSH10/100**
20	350	100	15	80	45	465	290	215	260	240	45°	**M-VSH20/100**

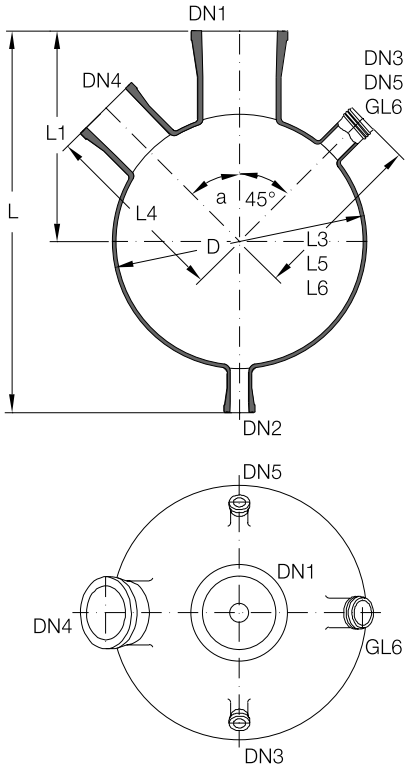




SPHERICAL VESSELS

Vessels with bottom nozzles

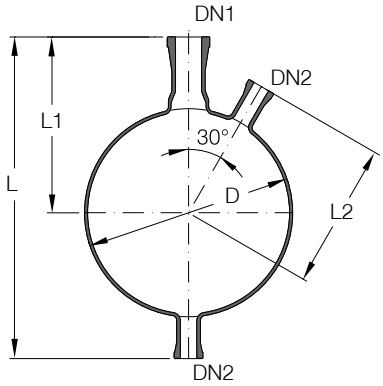
Nominal capacity(l)	D	DN1	DN2	DN3 DN5	DN4	GL6	L	L1	L3 L5	L4	L6	a	Reference
2	166	50	15	15	25	45	280	160	125	145	145	45°	**M-VSM2/50**
4	207	50	15	15	40	45	325	180	145	170	170	45°	**M-VSM4/50**
4	207	80	15	15	40	45	345	200	145	170	170	45°	**M-VSM4/80**
5	223	50	25	15	40	45	360	190	150	175	175	45°	**M-VSM5/50**
5	223	80	25	15	40	45	385	215	150	175	175	45°	**M-VSM5/80**
5	223	100	25	15	40	45	400	230	150	175	175	50°	**M-VSM5/100**
6	236	50	25	15	50	45	380	200	160	195	185	45°	**M-VSM6/50**
6	236	80	25	15	50	45	400	220	160	195	185	45°	**M-VSM6/80**
6	236	100	25	15	50	45	420	240	160	195	185	50°	**M-VSM6/100**
10	280	100	25	15	50	45	450	250	180	215	205	45°	**M-VSM10/100**
20	350	100	25	15	80	45	525	290	215	260	240	45°	**M-VSM20/100**

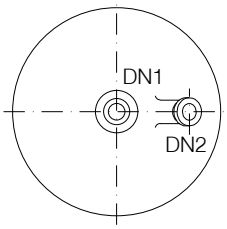


SPHERICAL VESSELS

Receivers with bottom nozzles

Nominal capacity(l)	D	DN1	DN2	L	L1	L2	Reference
2	166	25	15	275	155	125	**M-VSS2**
4	207	25	15	320	175	145	**M-VSS4**
6	236	25	15	350	190	160	**M-VSS6**





SPHERICAL VESSELS

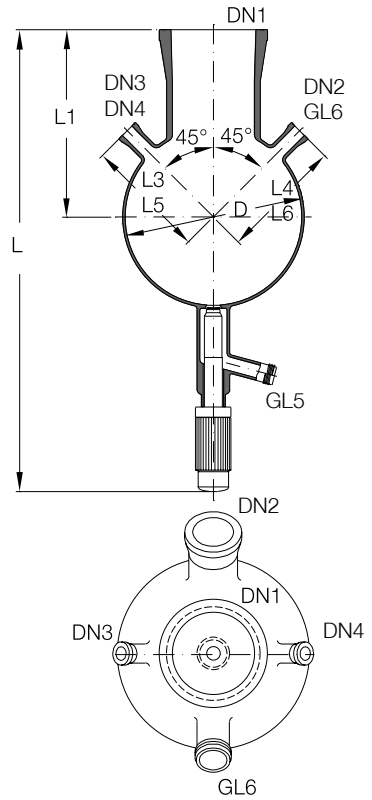
With low-dead-space bottom drain valve

Spherical vessels of type VSM have their own fused seat for a bottom drain valve, which seals the vessel bottom with low-dead-space from below. The M-OBAS bottom drain valve is used for nominal volumes of up to 6 liters; for volumes of 10 and 20 liters, the BASD valve is used, whose structural design is described in the "Fittings" chapter.

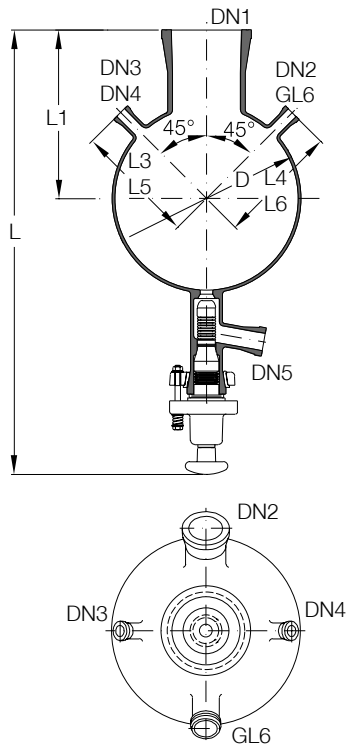
If spheres with bottom nozzles or bottom outlet valves are to be used in heating covers or bath heating vessels, the nozzle length must be adjusted.

Nominal capacity(l)	D	DN1	DN2	DN3 DN4	DN5 GL5	GL6	L ca.	L1	L3 L5	L4	L6	Type	Reference
2	166	50	25	15	18	45	430	160	125	145	145	**A**	**M-VSMB2/50**
4	207	50	40	15	18	45	470	180	145	170	170	**A**	**M-VSMB4/50**
4	207	80	40	15	18	45	490	200	145	170	170	**A**	**M-VSMB4/80**
5	223	50	40	15	25	45	525	190	150	175	175	**A**	**M-VSMB5/50**
5	223	80	40	15	25	45	550	215	150	175	175	**A**	**M-VSMB5/80**
5	223	100	40	15	25	45	565	230	150	175	175	**A**	**M-VSMB5/100**
6	236	50	50	15	25	45	545	200	160	195	185	**A**	**M-VSMB6/50**
6	236	80	50	15	25	45	565	220	160	195	185	**A**	**M-VSMB6/80**
6	236	100	50	15	25	45	585	240	160	195	185	**A**	**M-VSMB6/100**
10	280	100	50	15	25	45	660	250	180	215	205	**B**	**M-VSMB10/100**
20	350	100	80	15	25	45	735	290	215	260	240	**B**	**M-VSMB20/100**

A



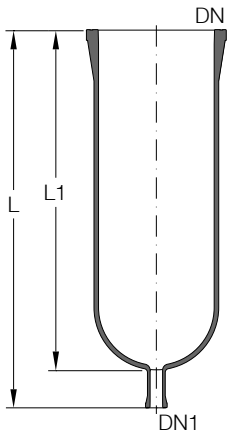
B



CYLINDRICAL VESSELS

Universal cylindrical vessels

These cylindrical vessels equipped with round bottoms can be used both for stirring tasks and as receivers.



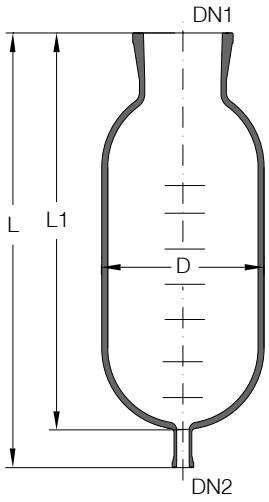
Nominal capacity(l)	DN	DN1	L	L1	Reference	Reference [2] with graduations
2	100	15	400	346	**M-VZ2/100**	**M-VZG2/100**
4	150	15	400	346	**M-VZ4/150**	**M-VZG4/150**
6	150	15	500	446	**M-VZ6/150**	**M-VZG6/150**
10	*200*	*25*	*550*	*490*	***VZ10/200***	***VZG10/200*** [1]
16	300	25	450	387	**M-VZ16/300**	**M-VZG16/300**

[1] Component out of WPR 2002
[2] Graduation for 6 i calibration 0,25 l, 10 l calibration 0,5 l, > 10 l calibration 2 l

CYLINDRICAL VESSELS

Receiver cylinder vessels

The vessels with round bottoms closed at the neck are especially suitable as receivers.



Nominal capacity(l)	DN1	DN2	D	L	L1	Reference	Reference [1] with graduations
6	100	15	165	575	521	**M-VZ6/100**	**M-VZG6/100**
10	100	15	215	575	521	**M-VZ10/100**	**M-VZG10/100**
16	150	15	270	650	596	**M-VZ16/150**	**M-VZG16/150**
25	150	25	315	700	636	**M-VZ25/150**	**M-VZG25/150**

[1] Graduation for 6 i calibration 0,25 l, 10 l calibration 0,5 l, > 10 l calibration 2 l

CYLINDRICAL VESSELS

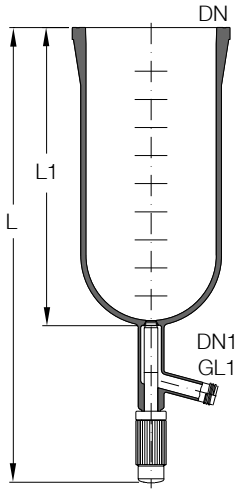
Universal cylindrical vessels with bottom drain valve

Cylindrical vessels of type VZB have their own fused seat for a bottom drain valve, which seals the round bottom with low-dead-space from below. The M-OBAS bottom drain valve is used for nominal volumes of up to 6 liters; for the 10- and 16-liter vessels, the BASD valve is used.

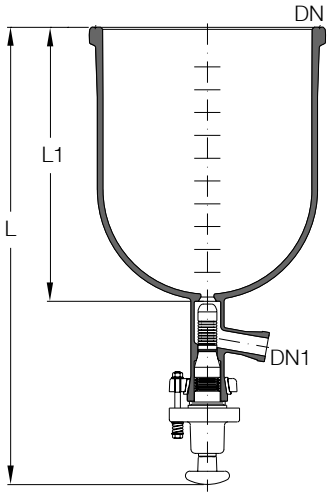
Nominal capacity(l)	DN	DN1 GL1	L	L1	Type	Reference	Reference with graduations
2	100	18	530	350	A	**M-VZB2/100**	**M-VZBG2/100**
4	150	18	530	350	A	**M-VZB4/150**	**M-VZBG4/150**
6	150	15	660	450	A	**M-VZB6/150**	**M-VZBG6/150**
10	*200*	*25*	*755*	*490*	*B*	***VZ10/200BASD***	***VZG10/200BASD*** [1]
16	300	25	655	390	B	**M-VZB16/300**	**M-VZBG16/300**

[1] Component out of WPR 2002

A



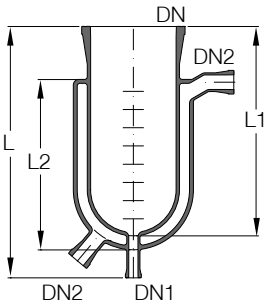
B



CYLINDRICAL VESSELS

Cylindrical vessels with jacket

IIn the Miniplant technology, jackets are fused at the bottom nozzle and inside vessel so they can be operated with water or thermal oil. The nozzles of the tempering jackets are equipped with a safety flat flange, to which you can make straight or angled connections with appropriate adapters from the "Connections" chapter.



Cylindrical vessels with jacket are supported at the neck.

Nominal capacity(l)	DN	DN1	DN2	L	L1	L2	Volume jacket	Reference	Reference [1] with graduations
2	100	15	15	475	400	325	2,3	**M-TVZ2/100**	**M-TVZG2/100**
4	150	15	15	450	375	305	2,9	**M-TVZ4/150**	**M-TVZG4/150**
6	150	15	15	565	490	420	4,0	**M-TVZ6/150**	**M-TVZG6/150**
10	200	25	25	580	490	423	7,0	**DVZ10/200**	**M-TVZG10/200**[1]
16	300	25	25	500	420	325	6,3	**M-TVZ16/300**	**M-TVZG16/300**

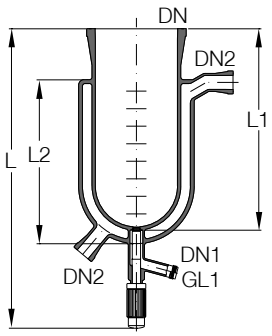
[1] Graduation for 6 i calibration 0,25 l, 10 l calibration 0,5 l, > 10 l calibration 2 l

CYLINDRICAL VESSELS

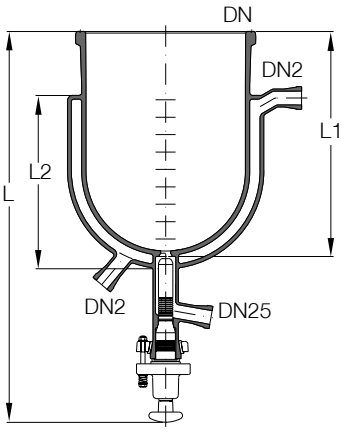
Cylindrical vessels with jacket and bottom drain valve

Jacketed cylindrical vessels of type TVZB have their own fused seat for a bottom drain valve, which seals the round bottom with low-dead-space from below. The M-OBAS bottom drain valve is used for nominal volumes of up to 6 liters; for the 10- and 16-liter vessel, the BAMD valve is used, whose structural design is described in the "Fittings" chapter.

A



B



Nominal capacity(l)	DN	DN1 GL1	DN2	L	L1	L2	Volume jacket	Type	Reference	Reference[1] with graduations
2	100	18	15	575	400	325	2,3	**A**	**M-TVZB2/100**	**M-TVZBG2/100**
4	150	18	15	550	375	305	2,9	**A**	**M-TVZB4/150**	**M-TVZBG4/150**
6	150	15	15	700	490	420	4,0	**A**	**M-TVZB6/150**	**M-TVZBG6/150**
10	200	25	25	805	490	423	7,0	***B***	**DVZ10/200BAMD**	**M-TVZBG10/200**
16	300	25	25	735	420	325	6,4	**B**	**M-TVZB16/300**	**M-TVZBG16/300**

[1] Graduation for 6 i calibration 0,25 l, 10 l calibration 0,5 l, > 10 l calibration 2 l

REACTION VESSELS

The reaction vessels have a dome end, so the thermodynamic characteristics can be transferred for the scale-up. A number of different stirring devices are available for mixing, whose combinations with vessels and covers are listed in a table in the "Stirrer Drives" section.

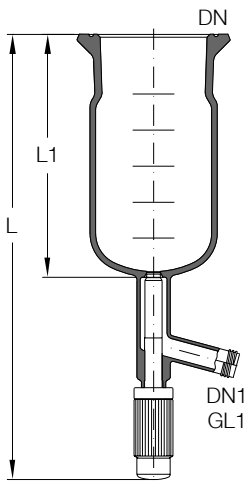
Up to volumes of 4 liters, the main flange is designed as a laboratory flange, for which appropriate covers are available.

Reaction vessels have their own fused seat for a bottom drain valve, which seals the dome end with low-dead-space from below. The M-OBAS bottom drain valve is used for nominal volumes of up to 6 liters; for 10 liters and larger, the BASD valve is used.

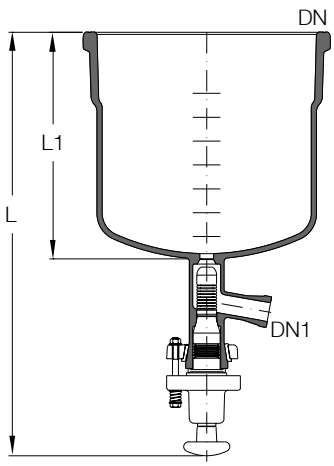
The reaction vessels M-VZB are delivered together with the bottom drain valve.

Nominal capacity(l)	SLF	DN	DN1	GL1	L	L1	Type	Reference
0,5	100	-	-	18	340	160	**A**	**M-VZKB05**
1,0	100	-	-	18	400	220	**A**	**M-VZKB1**
2,0	150	-	-	18	375	195	**A**	**M-VZKB2**
4,0	150	-	-	18	490	310	**A**	**M-VZKB4**
6,0	-	200	15	-	515	390	**C**	**M-VZKB6**
10	-	300	25	-	580	310	**B**	**M-VZKB10**
16	-	300	25	-	630	360	**B**	**M-VZKB16**
25	-	300	25	-	755	485	**B**	**M-VZKB25**

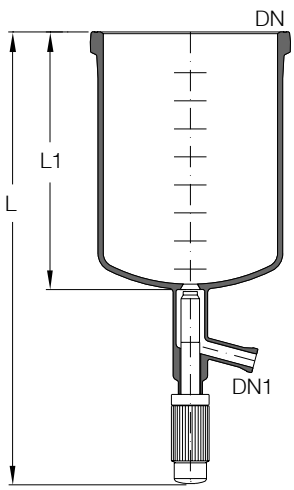
A



B



C



REACTION VESSELS

Reactions Vessels with integrated baffle OptiMix®

Due to the three baffles, melted to the wall in 120° angle, the mixing is enhanced and the mixing time reduced what increases the productivity of your plant. The principal design was developed and patented from DDPS for glass-lined vessels. A similar design is used for the glass reaction vessels, to allow scale up.

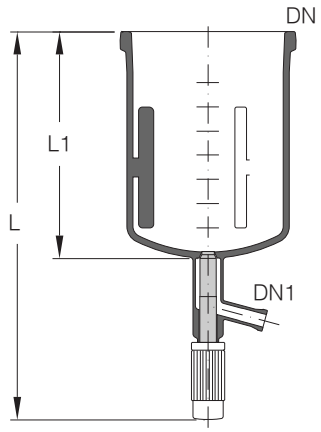
Reaction vessels have their own fused seat for a bottom drain valve, which seals the dome end with low-dead-space from below. The M-OBAS bottom drain valve is used for the nominal volume of 6 litres; for 10 litres and larger, the BASD valve is used.

OptiMix vessels can not be provided with anchor stirrers.

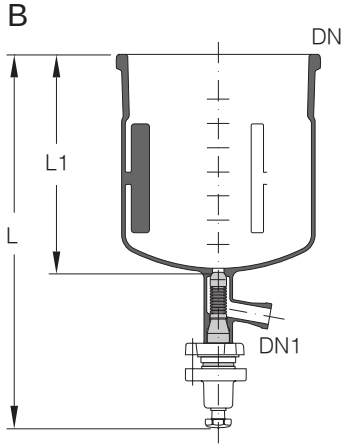
Nominal capacity(l)	DN	DN1	L	Type	Reference.
6	200	15	515	**A**	**M-VZKB6OP**
10	300	25	580	**B**	**M-VZKB10OP**
16	300	25	630	**B**	**M-VZKB16OP**
25	300	25	755	**B***	**M-VZKB25OP**

* The baffles are split and instaled in two levels.

A



B



JACKETED REACTION VESSELS

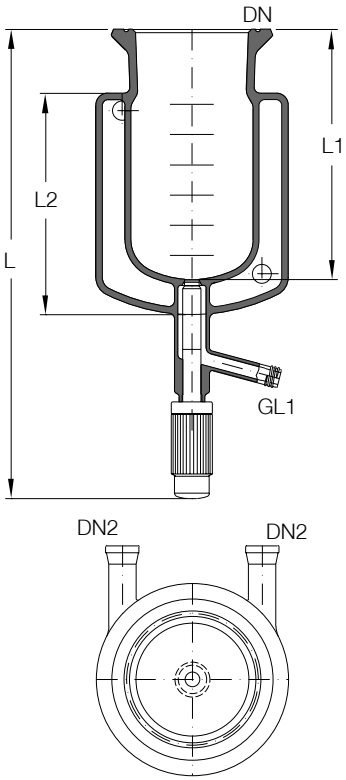
In the Miniplant technology, tempering jackets are fused at the bottom nozzle and inside vessel so they can be operated with water or thermal oil. The nozzles of the tempering jackets are equipped with a safety flat flange, to which you can make straight or angled connections with appropriate adapters from the "Connections" chapter.

Reaction vessels are delivered with their own fused seat for a bottom drain valve, which seals the bumped bottom with low-dead-space from below. The M-OBAS bottom drain valve is used for nominal volumes of up to 6 liters; for 10 liters and larger, the BAMD valve is used.

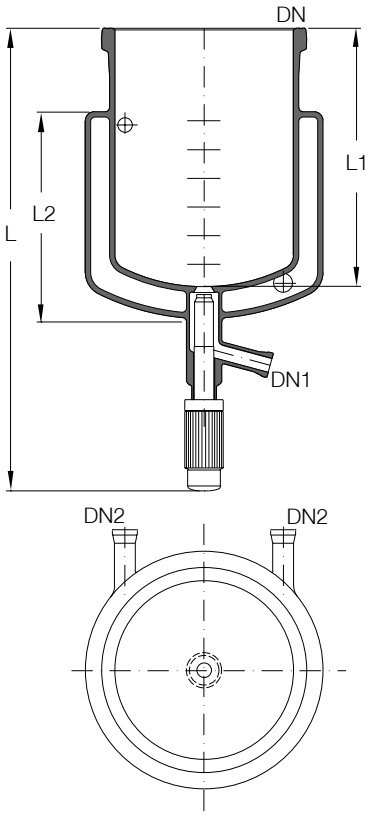
Cylindrical vessels with jacket are supported at the neck nozzle.

Nominal capacity(l)	DN SLF	DN1 GL1	DN2	L	L1	L2	Area dm²	Volume jacket	Type	Reference
0,5	100	18	15	340	160	130	4,0	1,2	A	**M-TVZKB05**
1,0	150	18	15	400	220	190	6,1	1,7	A	**M-TVZKB1**
2,0	150	18	15	375	195	165	8,0	2,0	A	**M-TVZKB2**
4,0	150	18	15	490	310	280	14,0	3,3	A	**M-TVZKB4**
6,0	200	15	15	510	300	235	15,2	4,4	B	**M-TVZKB6**
10	300	25	25	670	350	275	23,6	5,2	C	**M-TVZKB10**
16	300	25	25	700	380	260	29,7	9,7	D	**M-TVZKB16**
25	300	25	25	825	505	385	42,2	13,7	D	**M-TVZKB25**

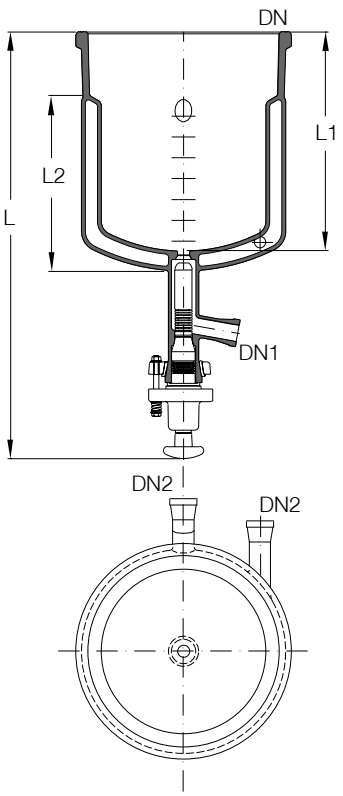
A



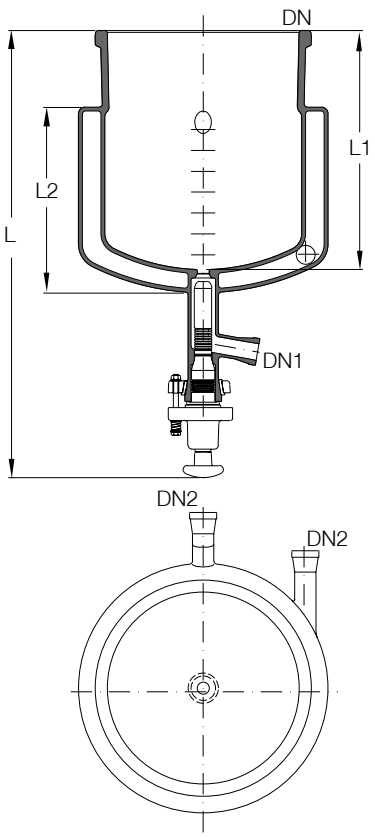
B



C



D



JACKETED REACTION VESSELS

Jacketed Reactions Vessels with integrated baffle OptiMix®

Due to the three baffles of the jacketed reaction vessel, melted to the wall in 120° angle, the mixing is enhanced and the mixing time reduced what increases the productivity of your plant. The principal design was developed and patented from DDPS for glass-lined vessels. A similar design is used for the glass reaction vessels, to allow scale up.

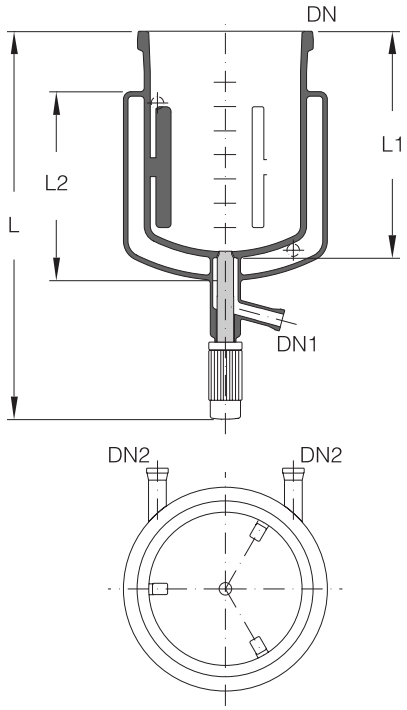
Reaction vessels have their own fused seat for a bottom drain valve, which seals the dome end with low-dead-space from below. The M-OBAS bottom drain valve is used for the nominal volume of 6 litres; for 10 litres and larger, the BASD valve is used.

OptiMix vessels can not be provided with anchor stirrers.

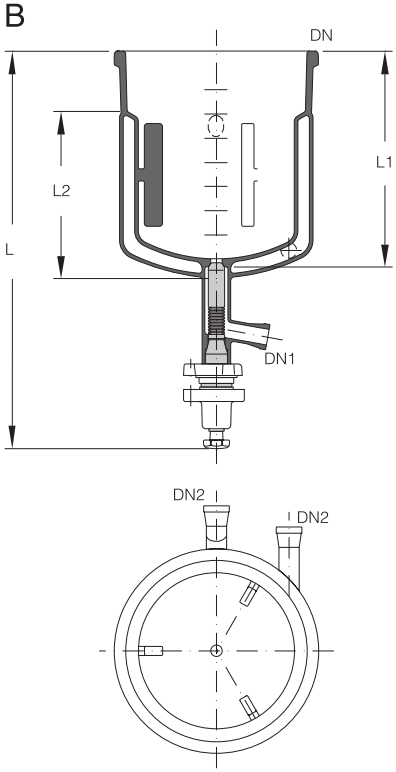
Nominal capacity(l)	DN	DN1	DN2	L1	L2	Area dm²	Volume jacket	Type	Reference
6	200	15	15	290	250	15,24	4,7	**A**	**M-TVZKB6OP**
10	300	25	25	350	275	23,59	5,2	**B**	**M-TVZKB10OP**
16	300	25	25	380	290	29,64	9,7	**C**	**M-TVZKB16OP**
25	300	25	25	505	415	42,2	13,7	**C***	**M-TVZKB25OP**

* The baffles are split and instaled in two levels.

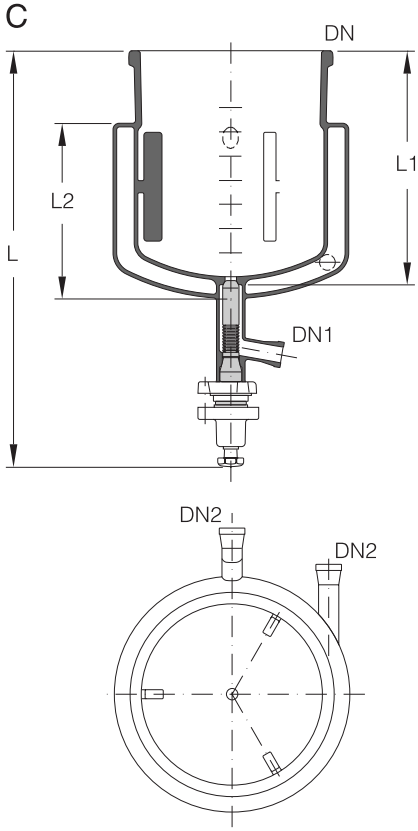
A



B



C



TRIPLE-WALL REACTOR

The triple-wall reactor offers a combination of tempering and isolating jackets. With this, the vessel can be operated in the product and jacket area from -80° up to +140 °C, although the temperature difference between the medium and heat medium should not exceed 50°C.

To avoid thermal stress, the heating or cooling speed must not exceed the value of 1 K/min.

The surrounding isolating jacket is evacuated to 10^{-7} bar and prevents the loss of heat to the environment and ice formation on the outside surface for processes below the freezing point. As the insulation jacket is not silver-coated, the process can be observed well using a light-colored thermal oil.

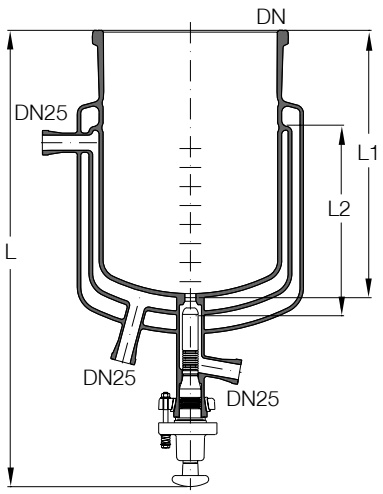
All triple-wall vessels are equipped with a low-dead-space bottom drain valve with overtwist lock. This valve seals from below in a fused glass flange.

All triple-wall vessels are laminated with Sectrans.

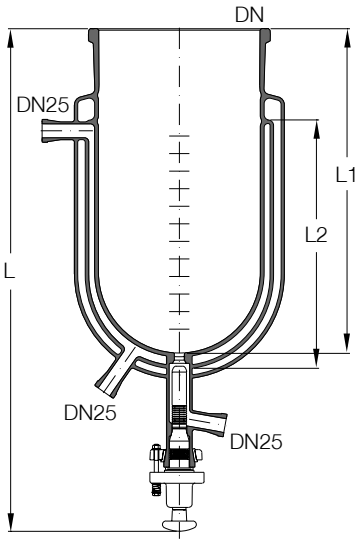
Flow nozzles can be used for better heat exchange in the jacket.

Nominal capacity(l)	DN	L	L1	L2	Area dm²	Volume jacket l	Type	Reference
6,3	200	700	370	255	16,8	9,5	**A**	**M-TWR6.3**
10	200	825	495	380	25,2	11,7	**A**	**M-TWR10**
16	300	790	460	325	31,5	8,2	**A**	**M-TWR16**
25	300	940	610	465	50,2	8,2	**B**	**M-TWR25**

A



B



TRIPLE-WALL REACTOR

Triple-wall reactor with integrated baffle OptiMix®

The OptiMix version of the triple-wall reactor are designed in accordance to the earlier mentioned version, but have three integrated baffles.

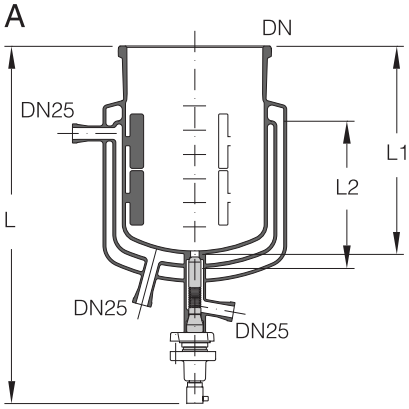
Due to the baffles, the mixing is enhanced and the mixing time reduced what increases the productivity of your plant. The principal design was developed and patented from DDPS for glass-lined vessels. A similar design is used for the glass reaction vessels, to allow scale up.

The baffles are melted to the inner wall in two layers and at an angle of 120°.

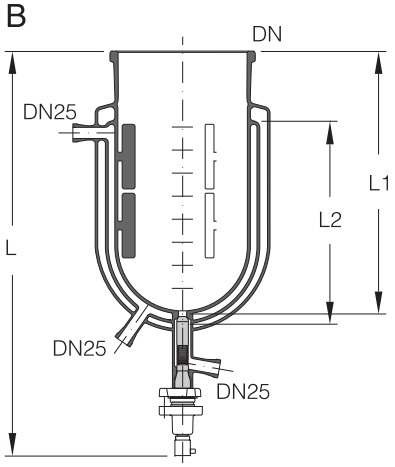
Nominal capacity(l)	DN	L	L1	L2	Area dm²	Volume jacket l	Type	Reference.
6,3	200	700	370	235	16,8	9,5	**A***	**M-TWR6.3OP**
10	200	825	495	360	25,2	11,7	**A**	**M-TWR10OP**
16	300	790	460	294	31,5	8,2	**A**	**M-TWR16OP**
25	300	940	610	440	50,2	8,2	**B**	**M-TWR25OP**

* Only one level of baffles.

A



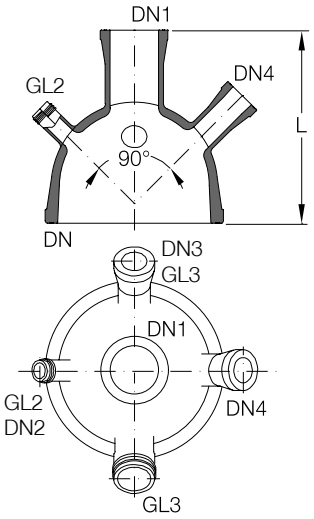
B



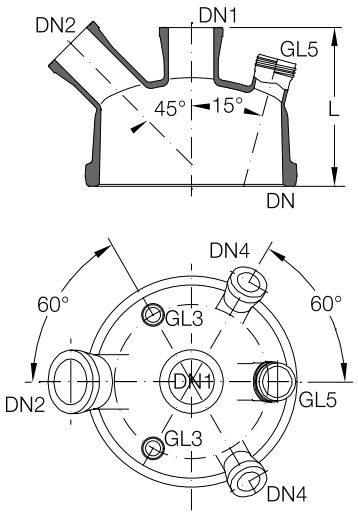
VESSEL COVERS

DN	DN1	GL2 DN2	GL3 DN3	GL4 DN4	GL5 DN5	L	Type	Reference
100	50	15	25	-	-	175	**A**	**M-VZA100/50**
150	50	25	45	25	-	200	**A**	**M-VZA150/50**
200	50	50	25	25	45	175	**B**	**M-VZA200/50**
300	50	80	25	25	40	225	**C**	**M-VZA300/50**

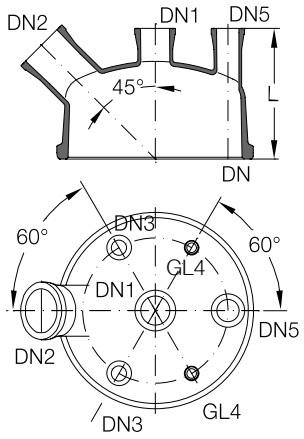
A



B



C

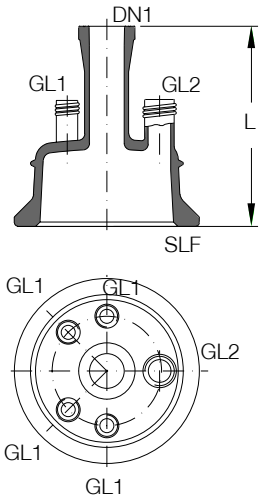


VESSEL COVERS

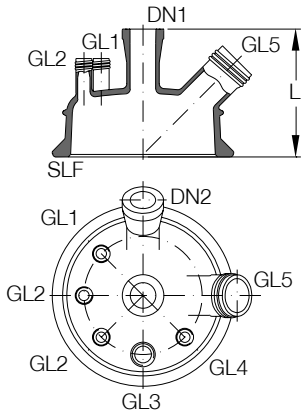
These vessel covers are suitable for connection to vessels with laboratory flanges. You will find a corresponding three-way holder in the "Connections" chapter.

SLF	DN1	DN2	GL1	GL2	GL3	GL4	GL5	L	Type	Reference
100	25	-	18	25	-	-	-	150	**A**	**M-VZC100/25**
150	25	25	18	18	25	18	45	130	**B**	**M-VZC150/25**

A



B

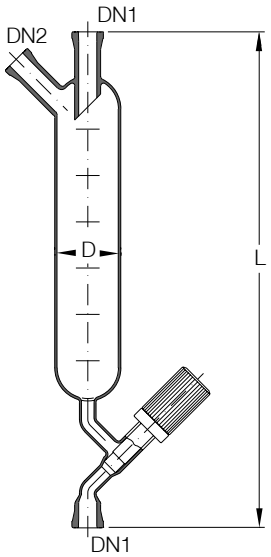


RECEIVERS

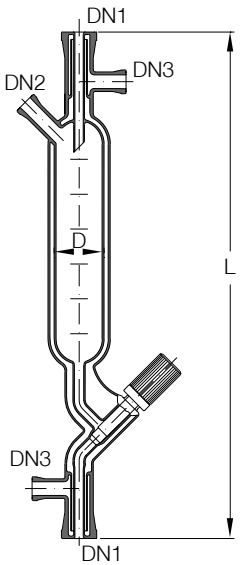
Receivers can be used both for measuring volume in a process and for feeding reaction partners. In the temperature-controlled version, the heat-transfer medium is guided over an integrated baffle plate into the flange area. You will find adapters for heat-transfer hoses in the "Connections" chapter.

Nominal capacity(l)	D	L	DN1	DN2	DN3	Type	Reference
0,5	60	450	15	15	-	**A**	**M-VG05**
1,0	70	530	15	15	-	**A**	**M-VG1**
2,0	85	650	15	15	-	**A**	**M-VG2**
4,0	110	700	15	15	-	**A**	**M-VG4**
0,5	60	610	25/15	15	15	**B**	**M-TVG05**
1,0	70	680	25/15	15	15	**B**	**M-TVG1**
2,0	85	820	25/15	15	15	**B**	**M-TVG2**
4,0	110	860	25/15	15	15	**B**	**M-TVG4**

A



B



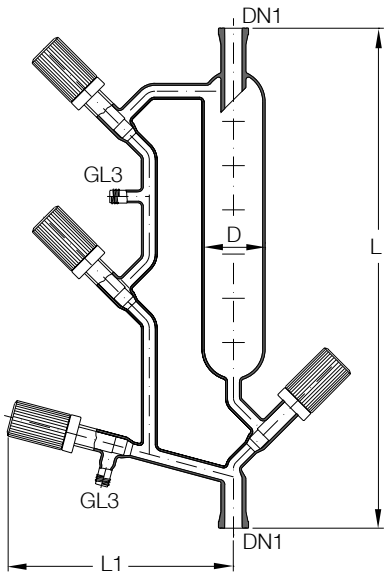
ANSCHÜTZ-THIELE RECEIVERS

This special design of a graduated receiver can be used for distillation volume measurements with vacuum columns. Through the integrated vacuum switching, distillation is not impaired during the measuring process.

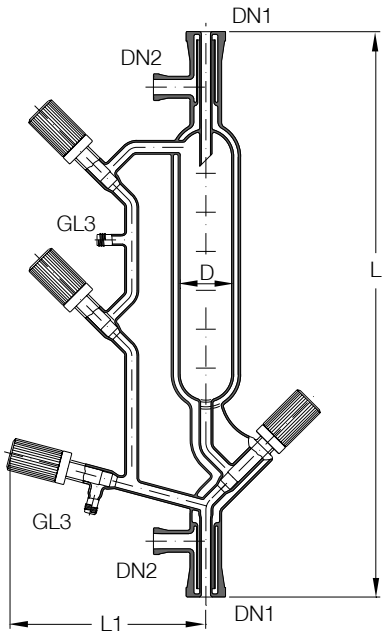
In the temperature-controlled version, the heat-transfer medium is guided over an integrated return into the flange area. You will find adapters for heat-transfer hoses in the "Connections" chapter.

Nominal capacity(l)	D	L	L1	L2	DN1	DN2	GL3	Type	Reference
0,25	48	425	163	125	15	-	GL14	**A**	**M-ATV025**
0,5	60	475	214	145	15	-	GL14	**A**	**M-ATV05**
1,0	70	560	233	160	15	-	GL14	**A**	**M-ATV1**
0,25	48	550	173	125	25/15	15	GL14	**B**	**M-TATV025**
0,5	60	610	234	145	25/15	15	GL14	**B**	**M-TATV05**
1,0	70	885	244	160	25/15	15	GL14	**B**	**M-TATV1**

A



B



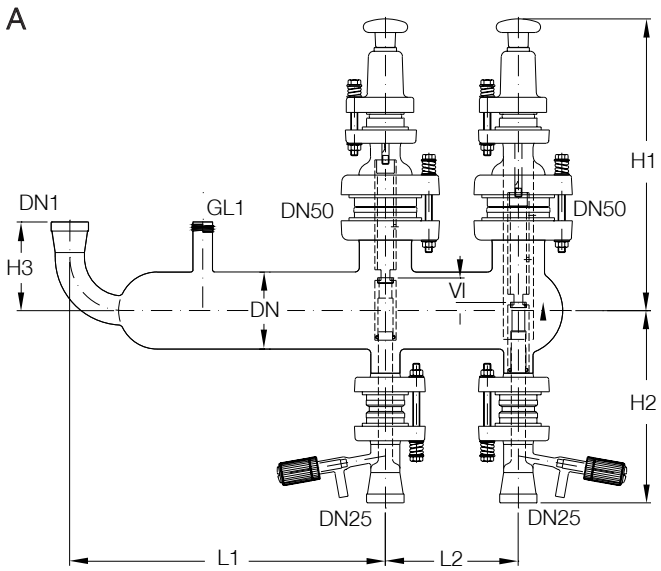
HORIZONTAL SEPARATORS

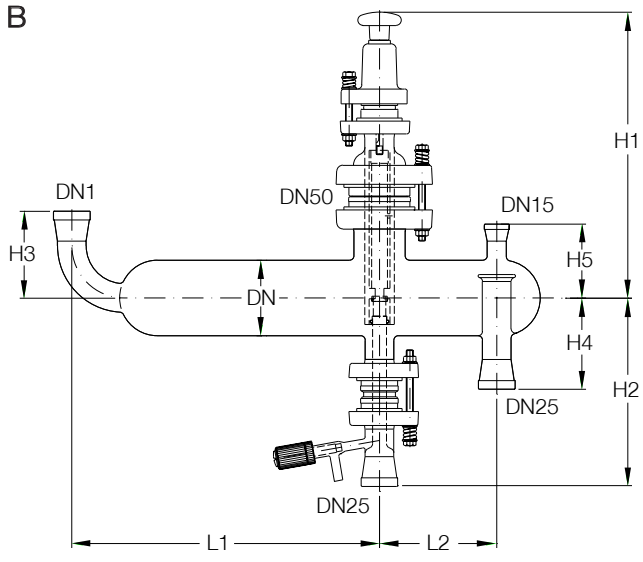
Separators are used for continuous separation of a two-phase mixture. They offer a large phase interface for separating and a low flow speed. The interface is regulated in both versions with an internal overflow valve for the heavy phase. An integrated jacket tube holds the light phase back from the height-adjustable overflow opening.

In version A, the total fill level of the separator can also be set with an overflow valve. Since the two valves can be interchanged with each other, the outlet nozzles for the heavy and light phases can easily be switched. This is an ideal possibility to make the phase switching without additional pipelines and valves.

In version B, the drain height of the light phase is set through the fused-in overflow tube.

DN	DN1	GL	L1	L2	L3	H1	H2	H3	H4	H5	Vl	Type	Reference
50	15	18	330	150	130	315	202	70	-	-	20	**A**	**M-AOFA50**
80	25	18	450	150	150	330	217	100	-	-	37	**A**	**M-AOFA80**
100	25	25	450	150	150	340	217	100	-	-	37	**A**	**M-AOFA100**
50	15	-	330	135	-	315	202	70	90	70	-	**B**	**M-AOF50**
80	25	-	450	135	-	330	217	100	105	85	-	**B**	**M-AOF80**
100	25	-	450	135	-	340	217	100	115	100	-	**B**	**M-AOF100**





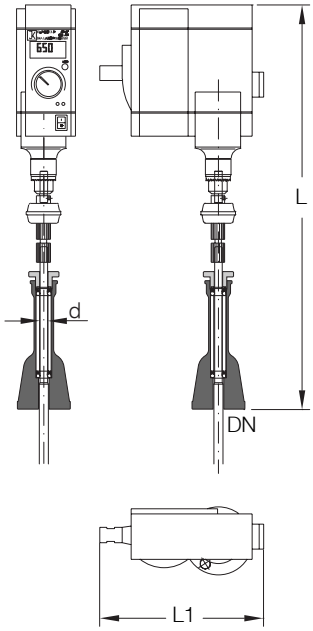
STIRRER DRIVES

You will find a selection of various combinations of vessels and covers with stirrer drives and stirrers in the following table. Besides the desired stirring task, decisive for the selection are the possibility to connect the stirrer to the drive and the sealing of the vessel. Besides the metal stirrers, corrosion-resistant stirrers/seal variants are also available.

Vessels	Covers	Stirrer drives M-RAL	Stirrer drives M-RAM	Stirrer drives M-RG	
Cylindrical Vessels		Diagonal blade stirrers borosilicate glass 3.3	Diagonal blade stirrers stainless steel	Propeller stirrers steel/PTFE	Turbine stirrers steel/PTFE
M-VZB2/100	M-VZA100/50	M-SSG45/700	M-SSE45/420	-	-
M-VZB4/150	M-VZA150/50	M-SSG60/730	M-SSE60/445	M-SPT70/680	M-STT70/680
M-VZB6/150	M-VZA150/50	M-SSG60/810	M-SSE60/535	M-SPT70/770	M-STT70/770
VZ10/200BASD	M-VZA200/50	-	-	M-SPT70/790	M-STT70/790
M-VZB16/300	M-VZA300/50	-	-	M-SPT90/725	M-STT90/725
Jacketed Cylindrical Vessels					
M-TVZB2/100	M-VZA100/50	M-SSG45/750	M-SSE45/470	-	-
M-TVZB4/150	M-TVZA150/50	M-SSE60/750	M-SSE60/470	M-SPT70/700	M-STT70/700
M-TVZB6/150	M-VZA150/50	M-SSG60/860	M-SSE60/575	M-SPT70/810	M-STT70/810
DV10/200BAMD	M-VZA200/50	-	-	M-SPT70/790	M-STT70/790
M-TVZB16/300	M-VZA300/50	-	-	M-SPT90/755	M-STT90/755
Reaction Vessels					
M-VZKB05	M-VZC100/25	M-SSG45/500	M-SSE45/230	-	-
M-VZKB1	M-VZC100/25	M-SSG45/550	M-SSE45/280	-	-
M-VZKB2	M-VZC150/25	M-SSG75/500	M-SSE75/235	-	-
M-VZKB4	M-VZC150/25	M-SSG75/620	M-SSE75/345	-	-
M-VZKB6/ M-VZKB6OP	M-VZA200/50	M-SSG75/660	M-SSE75/380	M-SPT90/620	M-STT90/620
M-VZKB10/ M-VZKB10OP	M-VZA300/50	-	-	M-SPT120/670	M-STT120/670
M-VZKB16/ M-VZKB16OP	M-VZA300/50	-	-	M-SPT120/710	M-STT120/710
M-VZKB25/ M-VZKB25OP	M-VZA300/50	-	-	M-SPT120/825	M-STT120/825
Jacketed Reaction Vessels					
M-TVZKB05	M-VZC05	M-SSG45/500	M-SSE45/230	-	-
M-TVZKB1	M-VZC100/25	M-SSG45/550	M-SSE45/280	-	-
M-TVZKB2	M-VZC150/25	M-SSG75/500	M-SSE75/235	-	-
M-TVZKB4	M-VZC150/25	M-SSG75/620	M-SSE75/345	-	-
M-TVZKB6/M-TVZKB6OP	M-VZA200/50	M-SSG75/660	M-SSE75/380	M-SPT90/620	M-STT90/620
M-TVZKB10/ M-TVZKB10OP	M-VZA300/50	-	-	M-SPT90/710	M-STT90/710
M-TVZKB16/ M-TVZKB16OP	M-VZA300/50	-	-	M-SPT120/730	M-STT120/730
M-TVZKB25/ M-TVZKB25OP	M-VZA300/50	-	-	M-SPT120/855	M-STT120/855
Triple-wall Reactors					
M-TWR6.3/M-TWR6.3OP	M-VZA200/50	-	-	M-SPT90/680	M-STT90/680
M-TWR10/M-TWR10OP	M-VZA200/50	-	-	M-SPT90/805	M-STT90/805
M-TWR16/M-TWR16OP	M-VZA300/50	-	-	M-SPT120/805	M-STT120/805
M-TWR25/M-TWR25OP	M-VZA300/50	-	-	M-SPT90/940	M-STT90/940
Spherical Vessels					
M-VSMB2/50	-	M-SSG45/440	M-SSE45/155	-	-
M-VSMB4/50	-	M-SSG45/480	M-SSE45/195	-	-
M-VSMB4/80	-	-	M-SSE60/215	M-SPT70/450	M-STT70/450
M-VSMB5/50	-	M-SSG75/500	M-SSE45/215	-	-
M-VSMB5/80	-	-	M-SSE60/235	M-SPT70/260	M-SPT70/260
M-VSMB5/100	-	-	M-SSE75/250	M-SPT70/270	M-SPT70/270
M-VSMB6/50	-	M-SSG75/500	M-SSE45/230	-	-
M-VSMB6/80	-	-	M-SSE60/245	M-SPT70/260	M-SPT70/260
M-VSMB6/100	-	-	M-SSE75/265	M-SPT90/285	M-SPT90/285
M-VSMB10/100	-	-	-	M-SPT90/310	M-SPT90/310
M-VSMB20/100	-	-	-	M-SPT90/440	M-SPT90/440

COMPLETE LABORATORY STIRRER DRIVES

Drive with stirring shaft seal for glass stirrers



The stirrer drives M-RAL and M-RALD are used in combination with the glass diagonal blade stirrers, which have a diameter of 10 mm in the area of clamping. The product is supplied with the drive, seal and flexible coupling. The stirring shaft seal can be flanged to the cover with a standard glass connector (not supplied).

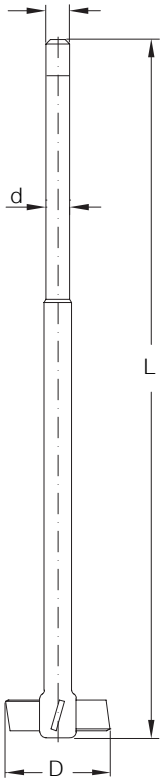
Due to integrated microprocessor-control, these robust, tested-and-proved drives have constant torque. An electronic safety circuit and the soft start-up that prevents spraying are additional advantages. The precision chuck can receive stirrer shafts up to a diameter of 10 mm. The drive of type M-RALD additionally has a digital speed indicator.

Connection voltage is 230V, 50 Hz, the protection rating IP42. The drive is suitable for a maximum ambient temperature of 40°C and maximum relative humidity of 80%. The output torque is 60 Ncm.

With the lip seal, the product comes into contact only with the highly corrosion-resistant materials borosilicate glass 3.3 and PTFE. It also guarantees a good guiding of the stirrer shaft (D 10 or 16 mm) and can be adjusted with a thrust screw.

DN	L	L1	d	Power W	Speed 1/min	Reference
25	527	218	10	75	40-1200	**M-RAL25/10**
25	542	218	16	75	40-1200	**M-RAL25/16**
50	538	218	10	75	40-1200	**M-RAL50/10**
50	553	218	16	75	40-1200	**M-RAL50/16**
25	527	218	10	130	50-2000	**M-RALD25/10**
25	542	218	16	130	50-2000	**M-RALD25/16**
50	538	218	10	130	50-2000	**M-RALD50/10**
50	553	218	16	130	50-2000	**M-RALD50/16**

Borosilicate glass diagonal blade stirrers



D	L	d	Reference[1)]
45	page 4-15	10	**M-SSG45/[L]**
60	page 4-15	10	**M-SSG60/[L]**
75	page 4-15	16	**M-SSG75/[L]**

[1)] References are completed by total length. For appropriate stirrers for the vessels please see table on page 4-15.

COMPLETE LABORATORY STIRRER DRIVES

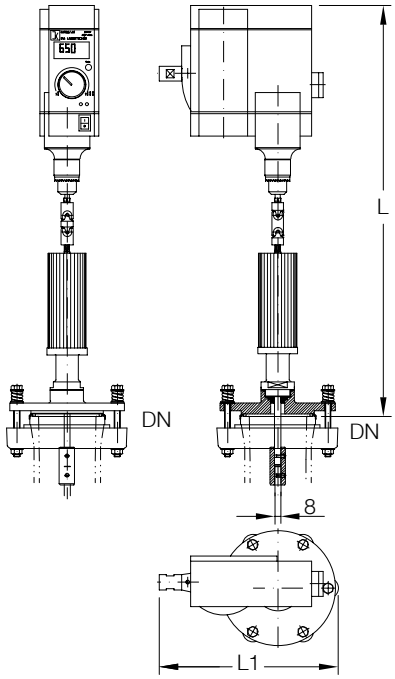
Magnetic coupling for metal stirring devices

The M-RAM and M-RAMD stirrer drives are used in combination with the metal, diagonal-blade and lattice stirrers, which are pinned to the drive shaft through an adapter. The product is supplied with the drive, magnetic coupling, stirring shaft adapter for a diameter of 10 mm, the dual cardan joint and the glass connecting elements.

Due to integrated microprocessor control, these robust, tested-and-proved drives have constant torque (max. 60 Ncm) up to the range of high viscosities (50,000 mPas). An electronic safety circuit and the soft start-up that prevents spraying are additional advantages. The drive of type M-RAMD additionally has a digital speed indicator.

Connection voltage is 230V, 50 Hz, the protection rating IP42. The drive is suitable for a maximum ambient temperature of 40°C and maximum relative humidity of 80%.

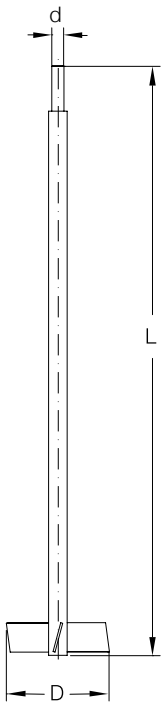
The stirring container seals equipped with a permanent magnet system are gasproof and suitable for high vacuums. Their corrosion resistance depends on the material chosen for the flange and shaft end. These parts are made standard in material No. 1.4435.



DN	L	L1	Power W	Speed 1/min	Reference
25	450	187	75	40-1200	**M-RAM25**
50	530	201	75	40-1200	**M-RAM50**
80	650	218	75	40-1200	**M-RAM80**
100	700	242	75	40-1200	**M-RAM100**
25	450	187	130	50-2000	**M-RAMD25**
50	530	201	130	50-2000	**M-RAMD50**
80	650	218	130	50-2000	**M-RAMD80**
100	700	242	130	50-2000	**M-RAMD100**

Metal diagonal blade stirrers

Material 1.4571, matte pickled and passivated

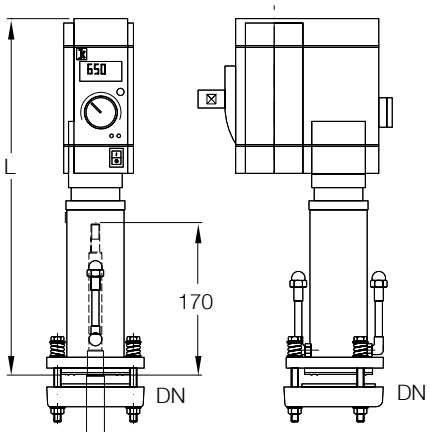


D	L	d	Reference[1)]
45	page 4-15	8	**M-SSE45/[L]**
60	page 4-15	8	**M-SSE60/[L]**
75	page 4-15	8	**M-SSE75/[L]**

[1)] References are completed by total length. For appropriate stirrers for the vessels please see table on page 4-15.

COMPLETE LABORATORY STIRRER DRIVES

Drive with mechanical seal for PTFE stirrers



The M-RGL laboratory stirrer is used when a PTFE diagonal-blade or turbine stirrer is to be used together with a laboratory stirrer drive. The product is supplied with the drive, rotary transmission lead-through for a shaft diameter of 18 mm and the glass connecting elements.

Due to integrated microprocessor control, these robust, tested-and-proved drives have a constant torque of max. 60 Ncm. They can be used up to the range of high viscosities (50,000 mPas). An electronic safety circuit and the soft start-up that prevents spraying are additional advantages. The drive has a digital speed indicator.

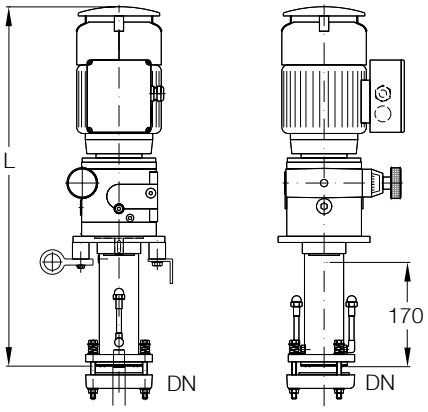
Connection voltage is 230V, 50 Hz, the protection rating IP42. The drive is suitable for a maximum ambient temperature of 40°C and maximum relative humidity of 80%.

A single-acting mechanical seal (sliding-ring SiC, counter ring, hard carbon), which is dependent on the direction of rotation, seals on the product side, while a radial shaft seal ring seals on the atmosphere side. Up to a product temperature of 90°C, the sliding ring chamber is filled with coolant/lubricant and the connections short-circuited. At a product temperature of over 90°C, the mechanical seal is flushed with 2-10 liters of tap water per hour .

DN	L	L1	L2	Reference
50	400	185	217	**M-RGL50/130**

COMPACT STIRRER DRIVE

Gear motor with mechanical seal for PTFE stirrers



Stirrer drive with ATEX certification for zone 1 and temperature class T4

The M-RGD compact stirrer drive is used in combination with the PTFE diagonal blade or turbine stirrers. It consists of a continuously variable, manually adjustable gear motor, rotary transmission lead-through with integrated bearings, and connecting elements. The compact stirrer drive is flanged with its PFA-coated connecting plate to the DN 50 glass nozzle.

A single-acting mechanical seal (sliding-ring SiC, counterring, hard carbon), which is dependent on the direction of rotation, seals on the product side, while a radial shaft seal ring seals on the atmosphere side. Up to a product temperature of 90°C, the sliding ring chamber is filled with coolant/lubricant and the connections short-circuited. At a product temperature of over 90°C, the mechanical seal is flushed with 2-10 liters of tap water per hour .

Standard is a three-phase A.C. motor of currency protection type EEx ell T4, 230/400V, 50 Hz.

DN	D	L	L1	Speed ^{1}/min	Power W	Reference
50	150	590	202	0 - 600	250	**M-RGD50/250**

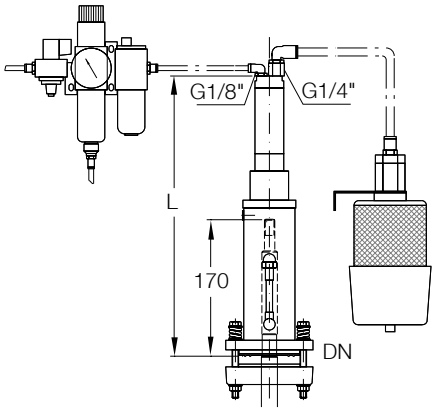
COMPRESSED AIR DRIVES WITH MECHANICAL SEAL

The compressed air drive is combined with the rotary transmission lead-through described in M-RGD and is likewise suitable for PTFE diagonal blade stirrers or turbine stirrers. It consists of the compressed air drive, rotary transmission lead-through with integrated bearings, and the connecting elements. The rotary transmission lead-through is flanged with its PFA-coated connecting plate to the DN 50 glass nozzle.

A single-acting mechanical seal (sliding ring SiC, counter ring, hard carbon), which is dependent on the direction of rotation, seals on the product side, while a radial shaft seal ring seals on the atmosphere side. Up to a product temperature of 90°C, the sliding ring chamber is filled with coolant/lubricant and the connections short-circuited. At a product temperature of over 90°C, the mechanical seal is flushed with 2-10 liters of tap water per hour.

The compressed air drive is operated with an excess pressure of 6.3 bar and has a torque of 4.3 Nm at a nominal speed of 535 rpm and an air throughput of 5.3 l/s.

A pressure reducer and silencer must be used for speed adjustment and noise reduction.

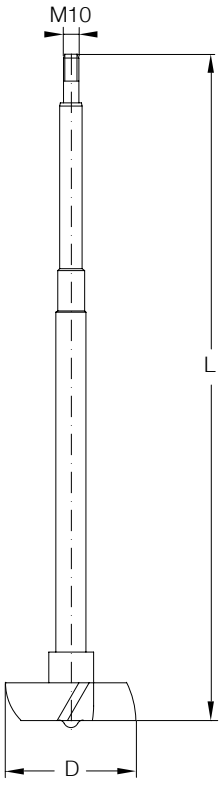


DN	L	L1	Reference
50	350	185	**M-RGP50/240**

PROPELLER STIRRERS, PTFE

The two-part stirrer consists of the PTFE-coated shaft and PTFE stirring device with steel core, which is connected to the shaft in a twist-free manner. A proper seal between the two parts is ensured over the entire permissible temperature range (-50° to +150°C).

The shaft coating and stirring device are made of heat-dissipating PTFE.



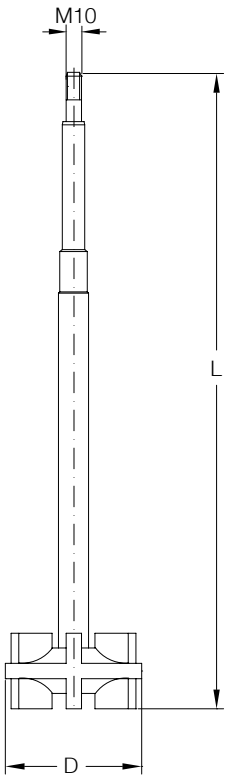
D	L	Reference[1)]
70	page 4-15	**M-SPT70/[L]**
90	page 4-15	**M-SPT90/[L]**
120	page 4-15	**M-SPT120/[L]**

[1)] References are completed by total length. For appropriate stirrers for the vessels please see table on page 4-15.

TURBINE STIRRERS, PTFE

The two-part stirrer consists of the PTFE-coated shaft and PTFE stirring device with steel core, which is connected to the shaft in a twist-free manner. A proper seal between the two parts is ensured over the entire permissible temperature range (-50° to +150°C).

The shaft coating and stirring device are made of heat-dissipating PTFE.

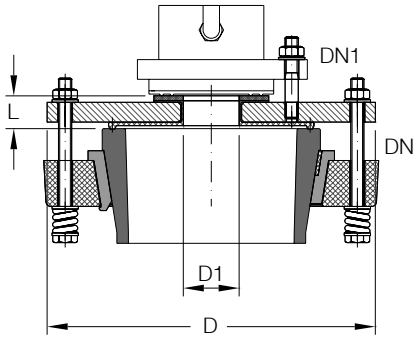


D	L	Reference.[1)]
70	page 4-15	**M-STT70/[L]**
90	page 4-15	**M-STT90/[L]**
120	page 4-15	**M-STT120/[L]**

[1)] References are completed by total length. For appropriate stirrers for the vessels please see table on page 4-15.

CONNECTING FLANGES FOR STIRRERS

The connecting flange TFR... is used to install stirrers in glass spheres and to reduce stirrer nozzles to the connection dimensions of the stirrer drives.



DN	DN1	D	D1	L	Reference
80	50	160	34	19	**TFR80/50**
100	50	200	34	20	**TFR100/50**