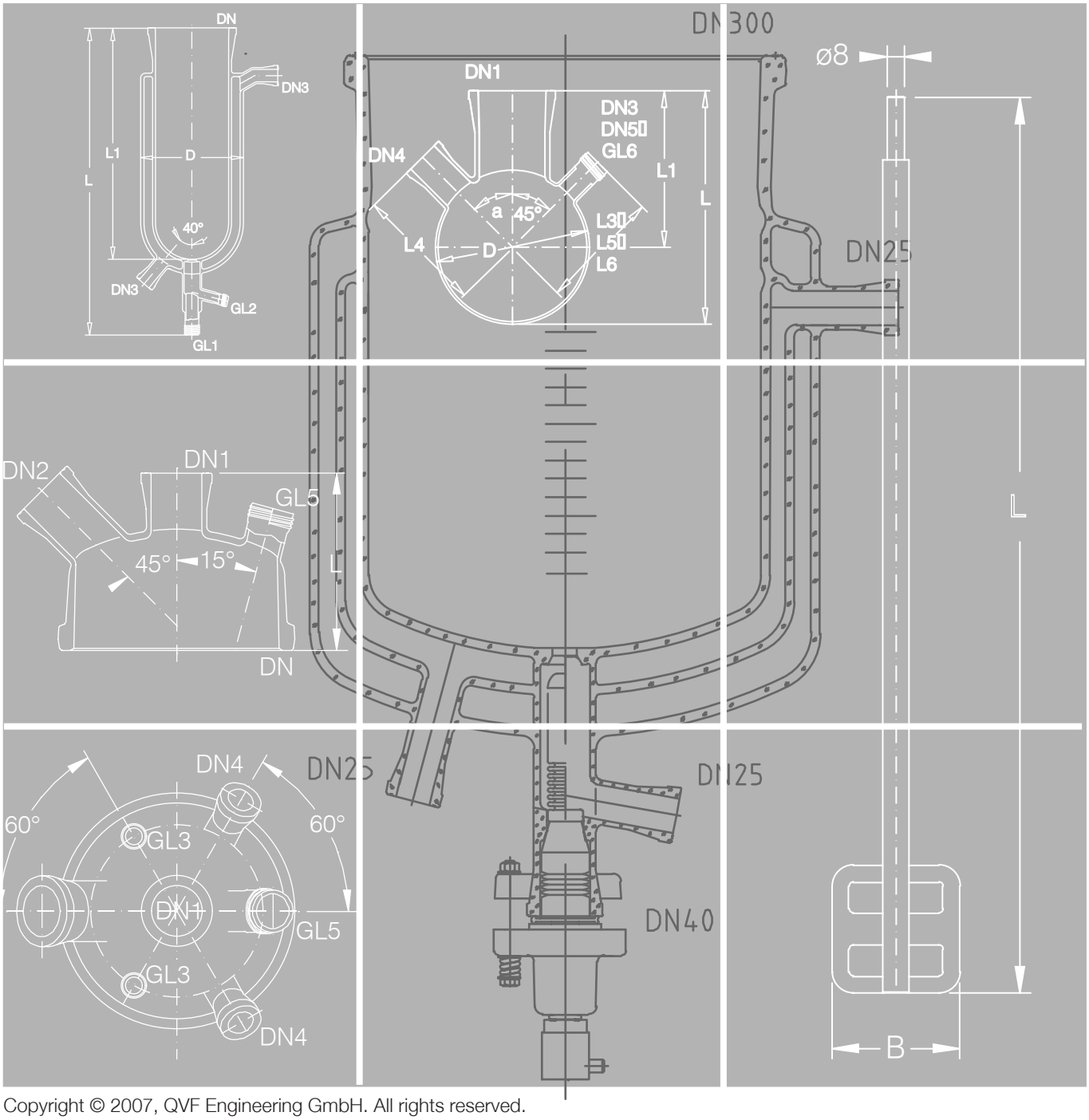


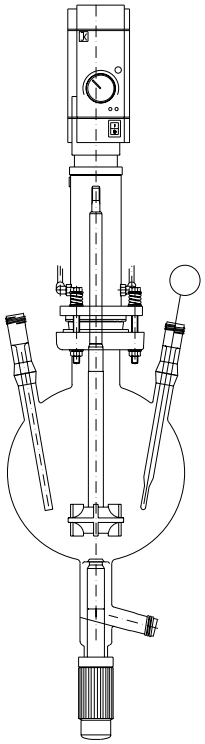
# SPHERICAL VESSELS

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.

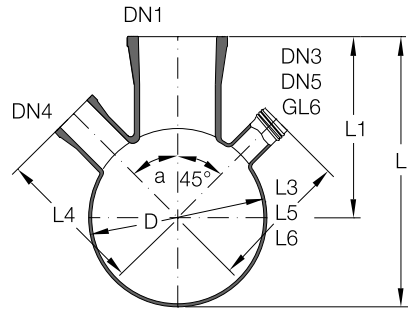
With low temperature reactions, temperatures in the jacket frequently run below the freezing point, so ice can form on the jacket, obstructing vision. Cylindrical triple-wall vessels in which the jacket is surrounded by an additional isolating jacket are suitable for this use. Standardized covers are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

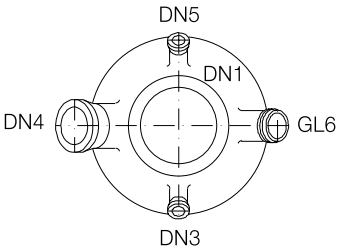


# SPHERICAL VESSELS

## 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** |

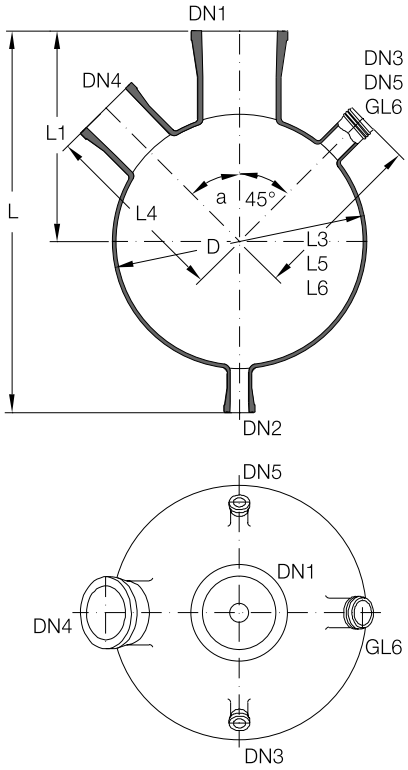


# SPHERICAL VESSELS

## 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** |



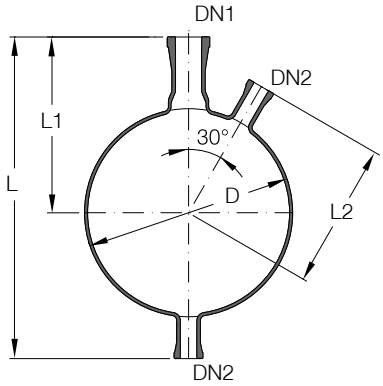


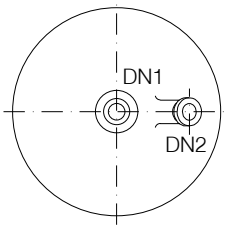


# SPHERICAL VESSELS

## 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

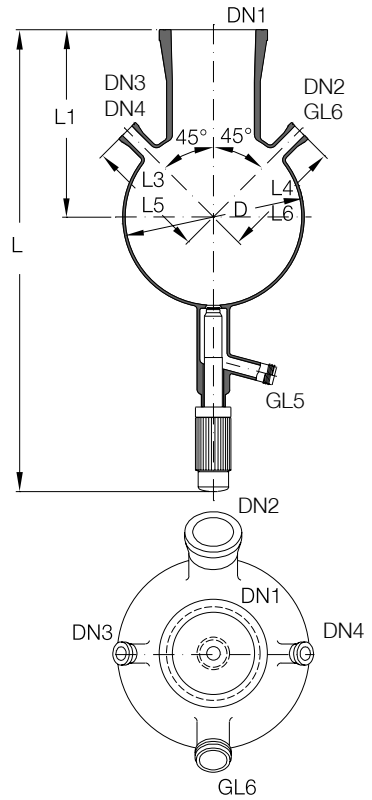
## With low-dead-space bottom drain valve

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.

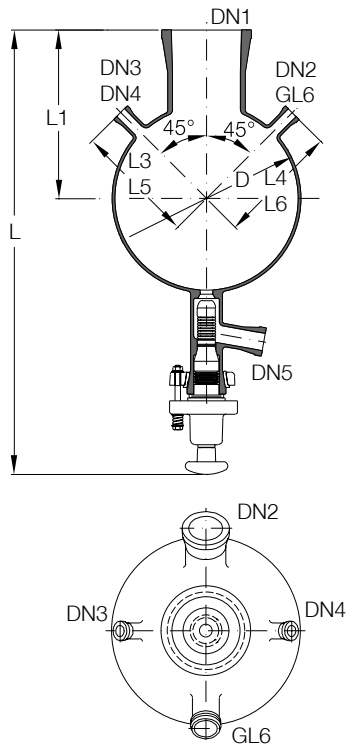
If spheres with bottom nozzles or bottom outlet valves are to be used in heating covers or bath heating vessels, the nozzle length must be adjusted.

| 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**



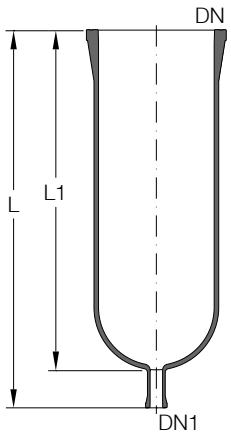

**B**



# CYLINDRICAL VESSELS

## Universal cylindrical vessels

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



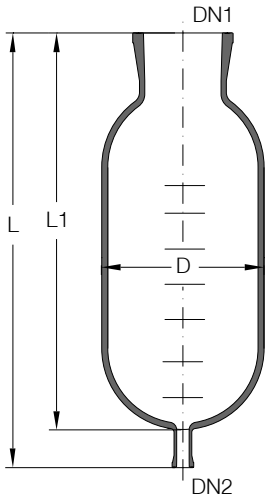

| Nominal capacity(l) | DN | DN1 | L | L1 | Reference | Reference [2] with graduations |
|---|---|---|---|---|---|---|
| 2 | 100 | 15 | 400 | 346 | **M-VZ2/100** | **M-VZG2/100** |
| 4 | 150 | 15 | 400 | 346 | **M-VZ4/150** | **M-VZG4/150** |
| 6 | 150 | 15 | 500 | 446 | **M-VZ6/150** | **M-VZG6/150** |
| *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

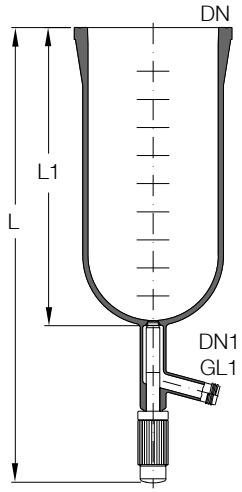
## Universal cylindrical vessels with bottom drain valve

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.

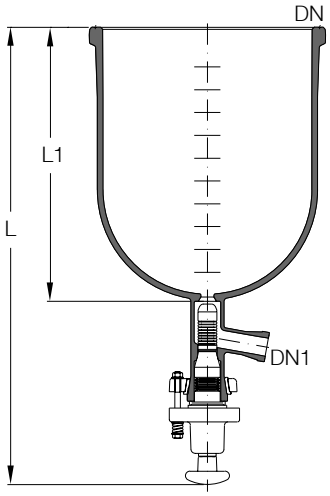
| Nominal capacity(l) | DN | DN1 GL1 | L | L1 | Type | Reference | Reference with graduations |
|---|---|---|---|---|---|---|---|
| 2 | 100 | 18 | 530 | 350 | A | **M-VZB2/100** | **M-VZBG2/100** |
| 4 | 150 | 18 | 530 | 350 | A | **M-VZB4/150** | **M-VZBG4/150** |
| 6 | 150 | 15 | 660 | 450 | A | **M-VZB6/150** | **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**

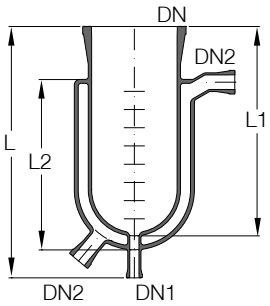



**B**




# 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.

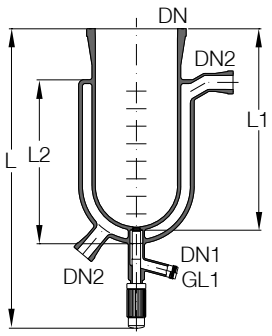
| Nominal capacity(l) | DN | DN1 | DN2 | L | L1 | L2 | Volume jacket | Reference | Reference [1] with graduations |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 100 | 15 | 15 | 475 | 400 | 325 | 2,3 | **M-TVZ2/100** | **M-TVZG2/100** |
| 4 | 150 | 15 | 15 | 450 | 375 | 305 | 2,9 | **M-TVZ4/150** | **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

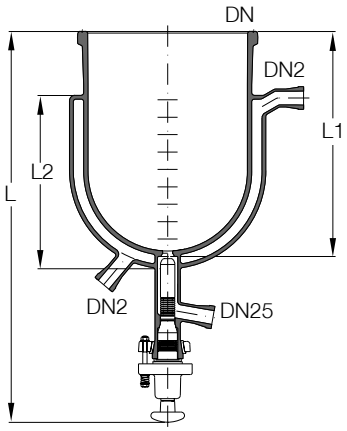
# CYLINDRICAL VESSELS

## Cylindrical vessels with jacket and bottom drain valve

A




B




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.

| 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.

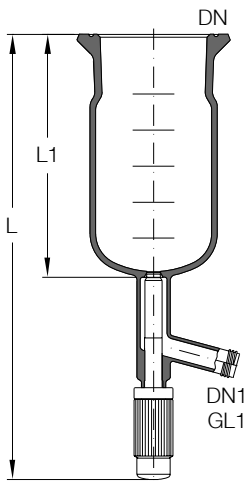
Up to volumes of 4 liters, the main flange is designed as a laboratory flange, for which appropriate covers are available.

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.

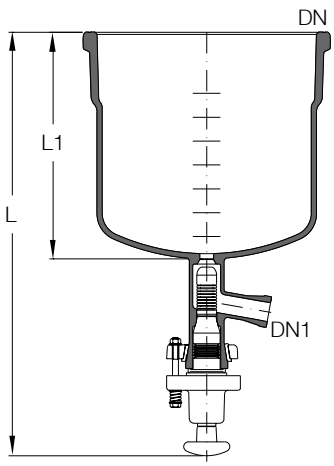
The reaction vessels M-VZB are delivered together with the bottom drain valve.

| 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** |

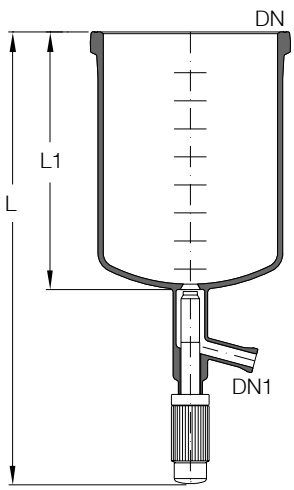
A




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.

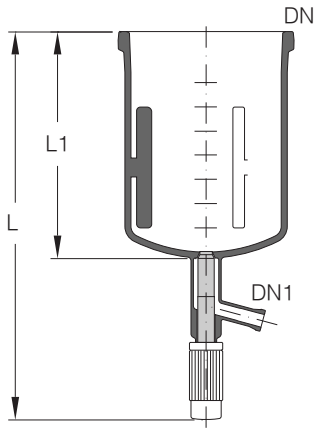
Reaction vessels have their own fused seat for a bottom drain valve, which seals the dome end with low-dead-space from below. The M-OBAS bottom drain valve is used for the nominal volume of 6 litres; for 10 litres and larger, the BASD valve is used.

OptiMix vessels can not be provided with anchor stirrers.

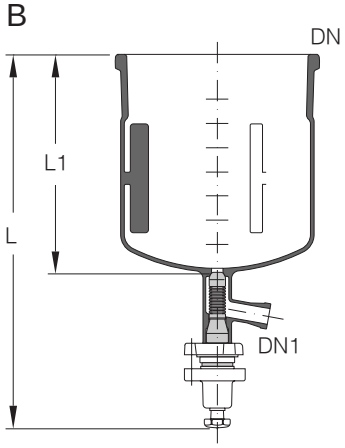
| Nominal capacity(l) | DN | DN1 | L | Type | Reference. |
|---|---|---|---|---|---|
| 6 | 200 | 15 | 515 | **A** | **M-VZKB6OP** |
| 10 | 300 | 25 | 580 | **B** | **M-VZKB10OP** |
| 16 | 300 | 25 | 630 | **B** | **M-VZKB16OP** |
| 25 | 300 | 25 | 755 | **B*** | **M-VZKB25OP** |

* The baffles are split and instaled in two levels.

A




B



# JACKETED REACTION VESSELS

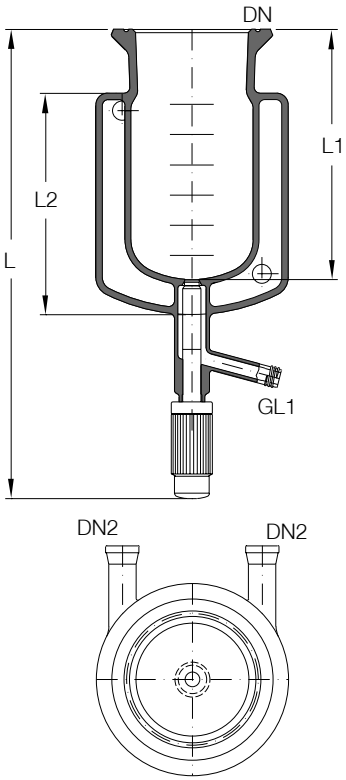
In the Miniplant technology, tempering jackets are fused at the bottom nozzle and inside vessel so they can be operated with water or thermal oil. The nozzles of the tempering jackets are equipped with a safety flat flange, to which you can make straight or angled connections with appropriate adapters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

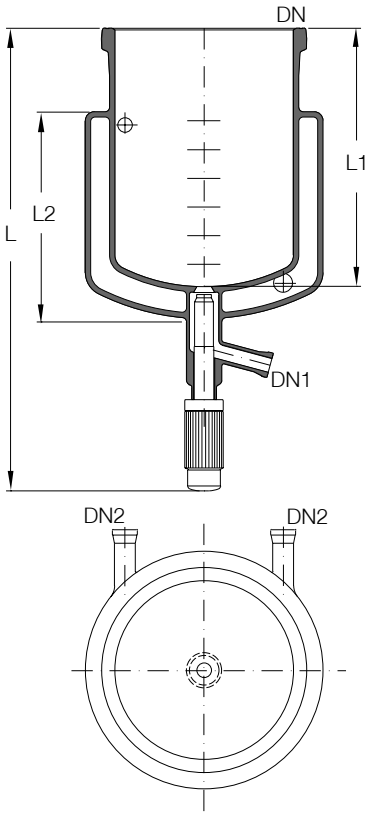
Cylindrical vessels with jacket are supported at the neck nozzle.

| 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** |

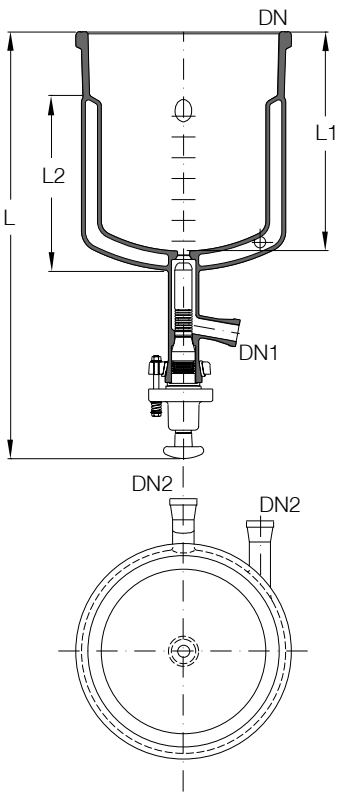
**A**



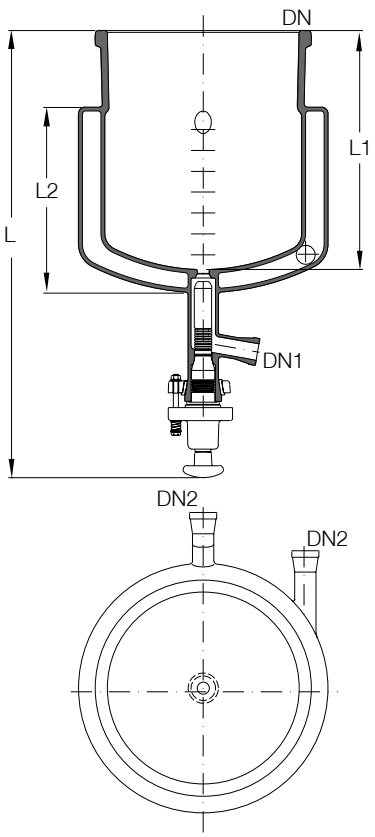

**B**




**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.

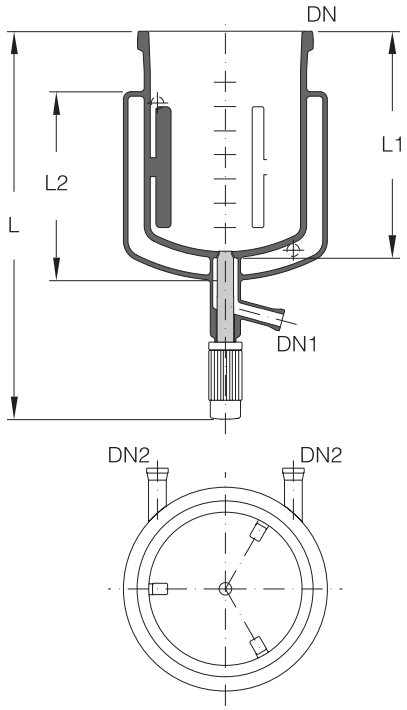
Reaction vessels have their own fused seat for a bottom drain valve, which seals the dome end with low-dead-space from below. The M-OBAS bottom drain valve is used for the nominal volume of 6 litres; for 10 litres and larger, the BASD valve is used.

OptiMix vessels can not be provided with anchor stirrers.

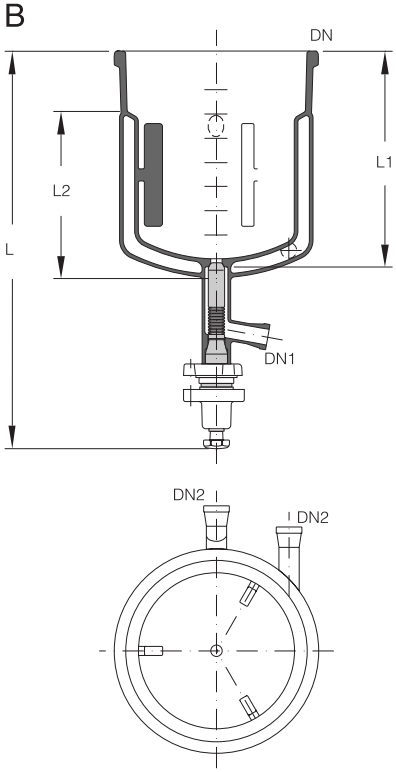
| Nominal capacity(l) | DN | DN1 | DN2 | L1 | L2 | Area dm² | Volume jacket | Type | Reference |
|---|---|---|---|---|---|---|---|---|---|
| 6 | 200 | 15 | 15 | 290 | 250 | 15,24 | 4,7 | **A** | **M-TVZKB6OP** |
| 10 | 300 | 25 | 25 | 350 | 275 | 23,59 | 5,2 | **B** | **M-TVZKB10OP** |
| 16 | 300 | 25 | 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.

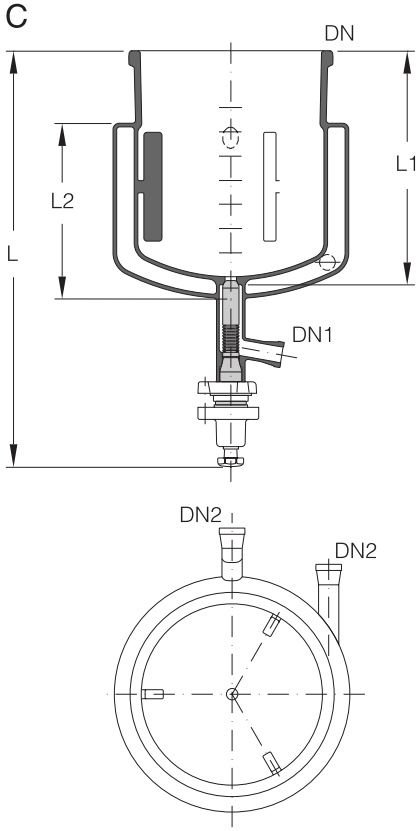
A




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.

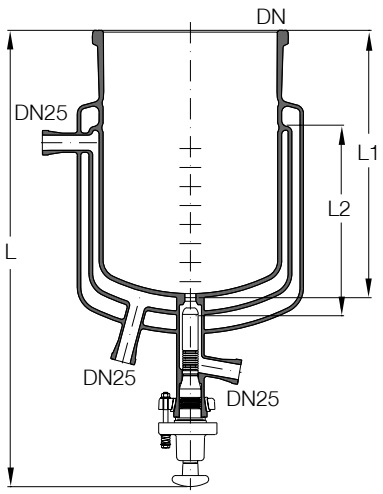
All triple-wall vessels are equipped with a low-dead-space bottom drain valve with overtwist lock. This valve seals from below in a fused glass flange.

All triple-wall vessels are laminated with Sectrans.

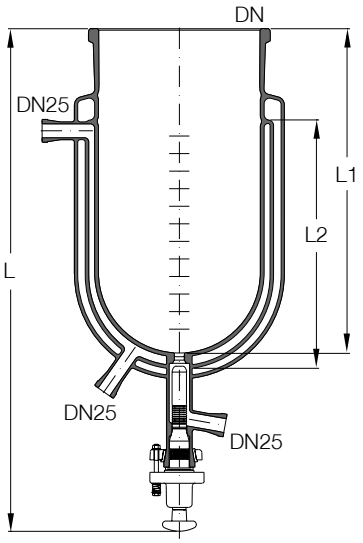
Flow nozzles can be used for better heat exchange in the jacket.

| 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.

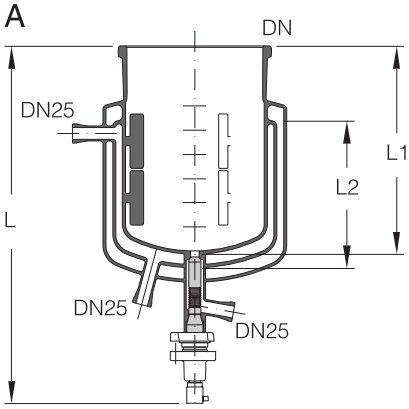
Due to the baffles, the mixing is enhanced and the mixing time reduced what increases the productivity of your plant. The principal design was developed and patented from DDPS for glass-lined vessels. A similar design is used for the glass reaction vessels, to allow scale up.

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

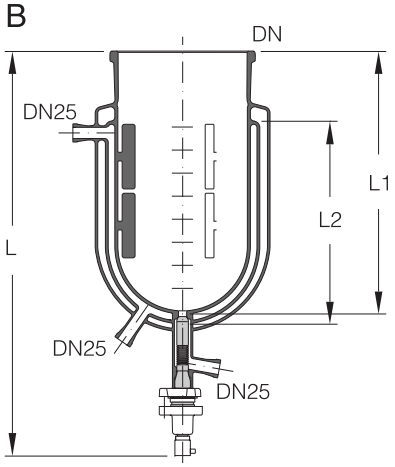
| Nominal capacity(l) | DN | L | L1 | L2 | Area dm² | Volume jacket l | Type | Reference. |
|---|---|---|---|---|---|---|---|---|
| 6,3 | 200 | 700 | 370 | 235 | 16,8 | 9,5 | **A*** | **M-TWR6.3OP** |
| 10 | 200 | 825 | 495 | 360 | 25,2 | 11,7 | **A** | **M-TWR10OP** |
| 16 | 300 | 790 | 460 | 294 |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



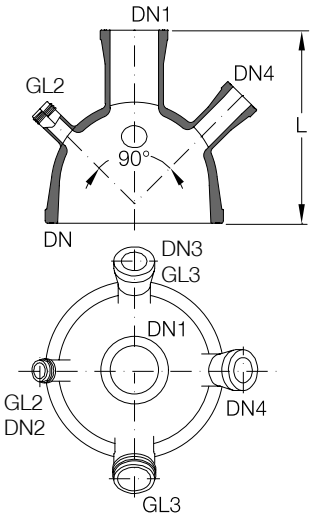

B



# VESSEL COVERS

| DN | DN1 | GL2<br>DN2 | GL3<br>DN3 | GL4<br>DN4 | GL5<br>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

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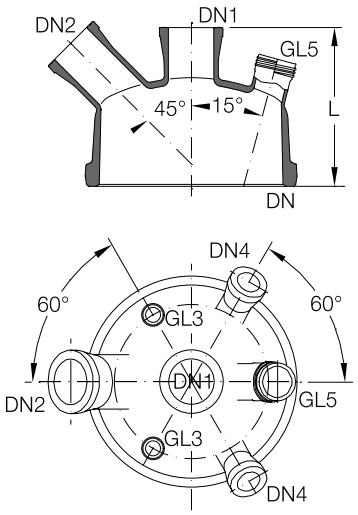
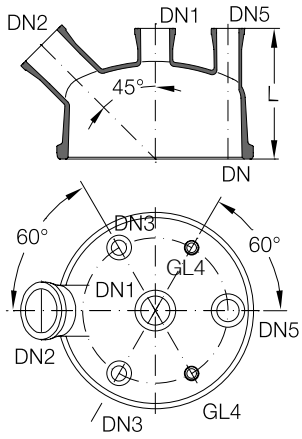



C

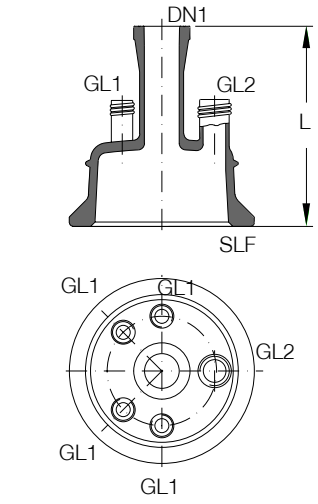



# VESSEL COVERS

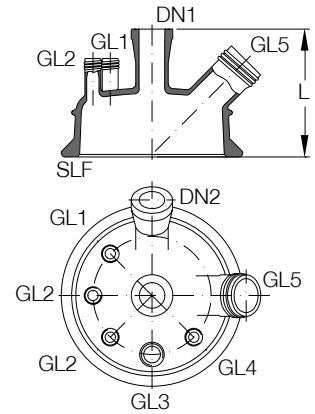
These vessel covers are suitable for connection to vessels with laboratory flanges. You will find a corresponding three-way holder in the "Connections" chapter.

| 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

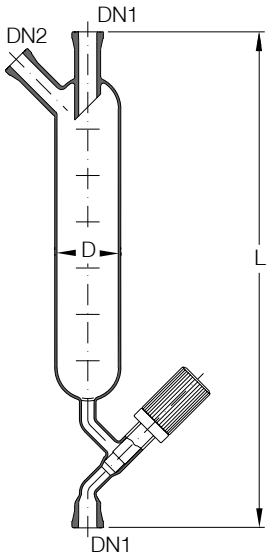


# RECEIVERS

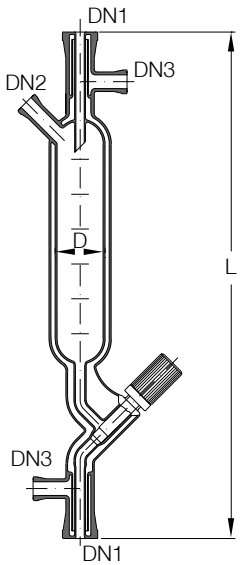
Receivers can be used both for measuring volume in a process and for feeding reaction partners. In the temperature-controlled version, the heat-transfer medium is guided over an integrated baffle plate into the flange area. You will find adapters for heat-transfer hoses in the "Connections" chapter.

| 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



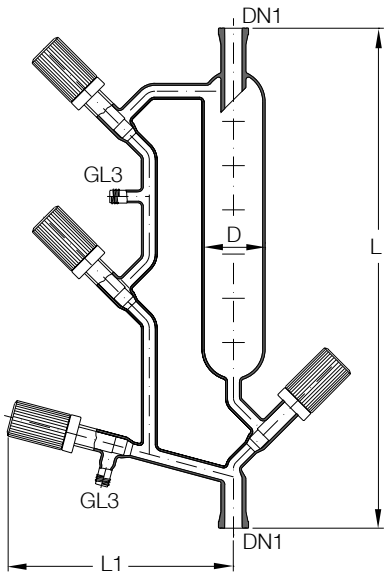
# ANSCHÜTZ-THIELE RECEIVERS

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.

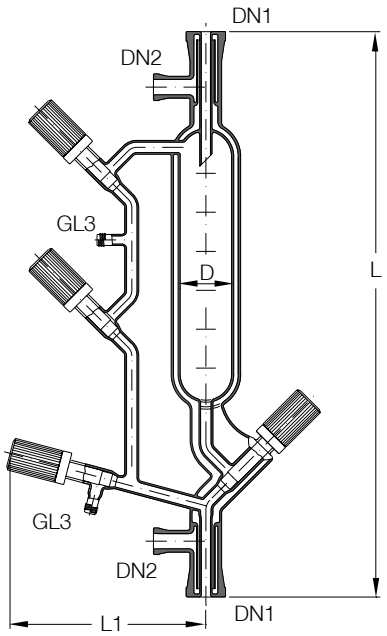
In the temperature-controlled version, the heat-transfer medium is guided over an integrated return into the flange area. You will find adapters for heat-transfer hoses in the "Connections" chapter.

| 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**



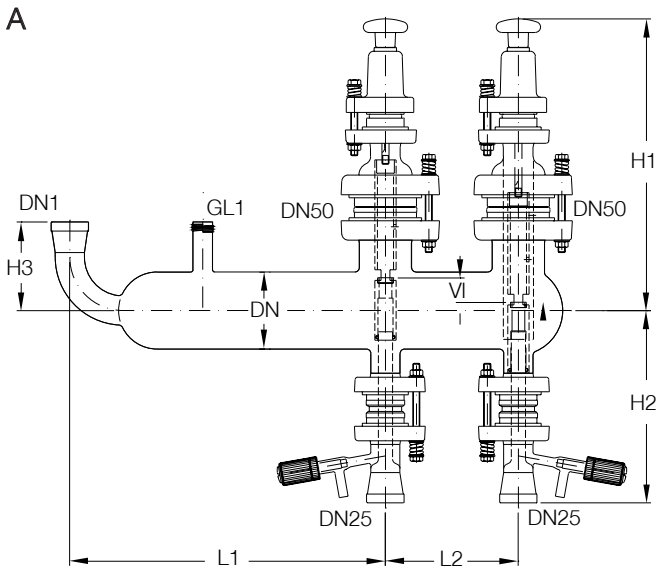
# HORIZONTAL SEPARATORS

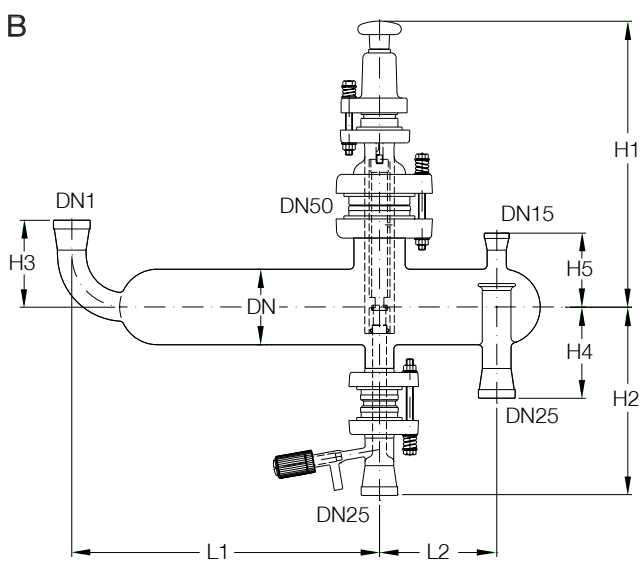
Separators are used for continuous separation of a two-phase mixture. They offer a large phase interface for separating and a low flow speed. The interface is regulated in both versions with an internal overflow valve for the heavy phase. An integrated jacket tube holds the light phase back from the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



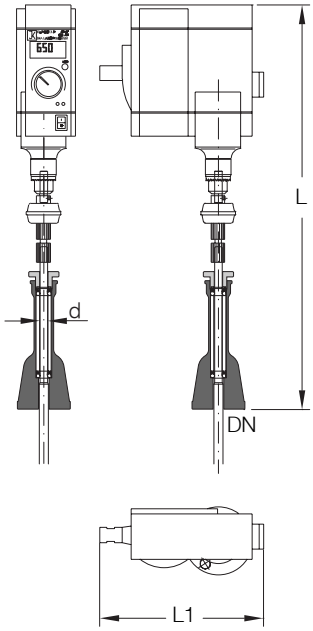
# STIRRER DRIVES

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).

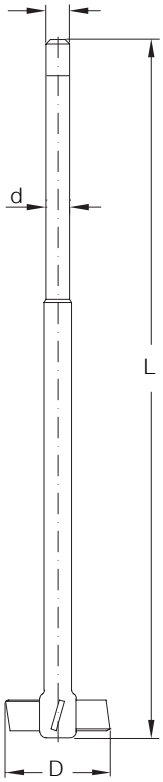
Due to integrated microprocessor-control, these robust, tested-and-proved drives have constant torque. An electronic safety circuit and the soft start-up that prevents spraying are additional advantages. The precision chuck can receive stirrer shafts up to a diameter of 10 mm. The drive of type M-RALD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

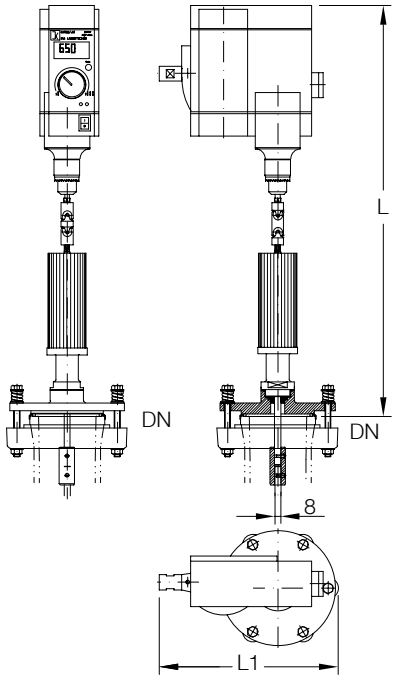



| D | L | d | Reference[1)] |
|---|---|---|---|
| 45 | page 4-15 | 10 | **M-SSG45/[L]** |
| 60 | page 4-15 | 10 | **M-SSG60/[L]** |
| 75 | page 4-15 | 16 | **M-SSG75/[L]** |

[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.

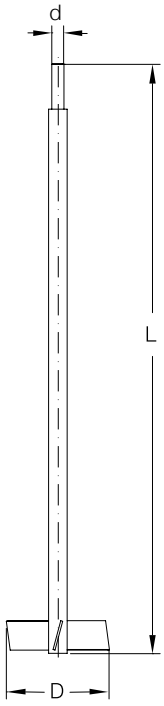
Connection voltage is 230V, 50 Hz, the protection rating IP42. The drive is suitable for a maximum ambient temperature of 40°C and maximum relative humidity of 80%.

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

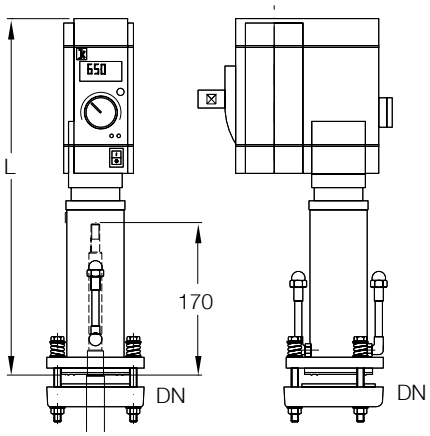



| D | L | d | Reference[1)] |
|---|---|---|---|
| 45 | page 4-15 | 8 | **M-SSE45/[L]** |
| 60 | page 4-15 | 8 | **M-SSE60/[L]** |
| 75 | page 4-15 | 8 | **M-SSE75/[L]** |

[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.

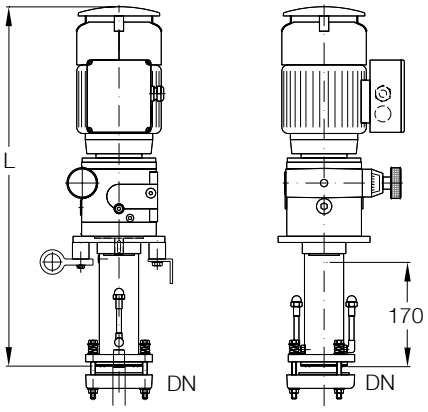
Connection voltage is 230V, 50 Hz, the protection rating IP42. The drive is suitable for a maximum ambient temperature of 40°C and maximum relative humidity of 80%.

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** |

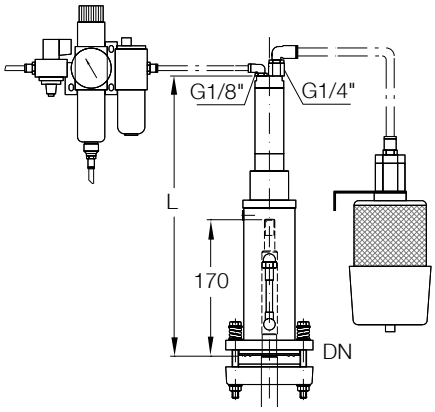
# COMPRESSED AIR DRIVES WITH MECHANICAL SEAL

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.

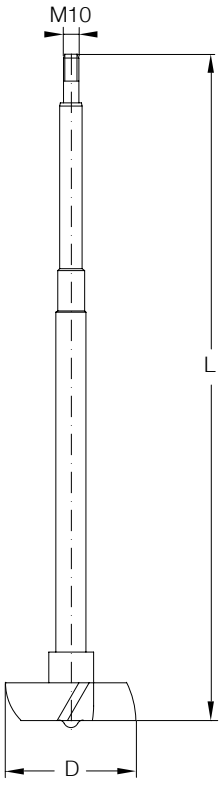



| DN | L | L1 | Reference |
|---|---|---|---|
| 50 | 350 | 185 | **M-RGP50/240** |

# 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.



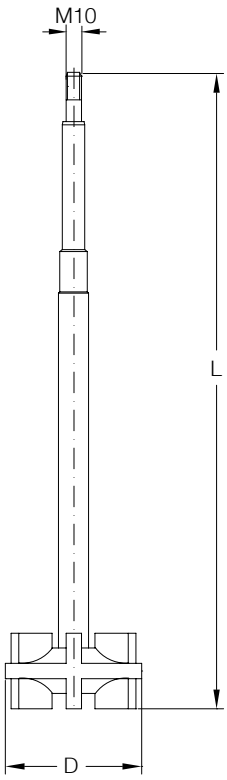

| D | L | Reference[1)] |
|---|---|---|
| 70 | page 4-15 | **M-SPT70/[L]** |
| 90 | page 4-15 | **M-SPT90/[L]** |
| 120 | page 4-15 | **M-SPT120/[L]** |

[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.

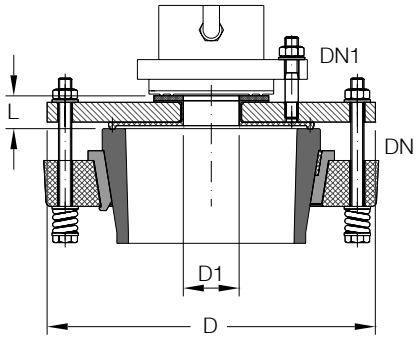



| D | L | Reference.[1)] |
|---|---|---|
| 70 | page 4-15 | **M-STT70/[L]** |
| 90 | page 4-15 | **M-STT90/[L]** |
| 120 | page 4-15 | **M-STT120/[L]** |

[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** |