# Stirring and Mixing



Magnetic stirring bars and stirrer shafts have to feature many different qualities since they are used with many different products and in different vessels. The comprehensive BOLA range is offering the best possible solution – if not, we will manufacture according to your specifications.

## PRODUCT TIPS

Page 52
Magnetic Stirring Bars

Page 20
Stirrer Shaft

Page 43
Stirrer Coupling

# BOLA Stirrer Shafts

## What you should know about BOLA Stirrer Shafts

BOLA Stirrer Shafts consist of a PTFE-jacketed stainless steel shaft and a stirrer blade made of solid PTFE. The stainless steel core provides high mechanical stability and allows a safe fixing in the agitator.

### Unbreakable

All glass stirrer shafts which are commonly used in laboratories are very fragile. Dropping, stirring solid materials or too much power transmitted from the agitator to the product can cause broken glass. Due to their solid stainless steel core, BOLA Stirrer Shafts are protected against all these possibilities of breaking.

### Universal chemical resistance

Due to the thick PTFE-jacket, the product which is stirred is only exposed to PTFE. This assures an almost universal chemical resistance. PTFE-jacketed stirrer shafts can be used whenever stirrer shafts made of PP (polypropylene), glass or stainless steel are not sufficient.

### Temperature resistance

Stirrer shafts made of PP (polypropylene) are deformed at temperatures exceeding +100°C and cannot be used any longer. All BOLA PTFE-jacketed stirrer shafts can be used at temperatures of up to +250°C without any negative effects on their chemical resistance.

### Non-adhesive

The surfaces of glass and stainless steel stirrer shafts allow adhesion of products (in particular such as dyes and glues). BOLA PTFE Stirrer Shafts, however, are non-adhesive and therefore eliminate adhesion of dyes and glues.

### Interchangeability

At present, most stirrer shafts used in laboratories are made of glass. All BOLA Stirrer Shafts are available with the same diameters, lengths and surface qualities (KPG) as stirrer shafts made of glass. Thus, the user can easily replace the glass stirrer shaft with a PTFE-jacketed stirrer shaft and does not have to change agitators, couplings and guiding devices.

### Safe fixing

The upper end of the BOLA Stirrer Shaft is not jacketed with PTFE and can therefore be fixed safely into the agitator or the stirrer coupling.

### Solid stirrer blade

The stirrer blade is fixed tightly to the stirrer shaft and cannot be loosened by the product which is still turning after switching off the agitator. The stirrer shafts are suitable for clockwise and counterclockwise rotation.

**Frequently asked: Why don't you coat stirrer shafts?**

Coating with PTFE only provides a thin plastic layer. This layer can be damaged very easily by aggressive products, friction or rough handling during storage. A possible consequence is that parts of the layer are peeled off.

**The BOLA solution:** A solid PTFE jacket together with solid stirrer blades. BOLA Stirrer Shafts provide a long durability and an excellent mechanical resistance.

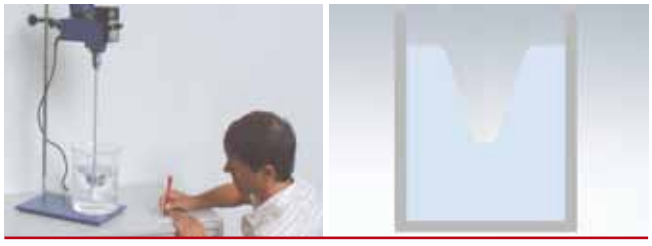
**Suitable chucking diameter of stirrer shafts**

Very long stirrer shafts need to have suitable diameters to be stable enough. All BOLA Stirrer Shafts have adequate diameters and lengths. If the chucking diameter of a stirrer shaft is too big, it can mostly be reduced by machining. This machining has to be made totally self-centring to avoid eccentricity of the stirrer shaft.
Please contact us if you need a reduced chucking diameter (see page 34).

**Results of stirring – tested for you**

In order to help you choose the suitable stirrer shaft for your application, we have made tests with typical data. These graphs shall give you an indication for the stirring effects of the BOLA Stirrer Shafts.

- Speed: 500 rpm
- Volume: 2.000 ml
- Product: water
- Temperature: 20°C
- Vessel: glass beaker



## BOLA Propeller Stirrer Shafts

BESTSELLER

| Material: | Temperature resistance: | Chemical resistance: | Stirring effect: |
|---|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** | **bottom-up** |

Product description:

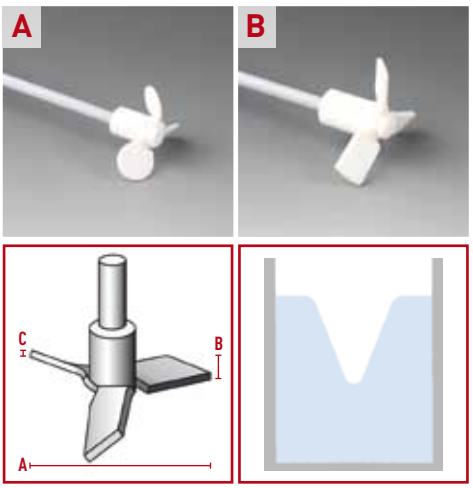
PTFE-jacketed stainless steel shaft, propeller completely made of PTFE with three 45° angled round or angular blades. Universal chemical resistance since the product is only exposed to PTFE.

FDA conform

| | Length mm | Shaft dia. mm | Chucking dia. mm | Dimensions according to drawing A | B | C mm | Cat. No.: |
|---|---|---|---|---|---|---|---|
| A | 250 | 6 | 4 | 50 | 18 | 1,5 | C 378-04 |
| | 350 | 6 | 4 | 50 | 18 | 1,5 | C 378-06 |
| | 450 | 6 | 4 | 50 | 18 | 1,5 | C 378-08 |
| B | 350 | 8 | 6,5 | 75 | 18 | 3,0 | C 378-12 |
| | 450 | 8 | 6,5 | 75 | 18 | 3,0 | C 378-14 |
| | 600 | 8 | 6,5 | 75 | 18 | 3,0 | C 378-16 |
| | 450 | 10 | 8,0 | 75 | 18 | 3,0 | C 378-18 |
| | 600 | 10 | 8,0 | 75 | 18 | 3,0 | C 378-20 |
| | 800 | 10 | 8,0 | 75 | 18 | 3,0 | C 378-22 |

**Applications:**

The product is sucked bottom-up, good axial flow with low shear force.




## BOLA Moon-Shaped Stirrer Shafts

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

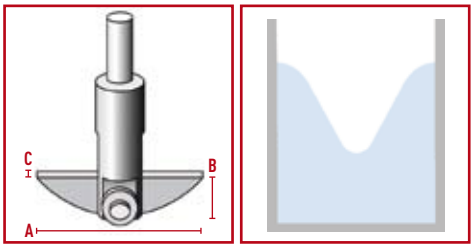
PTFE-jacketed stainless steel shaft, tilting half-moon stirrer blade with double-sided groove and access for the stirrer shaft completely made of PTFE. Universal chemical resistance since the product is only exposed to PTFE.

FDA conform

| Length mm | Shaft dia. mm | Chucking dia. mm | For ground joint NS | Dimensions according to drawing A | B | C mm | Cat. No.: |
|---|---|---|---|---|---|---|---|
| 350 | 8 | 6,5 | 24/29 | 65 | 18 | 3 | C 376-02 |
| 450 | 8 | 6,5 | 24/29 | 65 | 18 | 3 | C 376-04 |
| 350 | 8 | 6,5 | 29/32 | 90 | 24 | 3 | C 376-06 |
| 450 | 8 | 6,5 | 29/32 | 90 | 24 | 3 | C 376-08 |
| 600 | 8 | 6,5 | 29/32 | 90 | 24 | 3 | C 376-10 |
| 350 | 10 | 8,0 | 29/32 | 90 | 24 | 3 | C 376-12 |
| 450 | 10 | 8,0 | 29/32 | 90 | 24 | 3 | C 376-14 |
| 510 | 10 | 8,0 | 29/32 | 90 | 24 | 3 | C 376-16 |
| 600 | 10 | 8,0 | 29/32 | 90 | 24 | 3 | C 376-18 |
| 1.000 | 10 | 8,0 | 29/32 | 90 | 24 | 3 | C 376-19 |
| 600 | 16 | 14,0 | 45/40 | 125 | 35 | 3 | C 376-20 |
| 800 | 16 | 14,0 | 45/40 | 125 | 35 | 3 | C 376-22 |

**Applications:**

Tangential flow with little turbulence. The tilting half-moon blade is ideal for stirring in round-bottom flasks with ground joint necks. Blades (see Cat. No. C 400-.. on page 47) are available separately and can be mounted additionally.




## BOLA Double-Moon-Shaped Stirrer Shafts

Material: **PTFE**
Temperature resistance: **from -200°C to + 250°C**
Chemical resistance: **+++ universal**

NEW

FDA conform

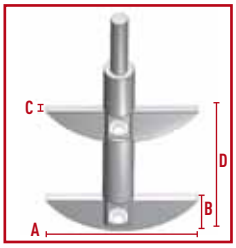
Product description:

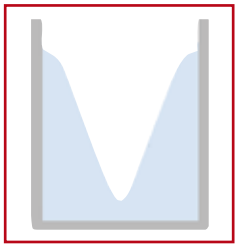
PTFE-jacketed stainless steel shaft, two each tilting half-moon stirrer blades with double-sided groove and access for the stirrer shaft completely made of PTFE. Universal chemical resistance since the product is only exposed to PTFE.

| Length mm | Shaft dia. mm | Chucking dia. mm | For ground joint NS | Dimensions according to drawing A | B | C | D | Cat. No.: |
|---|---|---|---|---|---|---|---|---|
| 350 | 8 | 6,5 | 24/29 | 65 | 18 | 3 | 130 | C 374-02 |
| 350 | 10 | 8,0 | 29/32 | 90 | 24 | 3 | 140 | C 374-12 |
| 450 | 10 | 8,0 | 29/32 | 90 | 24 | 3 | 140 | C 374-14 |
| 600 | 10 | 8,0 | 29/32 | 90 | 24 | 3 | 140 | C 374-18 |

**Applications:**

Tangential flow with little turbulence. Ideal for high and narrow vessels. The tilting half-moon blade is ideal for stirring in round-bottom flasks with ground joint neck. Blades (see Cat. No. C 400-.. on page 47) are available separately and can be mounted additionally.



## BOLA INNOVATION

**Stirrer Shafts – solid and chemically resistant**

Glass stirrer shafts can break, metal stirrer shafts are not chemically resistant. In comparison, BOLA Stirrer Shafts with stainless steel core are unbreakable and have an almost universal chemical resistance.

**SUITABLE:** page **36**
Stirrer bearings for BOLA stirrer shafts

## BOLA Stirrer Shafts with One Paddle

Material: **PTFE**
Temperature resistance: **from -200°C to + 250°C**
Chemical resistance: **+++ universal**
Stirring effect: **bottom-up**

FDA conform

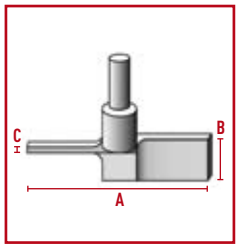
Product description:

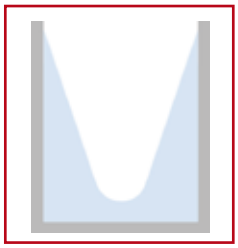
PTFE-jacketed stainless steel shaft, paddle completely made of PTFE with two 45° angled blades. Universal chemical resistance since the product is only exposed to PTFE.

| Length mm | Shaft dia. mm | Chucking dia. mm | Dimensions according to drawing A | B | C mm | Cat. No.: |
|---|---|---|---|---|---|---|
| 450 | 8 | 6 | 80 | 18 | 4 | C 379-02 |
| 600 | 8 | 6 | 80 | 18 | 4 | C 379-04 |
| 800 | 8 | 6 | 80 | 18 | 4 | C 379-06 |
| 600 | 10 | 8 | 110 | 20 | 5 | C 379-08 |
| 800 | 10 | 8 | 110 | 20 | 5 | C 379-10 |
| 1.000 | 10 | 8 | 110 | 20 | 5 | C 379-12 |
| 1.000 | 16 | 14 | 140 | 25 | 12 | C 379-18 |

**Applications:**

The product is sucked bottom-up, very good axial flow with low shear force.



# BOLA U-Shaped Stirrer Shafts

BESTSELLER

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

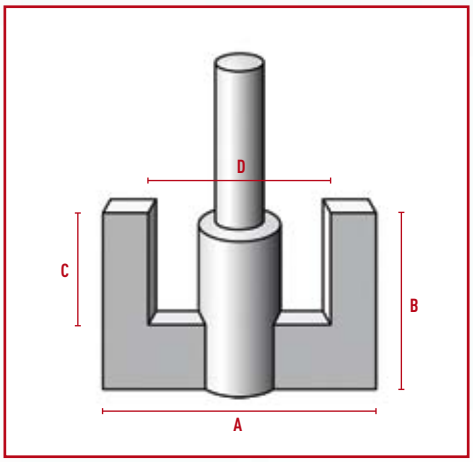
PTFE-jacketed stainless steel shaft, u-shaped stirrer blade completely made of PTFE. Universal chemical resistance since the product is only exposed to PTFE.

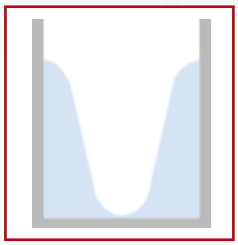
FDA conform

| Length mm | Shaft dia. mm | Chucking dia. mm | Dimensions according to drawing A | B | C | D mm | Cat. No.: |
|---|---|---|---|---|---|---|---|
| 350 | 8 | 6,5 | 40 | 35 | 20 | 26 | C 384-01 |
| 350 | 8 | 6,5 | 60 | 40 | 25 | 30 | C 384-02 |
| 450 | 8 | 6,5 | 60 | 40 | 25 | 30 | C 384-04 |
| 450 | 8 | 6,5 | 80 | 50 | 30 | 44 | C 384-06 |
| 600 | 8 | 6,5 | 80 | 50 | 30 | 44 | C 384-08 |
| 600 | 8 | 6,5 | 100 | 60 | 35 | 56 | C 384-10 |
| 350 | 10 | 8,0 | 80 | 50 | 30 | 44 | C 384-16 |
| 450 | 10 | 8,0 | 80 | 50 | 30 | 44 | C 384-17 |
| 600 | 10 | 8,0 | 100 | 60 | 35 | 56 | C 384-24 |
| 800 | 10 | 8,0 | 100 | 60 | 35 | 56 | C 384-28 |
| 1.000 | 10 | 8,0 | 100 | 60 | 35 | 56 | C 384-32 |
| 1.200 | 10 | 8,0 | 100 | 60 | 35 | 56 | C 384-40 |
| 600 | 10 | 8,0 | 130 | 80 | 55 | 80 | C 384-44 |
| 800 | 10 | 8,0 | 130 | 80 | 55 | 80 | C 384-48 |
| 1.000 | 16 | 14,0 | 130 | 80 | 55 | 80 | C 384-50 |
| 800 | 16 | 14,0 | 150 | 120 | 90 | 90 | C 384-52 |
| 1.000 | 16 | 14,0 | 150 | 120 | 90 | 90 | C 384-58 |
| 1.200 | 16 | 14,0 | 150 | 120 | 90 | 90 | C 384-64 |

**Applications:**

Strong, tangential flow with high shear rate in the margin area, little sediments on the wall of the vessel. Ideal for mixing viscous liquids.



**BOLA Practical Tipp**

Marion Stoppel » construction

**Big effective circular diameter, but small vessel neck?**

No problem if you use our tilting moon-shaped or centrifugal stirrer shafts.

see page 20 and 25

**SUITABLE:** page **32**
Additional stirrer blades

## BOLA BENEFITS

- very low centrifugal forces due to low weight
- suitable for both left- and right-handed rotation (except for GL 10 thread: no left-handed rotation possible)
- no resonance
- simple assembly by means of screw joints with clamp rings
- pivot (length 90 mm) can be shortened by the user

## BOLA Globe Stirrer Couplings

BESTSELLER

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **POM** | **from -20°C to + 110°C** | **++ very good** |

Product description:

Made of POM, a plastic material with a good mechanical strength, powerful transmission of up to 300 Ncm, suitable for a speed of up to 1.200 rounds per minute, maximum misalignment of axes 10 mm.

NEW

| | Opening for stirrer shaft mm | Upper dia. mm | Total length mm | Cat. No.: |
|---|---|---|---|---|
| A | Ø 6,5 and 10 | 10 | 190 | C 398-08 |
| B | Ø 8 and 10 | 10 | 190 | C 398-12 |
| C | Inner square SW6 | SW8 | 180 | C 399-12 |
| D | GL 10 | 10 | 170 | C 393-12 |

**Applications:**

Ideal for balancing misalignment of axes between agitator and stirrer shaft, suitable for glass, metal or BOLA stirrer shafts.

A

B

C

D

## BOLA INNOVATION

**Globe Stirrer Coupling**

The BOLA Globe Stirrer Coupling is made of a light-weight but robust plastic. It only produces a very low centrifugal force, its vibrations are damped so that it runs very smoothly.

# BOLA Maxi Propeller Stirrer Shafts

BESTSELLER

| Material: | Temperature resistance: | Chemical resistance: | Stirring effect: |
|---|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** | **bottom-up** |

Product description:

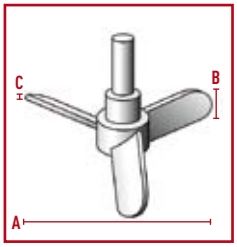
PTFE-jacketed stainless steel shaft, propeller completely made of PTFE with three 45° angled blades. Universal chemical resistance since the product is only exposed to PTFE.

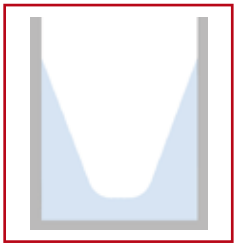
FDA conform

| Length mm | Shaft dia. mm | Chucking dia. mm | Dimensions according to drawing A | B | C mm | Cat. No.: |
|---|---|---|---|---|---|---|
| 450 | 10 | 8 | 140 | 20 | 4 | C 392-28 |
| 600 | 10 | 8 | 140 | 20 | 4 | C 392-34 |
| 800 | 10 | 8 | 140 | 20 | 4 | C 392-40 |
| 1.200 | 10 | 8 | 140 | 20 | 4 | C 392-42 |
| 800 | 16 | 14 | 140 | 26 | 6 | C 392-44 |
| 1.000 | 16 | 14 | 140 | 26 | 6 | C 392-46 |
| 600 | 16 | 14 | 200 | 26 | 6 | C 392-52 |
| 800 | 16 | 14 | 200 | 26 | 6 | C 392-58 |
| 1.000 | 16 | 14 | 200 | 26 | 6 | C 392-64 |
| 1.200 | 16 | 14 | 200 | 26 | 6 | C 392-70 |
| 1.600 | 16 | 14 | 200 | 26 | 6 | C 392-74 |
| 1.200 | 16 | 14 | 280 | 26 | 8 | C 392-80 |
| 1.600 | 16 | 14 | 280 | 26 | 8 | C 392-84 |
| 1.200 | 16 | 14 | 400 | 26 | 8 | C 392-90 |
| 1.600 | 16 | 14 | 400 | 26 | 8 | C 392-94 |

**Applications:**

The product is sucked bottom-up, very good axial flow with low local shear force.



Special **Request**?
+49 (0) 9346-9286-0

## Stirrer Shafts

At BOLA we get custom made stirrer shafts with exactly the dimensions that we require. This way we achieve optimal mixing of our products in glass reactors.

Dieter Waldhaus » Merck KGaA

## BOLA Impeller Stirrer Shafts

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

PTFE-jacketed stainless steel shaft, impeller completely made of PTFE with three blades bent backwards, lower side of impeller either even or 15° angled. Universal chemical resistance since the product is only exposed to PTFE

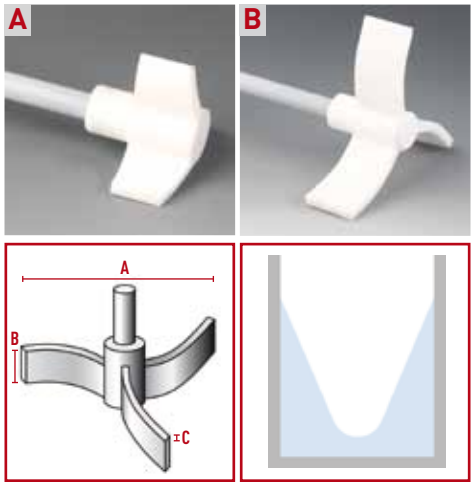
**NEW**

FDA conform

| | Length mm | Shaft dia. mm | Chucking dia. mm | Angle | Dimensions according to drawing A | B | C mm | Cat. No.: |
|---|---|---|---|---|---|---|---|---|
| A | 350 | 10 | 8 | 15° | 45 | 22 | 5 | C 389-18 |
| | 350 | 10 | 8 | 15° | 60 | 25 | 5 | C 389-20 |
| | 450 | 10 | 8 | 15° | 60 | 25 | 5 | C 389-22 |
| B | 350 | 10 | 8 | 0° | 100 | 25 | 5 | C 389-24 |
| | 450 | 10 | 8 | 0° | 100 | 25 | 5 | C 389-28 |
| | 600 | 10 | 8 | 0° | 100 | 25 | 5 | C 389-32 |
| | 800 | 10 | 8 | 0° | 100 | 25 | 5 | C 389-36 |
| | 600 | 10 | 8 | 0° | 150 | 25 | 5 | C 389-62 |
| | 800 | 10 | 8 | 0° | 150 | 25 | 5 | C 389-66 |

**Applications:**

Very good and gentle stirring due to blades which are bent backwards, low shear force. The 15° angled impellers are ideal for stirring in vessels with round bottom.




## BOLA Centrifugal Stirrer Shafts

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

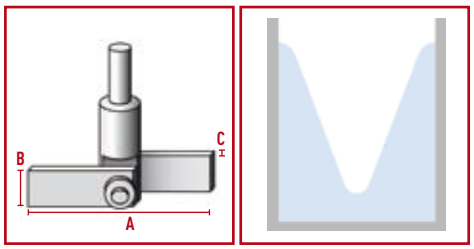
PTFE-jacketed stainless steel shaft, stirring unit (movable paddles, bolt and receiver for paddles) completely made of PTFE. The paddles open up at increasing speed. Universal chemical resistance since the product is only exposed to PTFE.

FDA conform

| Length mm | Shaft dia. mm | Chucking dia. mm | Dimensions according to drawing A | B | C mm | Cat. No.: |
|---|---|---|---|---|---|---|
| 350 | 6 | 4 | 50 | 17 | 2,0 | C 377-04 |
| 350 | 8 | 6,5 | 90 | 17 | 2,0 | C 377-08 |
| 450 | 8 | 6,5 | 90 | 17 | 2,5 | C 377-10 |
| 350 | 10 | 8,0 | 90 | 17 | 2,5 | C 377-12 |
| 450 | 10 | 8,0 | 90 | 17 | 2,5 | C 377-14 |
| 600 | 10 | 8,0 | 90 | 17 | 2,5 | C 377-16 |

**Applications:**

The stirrer shaft can be used for stirring in narrow mouth vessels or in vessels with ground joint opening (starting at size NS 24).




For ground joint starting at NS 24

**SUITABLE:** page **48**
Additional stirrer paddles

## BOLA Gassing Stirrer

| Material: | Temperature resistance: | Chemical resistance: | Vacuum: | autoclave: |
|---|---|---|---|---|
| **PTFE** | **from -200 °C to +250 °C** | **+++ universal** | **suitable** | **121°** |

NEW

FDA conform

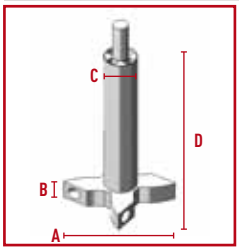
Product description:

PTFE-jacketed stainless steel shaft, propeller with four blades completely made of PTFE. Clockwise rotation of the shaft produces a vacuum behind the stirrer blades. By this vacuum, the gas is transported from the gas compartment through the hollow shaft and into the product. The rotation speed depends on the fluid level and the immersion depth: e. g. 430 rpm are necessary at 150mm, and 690 rpm are necessary at 350 mm.
The length of the shaft and the suction pipe can be adapted individually.
Minimum one baffle is imperative for proper operation (Cat.No. C 490-..).
Universal chemical resistance, the product is only exposed to PTFE.

| Length mm | Shaft dia. mm | Chucking dia.mm | Dimensions according to drawing A | B | C | D mm | Cat. No. |
|---|---|---|---|---|---|---|---|
| 484 | 10 | 8 | 72 | 12 | 20 | 187 | C 488-08 |
| 559 | 10 | 8 | 72 | 12 | 20 | 272 | C 488-14 |
| 657 | 10 | 8 | 72 | 12 | 20 | 387 | C 488-20 |

**Applications:**

Reduced reduction times compared to stirring without gassing due to high aeration of the product. Strong radial flow, ideal for gassing of liquids.




## BOLA Slip-On Baffle

| Material: | Temperature resistance: | Chemical resistance: | Vacuum: | autoclave: |
|---|---|---|---|---|
| **PTFE** | **from -200 °C to +250 °C** | **+++ universal** | **suitable** | **121°** |

NEW

FDA conform

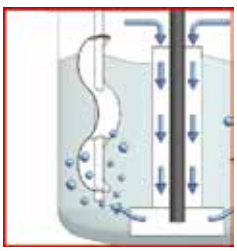
Product description:

Completely made of PTFE, supporting ring made of PFA. The baffle can be mounted at any position on a temperature probe or a solo stirrer shaft. Design based on DIN 28131. Universal chemical resistance, the product is only exposed to PTFE.

| For ground joint NS | Width mm | For shaft dia. mm | Fitting length mm ca. | Cat.No.: |
|---|---|---|---|---|
| 19/26 | 15 | 8 | 125 | C 490-10 |
| 29/32 | 23 | 8 | 125 | C 490-12 |

**Applications:**

Prevents rotation of the stirring products and provides an axial flow for better mixing. For gassing stirrers, one baffle is imperative.The position in the reactor can be optimized with BOLA Swivelling Screw Fittings (see Cat.No. D 690-.. and D 692-..).



## BOLA Stirrer Shafts with Blade

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

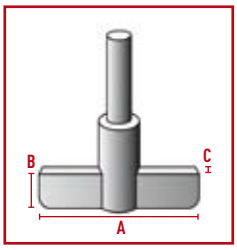
PTFE-jacketed stainless steel shaft, blade completely made of PTFE.
Universal chemical resistance since the product is only exposed to PTFE.

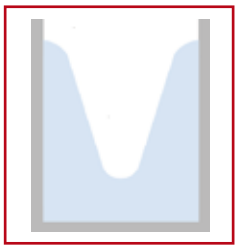
FDA conform

| Length mm | Shaft dia. mm | Chucking dia. mm | Dimensions according to drawing A | B | C mm | Cat. No.: |
|---|---|---|---|---|---|---|
| 450 | 8 | 6,5 | 90 | 20 | 5 | C 381-04 |
| 600 | 8 | 6,5 | 90 | 20 | 5 | C 381-06 |
| 450 | 10 | 8,0 | 120 | 30 | 5 | C 381-08 |
| 600 | 10 | 8,0 | 120 | 30 | 5 | C 381-10 |
| 800 | 10 | 8,0 | 120 | 30 | 5 | C 381-12 |
| 1.000 | 16 | 14,0 | 150 | 50 | 5 | C 381-18 |

**Applications:**

Tangential flow with little turbulence, gentle stirring.



**Helpful:** page **252**
Information on maximum revolutions per minute for BOLA stirrer shafts

## BOLA Solo Stirrer Shafts

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

PTFE-jacketed stainless steel shaft with fused lower end. Universal chemical resistance since the product is only exposed to PTFE.

FDA conform

| Length mm | Shaft dia. mm | Chucking dia. mm | Cat. No.: |
|---|---|---|---|
| 350 | 8 | 6,5 | C 472-08 |
| 600 | 8 | 6,5 | C 472-20 |
| 350 | 10 | 8,0 | C 474-08 |
| 600 | 10 | 8,0 | C 474-20 |
| 800 | 10 | 8,0 | C 474-30 |
| 1.000 | 10 | 8,0 | C 474-34 |
| 1.200 | 10 | 8,0 | C 474-40 |
| 1.200 | 16 | 14,0 | C 476-40 |
| 1.600 | 16 | 14,0 | C 476-60 |

**Applications:**

Ideal for use together with BOLA Stirrer Blades which can be fixed individually on the Solo Stirrer Shaft. Also usable as stirring staff for manual stirring.

## BOLA Stirrer Shafts with Two Paddles

| Material: | Temperature resistance: | Chemical resistance: | Stirring effect: |
|---|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** | **bottom-up** |

Product description:

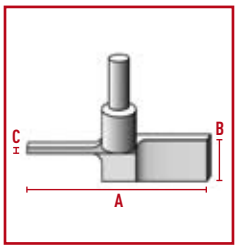
PTFE-jacketed stainless steel shaft, two PTFE paddles arranged crosswise at 90°. Upper paddle is fixed by means of clamp screws made of PEEK compound.

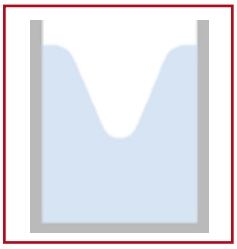
FDA conform

| Length mm | Shaft dia. mm | Chucking dia. mm | Distance of blades mm | Dimensions according to drawing A | B | C mm | Cat. No.: |
|---|---|---|---|---|---|---|---|
| 450 | 8 | 6,5 | 50 | 80 | 18 | 4 | C 380-02 |
| 600 | 8 | 6,5 | 50 | 80 | 18 | 4 | C 380-04 |
| 800 | 8 | 6,5 | 50 | 80 | 18 | 4 | C 380-06 |
| 600 | 10 | 8,0 | 100 | 110 | 20 | 5 | C 380-08 |
| 800 | 10 | 8,0 | 100 | 110 | 20 | 5 | C 380-10 |
| 1.000 | 10 | 8,0 | 100 | 110 | 20 | 5 | C 380-12 |
| 600 | 16 | 14,0 | 150 | 140 | 25 | 12 | C 380-14 |
| 800 | 16 | 14,0 | 150 | 140 | 25 | 12 | C 380-16 |
| 1.000 | 16 | 14,0 | 150 | 140 | 25 | 12 | C 380-18 |
| 1.200 | 16 | 14,0 | 150 | 140 | 25 | 12 | C 380-20 |

**Applications:**

The product is sucked bottom-up, very good axial flow with low local shear force. The upper paddle can be positioned individually.



## BOLA Fan-Shaped Stirrer Shafts

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

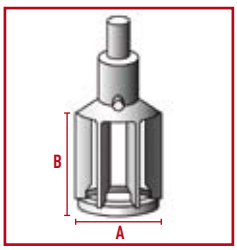
PTFE-jacketed stainless steel shaft, fan-shaped stirring unit completely made of PTFE.

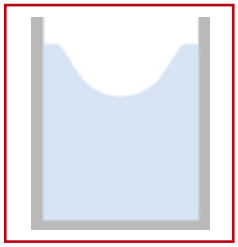
FDA conform

| Length mm | Shaft dia. mm | Chucking dia. mm | For ground joint NS | Dimensions according to drawing A | B mm | Cat. No.: |
|---|---|---|---|---|---|---|
| 300 | 8 | 6,5 | 29/32 | 24 | 35 | C 382-02 |
| 300 | 8 | 6,5 | 45/40 | 38 | 45 | C 382-06 |
| 450 | 8 | 6,5 | 45/40 | 38 | 45 | C 382-08 |
| 450 | 10 | 8 | 60/46 | 53 | 55 | C 382-12 |
| 600 | 10 | 8 | 60/46 | 53 | 55 | C 382-14 |

**Applications:**

The mixture is drawn off from the bottom. Ideal mixing due to centrifugal forces. Ideal for stirring in narrow mouth vessels or in vessels with ground joint openings.



**SUITABLE:** page **23**
Universal stirrer couplings

## BOLA Discs Stirrer Shafts

Material: **PTFE**
Temperature resistance: **from -200°C to + 250°C**
Chemical resistance: **+++ universal**

Product description:

PTFE-jacketed stainless steel shaft, discoidal stirrer blade with six radial paddles completely made of PTFE, similar to a "Rushton Turbine" stirrer shaft. Universal chemical resistance since the product is only exposed to PTFE.

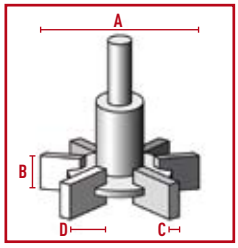
NEW

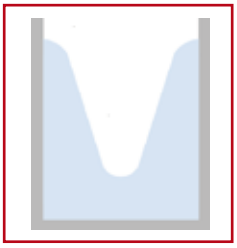
FDA conform

| Length mm | Shaft dia. mm | Chucking dia. mm | Suitable for NS | Suitable for NW | Dimensions according to drawing A | B | C | D mm | Cat. No.: |
|---|---|---|---|---|---|---|---|---|---|
| 350 | 6 | 4 | 29/32 | | 25 | 5 | 2 | 6,3 | C 598-12 |
| 350 | 6 | 4 | 45/40 | | 38 | 8 | 2 | 10 | C 598-16 |
| 350 | 10 | 8 | | 60 | 50 | 10 | 2 | 12,5 | C 598-22 |
| 600 | 10 | 8 | | 60 | 50 | 10 | 2 | 12,5 | C 598-26 |
| 350 | 10 | 8 | | 100 | 75 | 15 | 3 | 18,8 | C 598-32 |
| 600 | 10 | 8 | | 100 | 75 | 15 | 3 | 18,8 | C 598-36 |
| 600 | 10 | 8 | | 150 | 140 | 28 | 4 | 35 | C 598-42 |
| 1.000 | 10 | 8 | | 150 | 140 | 28 | 4 | 35 | C 598-46 |
| 600 | 10 | 8 | | 200 | 180 | 36 | 4 | 45 | C 598-52 |
| 1.000 | 10 | 8 | | 200 | 180 | 36 | 4 | 45 | C 598-56 |
| 600 | 16 | 14 | | 200 | 180 | 36 | 4 | 45 | C 598-62 |
| 1.200 | 16 | 14 | | 200 | 180 | 36 | 4 | 45 | C 598-66 |

**Applications:**

Axial suction of mixture, strong radial flow. Ideal for aerating liquids.



**BOLA Practical Tipp**

Marion Stoppel » construction

**Big effective circular diameter, but small vessel neck?**

No problem if you use our tilting moon-shaped or centrifugal stirrer shafts.

see page 20 and 25

## BOLA Double Impulse Stirrer Shafts

Material: **PTFE**
Temperature resistance: **from -200°C to + 250°C**
Chemical resistance: **+++ universal**
Stirring effect: **bottom-up**

Product description:

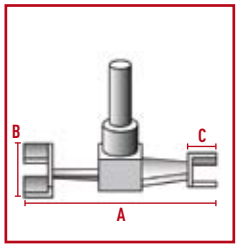
PTFE-jacketed stainless steel shaft, two paddles arranged crosswise at 90° completely made of PTFE. Upper paddle is fixed by means of clamp screws made of PEEK compound. Universal chemical resistance since the product is only exposed to PTFE.

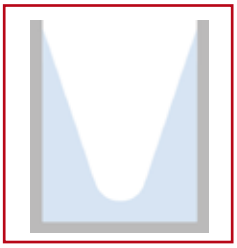
FDA conform

| Length mm | Shaft dia. mm | Chucking dia. mm | Distance of blades mm | Dimensions according to drawing A | B | C mm | Cat. No.: |
|---|---|---|---|---|---|---|---|
| 600 | 10 | 8 | 150 | 140 | 34 | 19 | C 391-18 |
| 800 | 16 | 8 | 150 | 140 | 34 | 19 | C 391-28 |
| 1.200 | 16 | 14 | 300 | 240 | 56 | 32 | C 391-34 |

**Applications:**

The inner stirring surfaces provide an upswing, while the parallel paddle ends provide a downward movement. Even viscous liquids are mixed ideally. The upper paddle can be positioned individually.



## BOLA Propeller Stirrer Shafts with 4 Blades

| Material: | Temperature resistance: | Chemical resistance: | Stirring effect: |
|---|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** | **bottom-up** |

Product description:

PTFE-jacketed stainless steel shaft, propeller completely made of PTFE with four 45° angled angular blades. Universal chemical resistance since the product is only exposed to PTFE.

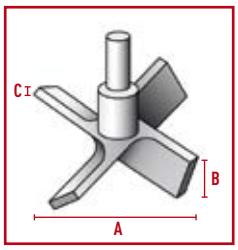
NEW

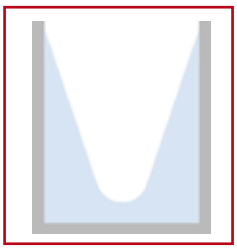
FDA conform

| Length mm | Shaft dia. mm | Chucking dia. mm | Dimensions according to drawing A | B | C mm | Cat. No.: |
|---|---|---|---|---|---|---|
| 350 | 8 | 6,5 | 50 | 18 | 4 | C 484-18 |
| 600 | 10 | 8,0 | 100 | 20 | 5 | C 484-36 |

**Applications:**

The product is sucked bottom-up, good axial flow with low shear force.



## BOLA Mini-Propeller Stirrer Shafts

| Material: | Temperature resistance: | Chemical resistance: | Stirring effect: |
|---|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** | **bottom-up** |

Product description:

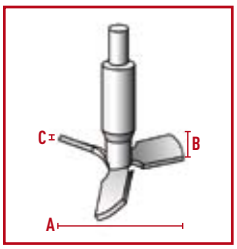
PTFE-jacketed stainless steel shaft, propeller completely made of PTFE with three 45° angled angular blades. Universal chemical resistance since the product is only exposed to PTFE.

FDA conform

| Length mm | Shaft dia. mm | Chucking dia. mm | Suitable for NS | Dimensions according to drawing A | B | C mm | Cat. No.: |
|---|---|---|---|---|---|---|---|
| 350 | 6 | 4 | 29/32 | 25 | 8 | 2 | C 482-12 |
| 350 | 6 | 4 | 45/40 | 40 | 12 | 2 | C 482-24 |

**Applications:**

The product is sucked bottom-up, good axial flow with low shear force. The small stirring diameter allows stirring in narrow mouth vessels or in vessels with ground joint openings.




## BOLA Micro Surface Stirrer Shafts

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

PTFE-jacketed stainless steel shaft, blade completely made of PTFE with four round paddles. Universal chemical resistance since the product is only exposed to PTFE.

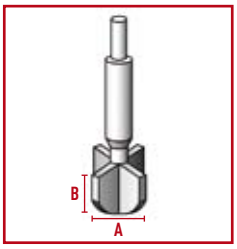
NEW

FDA conform

| Length mm | Shaft dia. mm | Chucking dia. mm | Dimensions according to drawing A | B mm | Cat. No.: |
|---|---|---|---|---|---|
| 120 | 3,5 | 2,5 | 8 | 8 | C 486-08 |
| 180 | 3,5 | 2,5 | 12 | 12 | C 486-12 |
| 200 | 4,0 | 3,0 | 14 | 14 | C 486-16 |
| 200 | 4,0 | 3,0 | 16 | 16 | C 486-20 |

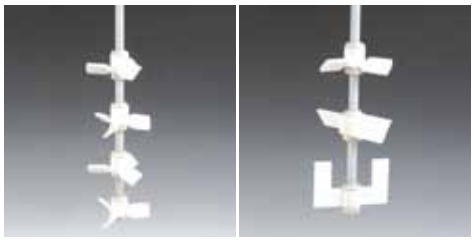
**Applications:**

Ideal for stirring in test tubes or narrow-mouth vessels, optimum mixture in round vessels and in vessels with low fill level.




# BOLA Stirrer Blades

These solid stirrer blades are made of PTFE and have a set of clamp screws made of a PTFE/PEEK compound. The blades can be fixed tightly on BOLA Stirrer Shafts by means of the clamp screws. A spanner wrench is included for easy assembly.



**Applications:**

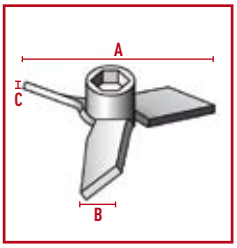
For flexible testing of optimum geometry and arrangement of blades on stirrer shafts. Usable to create stirrers with one single stage or with several stages.

| Material: | Temperature resistance: | Chemical resistance: | Stirring effect: |
|---|---|---|---|
| **PTFE / PEEK** | **from -200°C to + 250°C** | **+++ universal** | **bottom-up** |

## A Type: BOLA Propeller Blades

FDA conform

| Shaft dia. mm | Dimensions according to drawing A | B | C mm | Wrench size | Cat. No.: |
|---|---|---|---|---|---|
| 8 | 75 | 18 | 3 | 15 | C 440-08 |
| 10 | 75 | 18 | 3 | 19 | C 440-10 |


**Applications:**

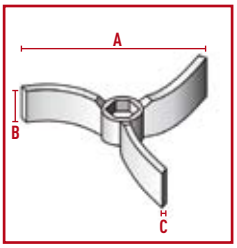
The product is sucked bottom-up, good axial flow with low shear force.

## B Type: BOLA Impeller Blades

FDA conform

NEW

| Shaft dia. mm | Dimensions according to drawing A | B | C mm | Wrench size | Cat. No.: |
|---|---|---|---|---|---|
| 10 | 60 | 25 | 6 | 19 | C 443-08 |
| 10 | 100 | 25 | 6 | 19 | C 443-10 |
| 10 | 150 | 25 | 6 | 19 | C 443-14 |


**Applications:**

Very good and gentle stirring due to blades which are bent backwards, low shear force.

**BOLA Practical Tipp**

Marie-Luise Bender » final assembly

**For an easier assembly of blades:**

Slide blade on the stirrer shaft, add clamp piece from above and nut from below and tighten it with a wrench.

# BOLA Stirrer Blades

| Material: | Temperature resistance: | Chemical resistance: | Stirring effect: |
|---|---|---|---|
| PTFE / PEEK | from -200°C to + 250°C | +++ universal | bottom-up |

## C Type: BOLA Propeller with 4 Blades

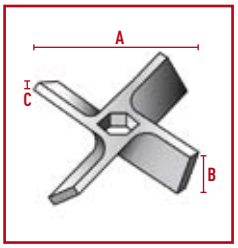
FDA conform

NEW

| Shaft dia. mm | Dimensions according to drawing A | B | C mm | Wrench size | Cat. No.: |
|---|---|---|---|---|---|
| 8 | 50 | 22 | 4 | 15 | C 448-08 |
| 10 | 100 | 25 | 5 | 19 | C 448-10 |
| 10 | 140 | 30 | 5 | 19 | C 448-20 |
| 10 | 200 | 30 | 5 | 19 | C 448-28 |
| 16 | 140 | 30 | 12 | 32 | C 448-36 |
| 16 | 200 | 30 | 12 | 32 | C 448-42 |

**Applications:**

The product is sucked bottom-up, good axial flow with low shear force.


## D Type: BOLA U-Shaped Blades

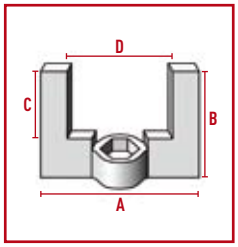
FDA conform

NEW

| Shaft dia. mm | Dimensions according to drawing A | B | C | D mm | Wrench size | Cat. No.: |
|---|---|---|---|---|---|---|
| 8 | 60 | 40 | 22 | 30 | 15 | C 445-08 |
| 8 | 100 | 60 | 35 | 56 | 15 | C 445-12 |
| 10 | 80 | 50 | 30 | 44 | 19 | C 445-16 |
| 10 | 100 | 60 | 35 | 56 | 19 | C 445-20 |
| 10 | 130 | 80 | 55 | 80 | 19 | C 445-30 |
| 10 | 150 | 120 | 90 | 90 | 19 | C 445-34 |
| 16 | 130 | 80 | 55 | 80 | 32 | C 445-40 |
| 16 | 150 | 120 | 90 | 90 | 32 | C 445-44 |

**Applications:**

Strong, tangential flow with high shear rate in the margin area, little sediments on the wall of the vessel. Ideal for mixing viscous liquids.


## BOLA INNOVATION

**Stirrer shaft kit**

Consists of Solo Stirrer Shaft and Stirrer Blades. Stirrer shafts can be composed individually since the blades can be fixed in requested height and direction.

# BOLA Stirrer Blades

| Material: | Temperature resistance: | Chemical resistance: | Stirring effect: |
|---|---|---|---|
| PTFE / PEEK | from -200°C to + 250°C | +++ universal | bottom-up |

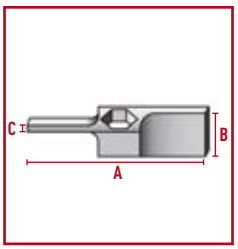
## E Type: BOLA Paddle

FDA conform

| | Shaft dia. mm | Dimensions according to drawing A | B | C mm | Wrench size | Cat. No.: |
|---|---|---|---|---|---|---|
| | 8 | 80 | 24 | 4 | 15 | C 446-08 |
| NEW | 10 | 80 | 25 | 5 | 19 | C 446-10 |
| | 10 | 110 | 25 | 5 | 19 | C 446-12 |
| NEW | 10 | 140 | 25 | 5 | 19 | C 446-14 |
| | 16 | 140 | 30 | 12 | 32 | C 446-16 |

**Applications:**

The product is sucked bottom-up, very good axial flow with shear force.

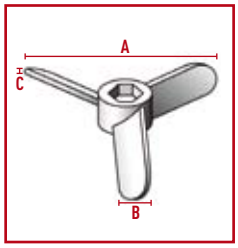

## F Type: BOLA Maxi Propeller Blades

FDA conform

| | Shaft dia. mm | Dimensions according to drawing A | B | C mm | Wrench size | Cat. No.: |
|---|---|---|---|---|---|---|
| NEW | 10 | 140 | 20 | 4 | 19 | C 441-10 |
| NEW | 10 | 200 | 20 | 6 | 19 | C 441-12 |
| | 16 | 140 | 26 | 6 | 32 | C 441-14 |
| | 16 | 200 | 26 | 6 | 32 | C 441-16 |

**Applications:**

The product is sucked bottom-up, very good axial flow with local shear force.


## G Typ: BOLA Moon-Shaped Blades

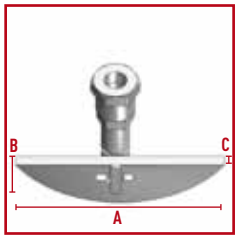
FDA conform

NEW

| Shaft dia. mm | Dimensions according to drawing A | B | C mm | For ground joint NS | Wrench size | Cat. No.: |
|---|---|---|---|---|---|---|
| 8 | 65 | 18 | 3 | 24/29 | 15 | C 442-08 |
| 10 | 90 | 24 | 3 | 29/32 | 19 | C 442-10 |

**Applications:**

Tangential flow with little turbulence, the tilting half-moon blade is ideal for stirring in round-bottom flasks with ground joint necks. Blades are available separately (see Cat. No. C 400-.. on page 47) and can be mounted additionally.


## Stirrer Shafts

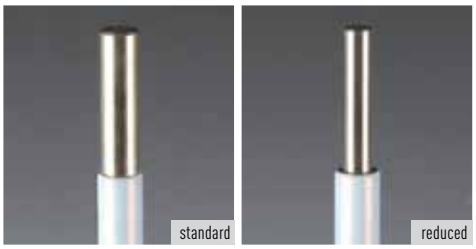
» At BOLA we get custom made stirrer shafts with exactly the dimensions that we require. This way we achieve optimal mixing of our products in glass reactors. «

Dieter Waldhaus » Merck KGaA

# BOLA Stirrer Shafts with Reduced Chucking Diameter (RCD)

For some applications, it is necessary to use very long stirrer shafts. These stirrer shafts must have suitable diameters to be stable enough. It can occur that the chucking diameter of these long stirrer shafts is too big for the agitator. All BOLA Stirrer Shafts listed below have a professionally reduced chucking diameter of 10 mm and can be fixed safely in all common agitators.

You need a smaller diameter, or a different stirrer shaft? No problem: Simply indicate the requested diameter and the catalogue number of the stirrer shaft.




| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

## A BOLA Stirrer Shafts with Blade RCD

PTFE-jacketed stainless steel shaft, blade completely made of PTFE. Universal chemical resistance since the product is only exposed to PTFE. Blade dimensions see Cat. No. C 381-.. on page 27.

FDA conform

| Length mm | Shaft dia. mm | Chucking dia. mm | Cat. No.: |
|---|---|---|---|
| 1.000 | 16 | 10 | **C 581-18** |

**Applications:**

Tangential flow with little turbulence, gentle stirring.

## B BOLA Moon-Shaped Stirrer Shafts RCD

PTFE-jacketed stainless steel shaft, tilting half-moon stirrer blade with double-sided groove and access for the stirrer shaft completely made of PTFE. Universal chemical resistance since the product is only exposed to PTFE. Blade dimensions see Cat. No. C 376-.. on page 20.

FDA conform

| Length mm | Shaft dia. mm | Chucking dia. mm | Cat. No.: |
|---|---|---|---|
| 600 | 16 | 10 | **C 576-20** |
| 800 | 16 | 10 | **C 576-22** |

**Applications:**

Tangential flow with little turbulence. The tilting half-moon blade is ideal for stirring in round-bottom flasks with ground joint necks. Blades are available separately and can be mounted additionally.

## C BOLA Maxi Propeller Stirrer Shafts RCD

PTFE-jacketed stainless steel shaft, propeller completely made of PTFE with three 45° angled blades. Universal chemical resistance since the product is only exposed to PTFE. Blade dimensions see Cat. No. C 392-.. on page 24.

FDA conform

| Length mm | Shaft dia. mm | Chucking dia. mm | Cat. No.: |
|---|---|---|---|
| 600 | 16 | 10 | **C 592-52** |
| 800 | 16 | 10 | **C 592-58** |
| 1.000 | 16 | 10 | **C 592-64** |
| 1.200 | 16 | 10 | **C 592-70** |

**Applications:**

The product is sucked bottom-up, very good axial flow with low local shear force.

# BOLA Stirrer Shafts with Reduced Chucking Diameter (RCD)

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| PTFE | from -200°C to + 250°C | +++ universal |

## D BOLA Stirrer Shafts with One Paddle RCD

PTFE-jacketed stainless steel shaft, paddle completely made of PTFE with two 45° angled blades. Universal chemical resistance since the product is only exposed to PTFE. Blade dimensions see Cat. No. C 379-.. on page 21.

FDA conform

| Length mm | Shaft dia. mm | Chucking dia. mm | Cat. No.: |
|---|---|---|---|
| 1.000 | 16 | 10 | C 579-18 |
| 1.200 | 16 | 10 | C 579-20 |

**Applications:**

The product is sucked bottom-up, very good axial flow with low shear force.

## E BOLA Stirrer Shaft with Two Paddles RCD

PTFE-jacketed stainless steel shaft, two paddles arranged crosswise at 90° completely made of PTFE. Upper paddle is fixed by means of clamp screws made of PEEK compound. Blade dimensions see Cat. No. C 380-.. on page 28.

FDA conform

| Length mm | Shaft dia. mm | Chucking dia. mm | Cat. No.: |
|---|---|---|---|
| 600 | 16 | 10 | C 580-14 |
| 800 | 16 | 10 | C 580-16 |
| 1.000 | 16 | 10 | C 580-18 |
| 1.200 | 16 | 10 | C 580-20 |

**Applications:**

The product is sucked bottom-up, very good axial flow with low local shear force. The upper paddle can be positioned individually.

## F BOLA U-Shaped Stirrer Shafts RCD

PTFE-jacketed stainless steel shaft, U-shaped stirrer blade completely made of PTFE. Universal chemical resistance since the product is only exposed to PTFE. Blade dimensions see Cat. No. C 384-.. on page 22.

FDA conform

| Length mm | Shaft dia. mm | Chucking dia. mm | Cat. No.: |
|---|---|---|---|
| 800 | 16 | 10 | C 584-52 |
| 1.000 | 16 | 10 | C 584-58 |
| 1.200 | 16 | 10 | C 584-64 |

**Applications:**

Strong, tangential flow with high shear rate in the margin area, little sediments on the wall of the vessel. Ideal for mixing viscous liquids.

D

E

F

## BOLA INNOVATION

**Stirrer Shafts – solid and chemically resistant**

Glass stirrer shafts can break, metal stirrer shafts are not chemically resistant. In comparison, BOLA Stirrer Shafts with stainless steel core are unbreakable and have an almost universal chemical resistance.

# BOLA Stirrer Bearings

BESTSELLER

| Material: | Temperature resistance: | Chemical resistance: | Vacuum: |
|---|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** | **suitable** |

Product description:

The sealing rings on these bearings ensure a perfect sealing. The ground joint no longer sticks, the danger of breaking is reduced and the cone can be removed easily from the socket. A special gasket made of PTFE and an FPM o-ring which is compressed by a GL screw cap provide a good sealing of the stirrer shaft. This gasket can be exchanged after wearing.

FDA conform

| Cone NS<br>European standard | For stirrer shaft dia.<br>mm | Total length<br>mm | Thread of screw cap<br>GL | Cat. No.: |
|---|---|---|---|---|
| 19/26 | 6 | 63 | 18 | **C 424-04** |
| 19/26 | 8 | 65 | 25 | **C 424-05** |
| 24/29 | 8 | 69 | 25 | **C 424-08** |
| 24/29 | 10 | 70 | 25 | **C 424-09** |
| 29/32 | 6 | 72 | 18 | **C 424-12** |
| 29/32 | 8 | 74 | 25 | **C 424-13** |
| 29/32 | 10 | 72 | 25 | **C 424-14** |
| 45/40 | 10 | 80 | 25 | **C 424-16** |
| 45/40 | 16 | 86 | 32 | **C 424-18** |
| **Cone**<br>US standard | **For stirrer shaft dia.**<br>mm | **Total length**<br>mm | **Thread of screw cap**<br>GL | **Cat. No.:** |
| 24/40 | 8 | 80 | 25 | **C 429-14** |
| 24/40 | 10 | 80 | 25 | **C 429-18** |

**Applications:**

Suitable for vacuum, perfect bearing for stainless steel, glass and BOLA Stirrer Shafts

## BOLA Glass Stirrer Bearings

BESTSELLER

| Material: | Temperature resistance: | Chemical resistance: | Vacuum: |
|---|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** | **suitable** |

Product description:

Combination of a borosilicate glass piece with ground joint, an interior PTFE shaft guide with integrated special gasket and a GL screw cap made of PPS. The special gasket made of PTFE and an FPM o-ring which is compressed by a GL screw cap provide a good sealing of the stirrer shaft. This gasket can be exchanged after wearing.

FDA conform

| Cone NS<br>European standard | For stirrer shaft dia.<br>mm | Total length<br>mm | Thread of screw cap<br>GL | Cat. No.: |
|---|---|---|---|---|
| 29/32 | 8 | 90 | 25 | **C 425-08** |
| 29/32 | 10 | 90 | 25 | **C 425-09** |
| 45/40 | 10 | 110 | 25 | **C 425-12** |
| 45/40 | 16 | 118 | 32 | **C 425-14** |
| **Cone**<br>US standard | **For stirrer shaft dia.**<br>mm | **Total length**<br>mm | **Thread of screw cap**<br>GL | **Cat. No.:** |
| 24/40 | 8 | 103 | 25 | **C 428-08** |
| 24/40 | 10 | 103 | 25 | **C 428-12** |

**Applications:**

Suitable for vacuum, perfect bearing for stirrer shafts made of stainless steel, glass and for BOLA Stirrer Shafts

**BOLA Practical Tipp**

Raimund Heber » sales

**Grease for ground joints?**

Forget about it. If you use our sleeves with ribs or with gripping ring, you don't need any more grease.

see page 150

## BOLA Ultra Stirrer Bearings

| Material: | Temperature resistance: | Chemical resistance: | Vacuum: |
|---|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** | **suitable** |

Product description:

Combination of a borosilicate glass piece with ground joint, an interior PTFE shaft guide with integrated special gasket and a pressure screw made of PTFE with glass fibre.

FDA conform

| Cone NS | For stirrer shaft dia.<br>mm | Total length<br>mm ca. | Cat. No.: |
|---|---|---|---|
| 29/32 | 8 | 108 | **C 426-08** |
| 29/32 | 10 | 108 | **C 426-09** |

**Applications:**

Suitable for vacuum, perfect bearing for stirrer shafts made of stainless steel, glass and for BOLA Stirrer Shafts

## BOLA Replacement Glass Parts

| Material: | Temperature resistance: | Chemical resistance: | Vacuum: |
|---|---|---|---|
| **Glass** | **from -200°C to + 250°C** | **+++ universal** | **suitable** |

Product description:

Borosilicate glass with ground joint and GL thread.

FDA conform

| Size NS | Thread GL | | | Cat. No.: |
|---|---|---|---|---|
| 29/32 | 25 | | | C 425-50 |
| 24/40 | 25 | | | C 425-51 |
| 45/40 | 25 | | | C 425-53 |
| 45/40 | 32 | | | C 425-55 |

**Applications:**

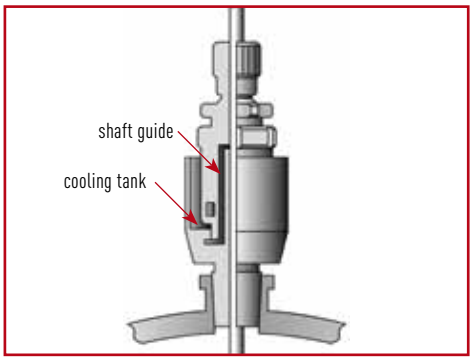
Spare part for BOLA Glass Stirrer Bearings

## BOLA Special Stirrer Bearings

| Material: | Temperature resistance: | Chemical resistance: | Pressure: | Vacuum: |
|---|---|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** | **low** | **suitable** |

Product description:

The 29/32 ground joint of these bearings provides a safe seat in the reactor lid. The stirrer shaft is held by an invisible shaft guide made of borosilicate glass which has an adjustable vacuum sealing. The stirrer can be adjusted in height by means of a lock nut. There is no abrasion. A cooling tank for an optional lubricant against overheating is also included. Suitable for vacuum up to at least 700 mm Hg and for low overpressure. Speeds of up to 500 rpm – temporarily even 1000 rpm - are admissible.




FDA conform

| Ground Joint NS | For stirrer shafts dia. mm | | Cat. No.: |
|---|---|---|---|
| 29/32 | 8 | | C 430-20 |
| 29/32 | 10 | | C 430-28 |

**Applications:**

Particularly suitable for long-term use. For all stirrer shafts made of stainless steel, glass or for BOLA Stirrer Shafts with a diameter of 8 or 10 mm.

## BOLA Replacement Shaft Guides

| Material: | Material: | Temperature resistance: | Chemical resistance: | Vacuum: |
|---|---|---|---|---|
| PTFE | FPM | from -200°C to + 250°C | +++ universal | suitable |

FDA conform

Product description:

With integrated, exchangeable special gasket made of PTFE and an FPM o-ring.

| For stirrer shaft dia. mm | Total length mm | | | Cat. No.: |
|---|---|---|---|---|
| 8 | 57 | | | C 425-58 |
| 10 | 57 | | | C 425-59 |
| 16 | 66 | | | C 425-60 |

**Applications:**

Spare part for BOLA Glass Stirrer Bearings and BOLA Ultra Stirrer Bearings

## BOLA Special Gaskets

| Material: | Material: | Temperature resistance: | Chemical resistance: | Vacuum: |
|---|---|---|---|---|
| PTFE | FPM | from -200°C to + 250°C | +++ universal | suitable |

FDA conform

Product description:

Easily exchangeable combination of PTFE gasket with FPM o-ring for PTFE shaft guides. The gaskets provide sealing of the stirrer shafts.

| For stirrer shaft dia. mm | | | | Cat. No.: |
|---|---|---|---|---|
| 6 | | | | C 425-69 |
| 8 | | | | C 425-70 |
| 10 | | | | C 425-71 |
| 16 | | | | C 425-72 |

**Applications:**

Spare part for BOLA Glass Stirrer Bearings and BOLA Ultra Stirrer Bearings

## BOLA Replacement Screw Caps

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| PPS | from -200°C to + 250°C | ++ very good |

FDA conform

Product description:

Screw caps compress the o-ring of the special gasket and provide sealing of the stirrer shaft.

| For stirrer shaft dia. mm | Thread GL | | | Cat. No.: |
|---|---|---|---|---|
| 6 | 18 | | | C 425-82 |
| 8 | 25 | | | C 425-84 |
| 10 | 25 | | | C 425-86 |
| 16 | 32 | | | C 425-88 |
| 16 | 25 | | | C 425-90 |
| 22 | 32 | | | C 425-92 |

**Applications:**

Spare part for BOLA Glass Stirrer Bearings

## BOLA Magnetic Stirrer Heads with Ground Joint

| Material: | Material: | Temperature resistance: | Chemical resistance: | Vacuum: |
|---|---|---|---|---|
| **PTFE** | **PFA** | **from -200°C to + 250°C** | **+++ universal** | **suitable** |

Product description:

Gastight permanent magnetic coupling with ball bearing encapsulated in ceramics and square connection for cardan joint. PTFE cone size 29 with release nut made of PTFE with glass fibre for easy removal of the ground joint. All products which are exposed to the medium do not contain any metals. The 8 mm shaft guide provides guidance without friction of stirrer shafts up to a speed of 800 rpm. The stirrer head can also be fixed directly into the chuck by mounting the included metal adaptor on the square connection (6 mm).

FDA conform

| Torque Ncm | Ground joint NS | Viscosity up to mPas | Volume up to ml | Speed rpm max. | Total length mm | Cat. No.: |
|---|---|---|---|---|---|---|
| 20 | 29/32 | 1.500 | 2.000 | 800 | 203 | **C 450-16** |
| 40 | 29/32 | 2.500 | 4.000 | 800 | 215 | **C 450-24** |

**Applications:**

For absolute vacuum.


## BOLA Magnetic Stirrer Heads with Flange

| Material: | Material: | Temperature resistance: | Chemical resistance: | Vacuum: |
|---|---|---|---|---|
| **PTFE** | **PFA** | **from -200°C to + 250°C** | **+++ universal** | **suitable** |

Product description:

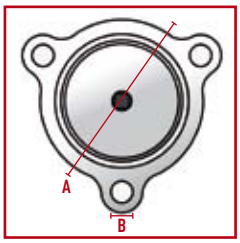
Gastight permanent magnetic coupling with ball bearing encapsulated in ceramics, square connection for cardan joint and flange NW 25. All products which are exposed to the medium do not contain any metals. The 8 mm shaft guide provides guidance without friction of stirrer shafts up to a speed of 800 rpm. The stirrer head can also be fixed directly into the chuck by mounting the included metal adaptor on the square connection (6 mm). Universal chemical resistance, since the product is only exposed to PTFE and PFA.

FDA conform

| Torque Ncm | Flange NW | Viscosity up to mPas | Volume up to ml | Bolt circle dia. A mm | Bore dia B mm | Length mm | Cat. No.: |
|---|---|---|---|---|---|---|---|
| 60 | 25 | 3.500 | 6.000 | 75 | 9 | 215 | **C 454-24** |

**Applications:**

For absolute vacuum.




## BOLA INNOVATION

**Magnetic Stirrer Heads**

All wetted parts are metal-free. An almost universal chemical resistance is provided due to the use of fluoroplastics.

BESTSELLER

## BOLA Magnetic Stirrer Heads (G-MRK)

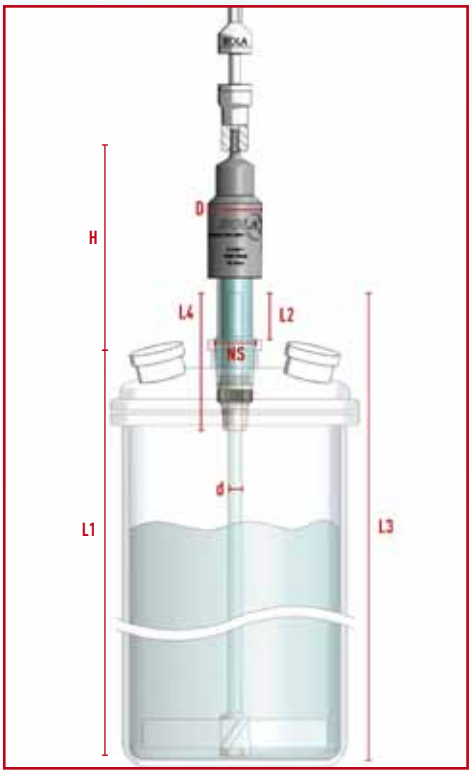
| Material: | Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|---|
| **PTFE / compound** | **Glass** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

Perfect combination of drive shaft with ball bearings, rotor and lower bearing made of PTFE/PEEK and a conductor made of borosilicate glass. Requires little space due to compact construction. No leakage or memory effects due to non-porous, welded rotor. This rotor holds the stirrer shaft by means of three stud screws which are fixed in the counterbores of the stirrer shaft. This provides optimum power transmission and a safe fixing. The 6 mm square can be fixed into the stirrer coupling or into the agitator.

FDA conform

| | Stirrer shaft Ø d mm | Height H mm | Conductor NS | Top of ground joint to top of stirrer shaft mm L2 | Insertion length of shaft mm L4 | Cat.No. |
|---|---|---|---|---|---|---|
| NEW | 6 | 90 | 19/26 | 20 | 63 | C 512-08 |
| | 8 | 148 | 29/32 | 33 | 97 | C 502-08 |
| | 10 | 148 | 29/32 | 33 | 97 | C 502-16 |
| NEW | 8 | 140 | 45/40 | 25 | 97 | C 504-08 |
| NEW | 10 | 140 | 45/40 | 25 | 97 | C 504-16 |




**Product advantages:**

» powerful transmission
for ground joint size 19/26: 15 Ncm
for ground joint size 29/32 and 45/40: 50 Ncm

» no grease required

» all products which are exposed to the medium do not contain any metals

» high speed of up to max. 1.500 rpm

» high working temperatures up to +250°C are possible

» excellent chemical resistance

» safe to run dry

» long durability

» space-saving drive shaft O.D.'s
for ground joint size 19/26: 28 mm
for ground joint size 29/32 and 45/40: 38 mm

**Applications:**

Ideal for reactor lids with a center ground joint, suitable for stirrer shafts made of glass or stainless steel with counterbores (see page 42) for a safe fixing into the rotor.

» L1 Internal height from the top of the ground joint to the vessel bottom.
» L3 maximum total length of stirrer shaft = L1+L2

## BOLA Conductors for Magnetic Stirrer Heads

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **Glass** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

Borosilicate glass with ground joint and glued upper bearing. Alternatively without ground joint for fusing on the reactor lid (upper bearing to be glued is included).

FDA conform

| | Ground joint NS | | | | Cat.No.: |
|---|---|---|---|---|---|
| A | 19/26 | | | | C 463-19 |
| | 29/32 | | | | C 463-29 |
| | 45/40 | | | | C 463-45 |
| B | for fusing | | | | C 461-08 |

**Applications:**

Accessory for BOLA Magnetic Stirrer Head (see page 41).

A

B

## BOLA Stirrer Shafts for Magnetic Stirrer Heads

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **Glass** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

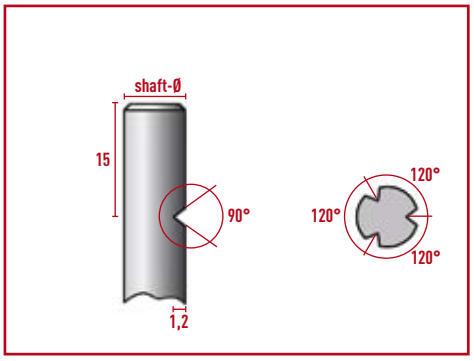
Ground and polished borosilicate stirrer shaft with integrated counterbores for the three stud screws of the rotor of the BOLA Magnetic Stirrer Head.

FDA conform

| Length mm | Stirrer shaft dia. mm | | Cat.No.: |
|---|---|---|---|
| 400 | 10 | | C 492-16 |
| 600 | 10 | | C 492-24 |

**Applications:**

Accessory for BOLA Magnetic Stirrer Head (see page 41). Ideal for use together with BOLA Stirrer Blades which can be fixed individually. Shaft can be shortened on demand.




**BOLA Practical Tipp**

Raimund Heber » sales

**Grease for ground joints?**

Forget about it. If you use our sleeves with ribs or with gripping ring, you don't need any more grease.

see page 150

## BOLA BENEFITS

» gastight stirrer head for perfect vacuum
» stirrer shaft's height adjustable, approx. 40 mm
» also suitable for shortened stirrer shafts
» powerful transmission of up to 90 Ncm

## BOLA Magnetic Stirrer Heads (P-MRK)

BESTSELLER

| Material: | Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|---|
| **PTFE / compound** | **Glass** | **from -200°C to + 250°C** | **+++ universal** |

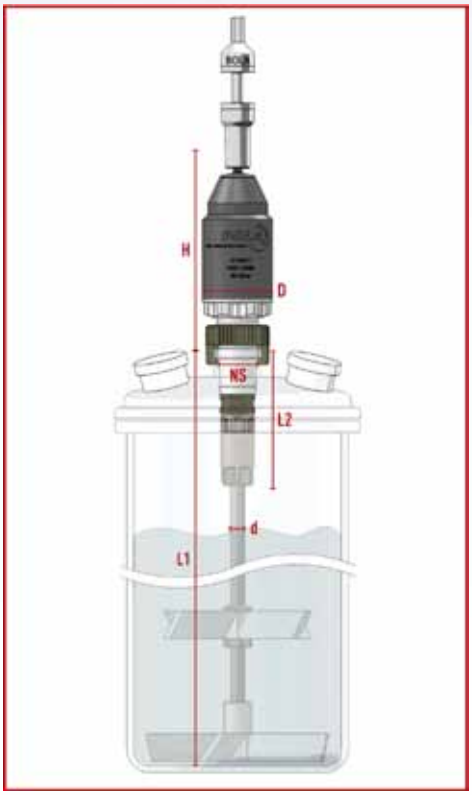
Product description:

Ideal stirrer head for PTFE-jacketed stirrer shafts from BOLA. Consisting of capsuled drive shaft (stainless steel) with ball bearings, rotor and lower bearing made of PTFE/PEEK and a hollow shaft made of borosilicate glass. Requires little space due to compact construction. No leakage or memory effects due to non-porous, welded rotor. Compression fittings for safe fixing of stirrer shaft and optimum power transmission.
Joint-Cone with nut (Safe-Lab) for easy locking and unlocking of the ground joint. Square size 6 mm for accepting an agitator or a stirrer coupling.

NEW

FDA conform

| For stirrer shaft dia. d mm | Height H mm | Size NS | L2 Insertion length of shaft mm | Drive shaft D O.D. mm | Cat. No. |
|---|---|---|---|---|---|
| 8 | 145 | 29/32 | 95 | 50 | **C 520-24** |
| 10 | 145 | 29/32 | 95 | 50 | **C 520-28** |
| 10 | 160 | 45/40 | 95 | 50 | **C 520-48** |

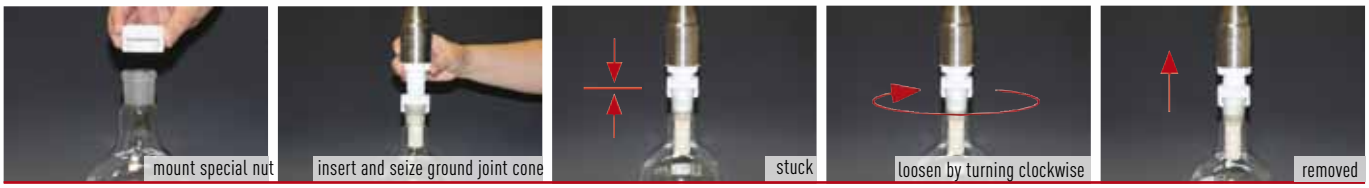



**Product advantages:**

» excellent chemical resistance
» all products which are exposed to the medium do not contain any metals
» no grease required / save to run dry
» high speed of up to max. 1.500 rpm
» drive shaft fixed for your safety
» high durability
» easy disassembly of all parts for cleaning

**Applications:**

» Suitable for all BOLA Stirrer Shafts jacketed with PTFE. Ideal for reactorlids with center ground joint.
» L1 The max. shaft length corresponds to the internal height from the top of the ground joint to the vessel bottom plus 15 mm.



# BOLA Magnetic Stirrer Heads (P-MRK) with Flat Flange

BESTSELLER

| Material: | Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|---|
| **PTFE / compound** | **Glass** | **from -200°C to + 250°C** | **+++ universal** |

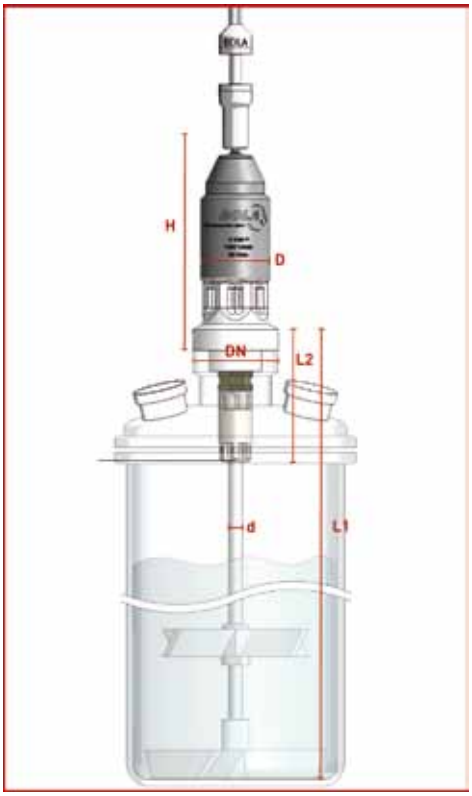
Product description:

Ideal stirrer head for PTFE-jacketed stirrer shafts from BOLA. Consisting of capsuled drive shaft (stainless steel) with ball bearings, rotor and lower bearing made of PTFE/PEEK and a hollow shaft made of borosilicate glass. Requires little space due to compact construction. No leakage or memory effects due to non-porous, welded rotor. Compression fittings for safe fixing of stirrer shaft and optimum power transmission.
Suitable for flat flanges of Duran (former Schott AG), sealing to be made with a gasket of your choice. Square size 6 mm for accepting an agitator or a stirrer coupling.

NEW

FDA conform

| For stirrer shaft dia. d mm | Height H mm | Flat Flange DN | L2 Insertion length of shaft mm | Drive shaft D O.D. mm | Cat. No. |
|---|---|---|---|---|---|
| 10 | 160 | 40 | 95 | 50 | **C 522-40** |
| 10 | 160 | 50 | 95 | 50 | **C 522-50** |




**Product advantages:**

- » gastight stirrer head for perfect vacuum
- » stirrer shaft's height adjustable, approx. 40 mm
- » also suitable for shortened stirrer shafts
- » powerful transmission of up to 90 Ncm
- » excellent chemical resistance
- » all products which are exposed to the medium do not contain any metals
- » no grease required / save to run dry
- » high speed of up to max. 1.500 rpm
- » drive shaft fixed for your safety
- » high durability
- » easy disassembly of all parts for cleaning

**Applications:**

- » Suitable for all BOLA Stirrer Shafts jacketed with PTFE. Ideal for reactorlids with flat flange.
- » L1 The max. shaft length corresponds to the internal height from the top of the ground joint to the vessel bottom.

## Magnetic Stirrer Heads

» The Magnetic Stirrer Heads can easily be operated since they are outside of the glass reactor. And they are perfect to draw vacuum. «

Carina Cezanne » Merck KGaA

## BOLA INNOVATION

**Metal-free Magnetic Stirrer Heads**

Many chemicals react with metal magnetic stirrer heads. Therefore, all wetted parts of BOLA Magnetic Stirrer Heads are metal-free and thus more economic.

## BOLA GT Glass Stirrer Shafts

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

KPG stirrer shaft made of borosilicate glass, tiltable moon-shaped stirrer blade with angular groove and clamping bolts completely made of PTFE. For vessels with a 29/32 ground joint. Universal chemical resistance since the product is only exposed to PTFE and glass.

FDA conform

| Length mm | Shaft dia. mm | Blade dimensions mm | Cat.No.: |
|---|---|---|---|
| 290 | 10 | 50 x 24 x 3 | C 375-02 |
| 340 | 10 | 68 x 24 x 3 | C 375-04 |
| 390 | 10 | 68 x 24 x 3 | C 375-06 |
| 490 | 10 | 90 x 24 x 3 | C 375-08 |
| 560 | 10 | 90 x 24 x 3 | C 375-10 |

**Applications:**

Tangential flow with little turbulence. The tilting half-moon blade is ideal for stirring in round-bottom flasks with ground joint necks. Blades are available separately and can be mounted additionally.


For ground joint NS 29/32

**BOLA Practical Tipp**

Ernst Schweitzer » development

**Protecting glass stirrer shafts effectively**

For protection from breaking for example due to misalignment of axes simply use our globe stirrer coupling. It is very lightweight and therefore has only low centrifugal force.

see page 23

## BOLA KPG Glass Stirrer Shafts

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

KPG stirrer shaft with double pivot made of ground and polished borosilicate glass, tiltable moon-shaped stirrer blade with double-sided groove completely made of PTFE. For vessels with a 29/32 ground joint. Universal chemical resistance since the product is only exposed to PTFE and glass.

FDA conform

| Length mm | Shaft dia. mm | Blade dimensions mm | Cat.No.: |
|---|---|---|---|
| 350 | 10 | 50 x 24 x 3 | C 387-05 |
| 350 | 10 | 75 x 24 x 3 | C 387-07 |
| 350 | 10 | 90 x 24 x 3 | C 387-09 |
| 400 | 10 | 50 x 24 x 3 | C 387-11 |
| 400 | 10 | 75 x 24 x 3 | C 387-13 |
| 400 | 10 | 90 x 24 x 3 | C 387-15 |

**Applications:**

Tangential flow with little turbulence. The tilting half-moon blade is ideal for stirring in round-bottom flasks with ground joint necks. Blades are available separately and can be mounted additionally.


For ground joint NS 29/32

# BOLA Stirrer Blades

Why have stirrer blades to be „tiltable"?
Only a tiltable stirrer blade can be pulled through a narrow neck.

All BOLA Stirrer Blades have a central bore to fix them on a shaft. It is important that this bore is slightly out of the middle. Otherwise, it would be difficult to draw a shaft with mounted blade through e.g. a NS 29 neck of a round bottom flask.
By the way: As soon as the shaft rotates, the centrifugal forces push the blade into the correct horizontal position and optimal mixing is assured.

Blocked: The blade does not tilt and cannot be removed from the vessel.

How it should be: The blade has an excentric bore. It tilts and can easily be removed from the vessel.

## BOLA Moon-Shaped Stirrer Blades

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

Completely made of PTFE, with angular groove. For vessels with a 29/32 ground joint.

FDA conform

| Suitable for ml | Bore dia. mm | Blade dimensions mm | Cat.No.: |
|---|---|---|---|
| 100 | 5,8 | 50 x 24 x 3 | **C 401-02** |
| 250 | 5,8 | 68 x 24 x 3 | **C 401-04** |
| 1.000 | 5,8 | 90 x 24 x 3 | **C 401-08** |

**Applications:**

For glass stirrer shafts and KPG glass stirrer shafts (Cat.No. C 375- ... on page 45).

## BOLA Moon-Shaped Stirrer Blades

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

Completely made of PTFE, with one-sided groove and bore dia. 10 mm.

FDA conform

| Suitable for ml | For ground joint NS | Blade dimensions mm | Cat. No.: |
|---|---|---|---|
| 100 | 24/29 | 50 x 18 x 3 | **C 402-07** |
| 100 | 29/32 | 50 x 24 x 3 | **C 402-09** |
| 250 | 24/29 | 65 x 18 x 3 | **C 402-14** |
| 250 | 29/32 | 68 x 24 x 3 | **C 402-16** |
| 500 | 24/29 | 75 x 18 x 3 | **C 402-19** |
| 500 | 29/32 | 75 x 24 x 3 | **C 402-21** |
| 1.000 | 29/32 | 90 x 24 x 3 | **C 402-24** |
| 2.000 | 29/32 | 110 x 24 x 3 | **C 402-26** |
| 4.000/6.000 | 29/32 | 125 x 24 x 3 | **C 402-31** |

**Applications:**

For glass stirrer shafts with one-sided pivot.

## BOLA Moon-Shaped Stirrer Blades

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

Completely made of PTFE, with double-sided groove.

FDA conform

| Suitable for ml | Bore dia. mm | For ground joint NS | Blade dimensions mm | Cat.No.: |
|---|---|---|---|---|
| 100 | 8,5 | 24/29 | 50 x 18 x 3 | **C 400-06** |
| 100 | 8,5 | 29/32 | 50 x 24 x 3 | **C 400-08** |
| 250 | 8,5 | 24/29 | 65 x 18 x 3 | **C 400-12** |
| 250 | 8,5 | 29/32 | 68 x 24 x 3 | **C 400-14** |
| 500 | 8,5 | 24/29 | 75 x 18 x 3 | **C 400-16** |
| 500 | 8,5 | 29/32 | 75 x 24 x 3 | **C 400-18** |
| 1.000 | 8,5 | 29/32 | 90 x 24 x 3 | **C 400-20** |
| 2.000 | 8,5 | 29/32 | 110 x 24 x 3 | **C 400-22** |
| 2.000 | 12,5 | 45/40 | 125 x 35 x 3 | **C 400-24** |
| 4.000/6.000 | 8,5 | 29/32 | 125 x 24 x 3 | **C 400-26** |
| 4.000/6.000 | 12,5 | 45/40 | 145 x 35 x 4 | **C 400-28** |

**Applications:**

For glass stirrer shafts with double pivot, KPG glass stirrer shafts (Cat.No. C 387- ... on page 45) and PTFE-jacketed stainless steel stirrer shafts (Cat. No. C 376-... on page 20).

## BOLA Centrifugal Stirrer Blades

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

FDA conform

Product description:

Completely made of PTFE, consisting of 2 paddles, bolt and clamp ring. For vessels with a 24/29 ground joint (or bigger).

| Stirring dia. mm | Blade dimensions mm | | Cat. No.: |
|---|---|---|---|
| 50 | 2 | | C 407-04 |
| 70 | 2 | | C 407-06 |
| 90 | 2,5 | | C 407-08 |

**Applications:**

For centrifugal stirrer shafts (Cat. No. C 377-.. on page 25)

|« »|
Special **Request**?
+49 (0) 93 46-92 86-0

For ground joint starting at NS 24/29

## BOLA Bolts and Clamp Rings

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

FDA conform

Product description:

Completely made of PTFE, bolts are available in 2 different versions:

**A** Cylindrical shape

| Bolt dia. mm | Usable length mm | For blades with bore dia. mm | Cat. No.: |
|---|---|---|---|
| 6 | 12 | 6,5 | C 410-02 |
| 12 | 16 | 12,5 | C 410-06 |

**B** With a distance piece between blade and stirrer shaft. The blade remains movable.

| Bolt dia. mm | Usable length mm | For blades with bore dia. mm | Cat. No.: |
|---|---|---|---|
| 8 | 12 | 8,5 | C 410-04 |
| 12 | 19 | 12,5 | C 410-08 |

**Applications:**

For moon-shaped stirrer blades with double-sided groove (Cat. No. C 400- .. on page 47)


# BOLA Stirring Bars

## What you should know about magnetic stirring and mixing

For optimum results, both drive magnet and stirring bar are decisive. For optimum efficiency, the distance between the magnetic poles of the drive magnet and the length of the stirring bar should be equal. A magnetic stirring bar which is too small will eventually gravitate toward one of the poles of the drive magnet. Stirring efficiency is influenced by the material, by the thickness of the cover plate and the thickness of the vessel. For the best magnetic coupling, the distance between the magnets should be minimized.

**HELPFUL:** page **253**
Detailed information on magnetic stirring

## What you should know about the choice of stirring bars

Improperly selected stirring bars are often cause flickering of the bars in the vessel, respectively ineffective mixing of the product.
You can find an overview of the most common stirring bars here below:

**Cylindrical Magnetic Stirring Bars:**
They are the most commonly used magnetic stirring bars. Due to their simple shape they can be offered at very attractive prices. Cylindrical magnetic stirring bars offer excellent centering and smooth running characteristics.

**Glass Magnetic Stirring Bars:**
They have a non-porous and smooth glass-coating. All following processes are not affected by any carry-over. There is an increased abrasion between glass vessels and glass stirring bars.

**Ultra Magnetic Stirring Bars:**
These magnetic stirring bars have very smooth and seamless surfaces. No substance can penetrate into their surfaces and thus, all following processes are not affected by any „carry-over". They are mainly used for high-purity work or trace analysis

**Power Magnetic Stirring Bars:**
Due to special magnetic material, their torque loads are larger than those of conventional magnetic stirring bars. Power magnetic stirring bars are mainly used for agitating viscous liquids or for bridging larger distances between the magnetic stirring machine and the magnetic stirring bar.

**Square Magnetic Stirring Bars:**
They are particularly suitable for big vessels due to the high magnetic force. Solids are released or removed from the bottom of the vessel.

**Egg-Shaped Magnetic Stirring Bars:**
They are particularly suitable for round-bottom flasks. Their shape mimics that of the flasks and assures complete mixing. Those magnetic stirring bars have an egg-shaped magnetic core which assures a better force transmission than a cylindrical core.

**Triangular Magnetic Stirring Bars:**
Such magnets are useful for mixing reagents which resist dissolving or for avoiding any residues at the bottom of the vessels. They provide strong turbulence at relatively low speeds.

**Magnetic Stirring Bars with Pivot Ring:**
Their interrupted surface provides greater surface area and added turbulence. Only their pivot ring and one end of the magnetic stirring bar touch the bottom of the vessel. Therefore these magnetic stirring bars have a more steady spinning position and a better longevity.

**Star Head Magnetic Stirring Bars:**
Optimum stirring in tall, narrow diameter vessels. Ideal stirring bar for cuvettes or test tubes.

**Center Magnetic Stirring Bars:**
These magnetic stirring bars provide better stirring action and a more stable spinning position due to the punctual position.

## Tolerances of the magnetic stirring bars

» The dimensions of the magnetic stirring bars are nominal dimensions which can have a tolerance of +/- 5% in length and +/- 10% in diameter.

## Results of stirring – tested for you

In order to help you choose the suitable magnetic stirring bar for your application, we have made tests with these data under real conditions. You will find graphs for each magnetic stirring bar on the next pages.

» **Speed:** 500 rpm
» **Volume:** 2.000 ml
» **Product:** water
» **Temperature:** 20°C
» **Vessel:** glass beaker

## We "meliorate" your specific magnetic stirring bars

» These stirring bars can for example be built in devices or can be used for special applications

» The diameter of the magnetic stirring bars can be machined with a tolerance of up to +/- 0,02 mm

» The magnetic stirring bars are ground to obtain a seamless amplitude

» The ends are polished to receive a round or any other shape

» The surface is becoming extremely smooth and even, so that contaminations cannot adhere

» Reproducibility both in diameter and surface are granted

## BOLA Cylindrical Magnetic Stirring Bars

BESTSELLER

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

PTFE-encapsulated magnetic core (Alnico 5), standard magnetic stirring bar, universal chemical resistance.

FDA conform

| Length mm | Dia. mm | Cat. No.: | Length mm | Dia. mm | Cat. No.: |
|---|---|---|---|---|---|
| 2 | 2 | C 350-01 | 30 | 7 | C 350-22 |
| 3 | 3 | C 350-02 | 30 | 10 | C 350-41 |
| 5 | 2 | C 350-03 | 35 | 6 | C 350-23 |
| 6 | 3 | C 350-04 | 40 | 7 | C 350-24 |
| 7 | 2 | C 350-05 | 40 | 8 | C 350-25 |
| 8 | 2 | C 350-06 | 40 | 10 | C 350-26 |
| 8 | 3 | C 350-07 | 45 | 8 | C 350-27 |
| 10 | 3 | C 350-08 | 50 | 7 | C 350-28 |
| 10 | 6 | C 350-09 | 50 | 8 | C 350-29 |
| 12 | 4,5 | C 350-10 | 55 | 12 | C 350-30 |
| 13 | 3 | C 350-11 | 60 | 7 | C 350-31 |
| 15 | 2 | C 350-12 | 60 | 9 | C 350-32 |
| 15 | 4,5 | C 350-13 | 70 | 9 | C 350-33 |
| 15 | 6 | C 350-14 | 70 | 13 | C 350-34 |
| 20 | 3 | C 350-15 | 80 | 10 | C 350-35 |
| 20 | 6 | C 350-16 | 110 | 27 | C 350-36 |
| 20 | 7 | C 350-17 | 120 | 12 | C 350-37 |
| 25 | 5 | C 350-18 | 127 | 12 | C 350-38 |
| 25 | 6 | C 350-19 | 155 | 27 | C 350-39 |
| 25 | 7 | C 350-20 | | | |
| 30 | 6 | C 350-21 | | | |

**Applications:**

Cylindrical magnetic stirring bars offer excellent centering and smooth running characteristics.

**BOLA Practical Tipp**

Uwe Hossfeld » application engineering

**Your magnetic stirring bar flutters?**

To prevent this, the lengths of driving magnet in the stirrer and stirring bar should be approximately the same. In addition, the distance between these two should be as small as possible.

|« »|
Special **Request**?
+49 (0) 9346-9286-0

## BOLA Square Magnetic Stirring Bars

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

PTFE-encapsulated magnetic core (Alnico 5), universal chemical resistance.

FDA conform

| Dimensions mm | | | Cat. No.: |
|---|---|---|---|
| 14 x 14 x 45 | | | C 361-03 |
| 14 x 14 x 90 | | | C 361-06 |

**Applications:**

They are particularly suitable for big vessels, strong turbulences at low speed; solids are released or even avoided.

## BOLA Magnetic Stirring Bars with Pivot Ring

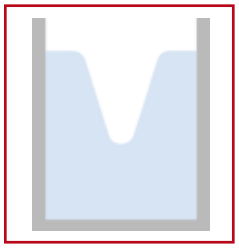
| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

PTFE-encapsulated magnetic core (Alnico 5), cylindrical shape with pivot ring, universal chemical resistance.

FDA conform

| Length mm | Dia. mm | Cat. No.: | Length mm | Dia. mm | Cat. No.: |
|---|---|---|---|---|---|
| 8 | 3 | C 354-02 | 35 | 6 | C 354-20 |
| 12 | 5 | C 354-05 | 40 | 8 | C 354-23 |
| 15 | 5 | C 354-08 | 45 | 8 | C 354-26 |
| 20 | 6 | C 354-11 | 50 | 8 | C 354-29 |
| 25 | 6 | C 354-14 | 60 | 9 | C 354-32 |
| 30 | 6 | C 354-17 | 70 | 9 | C 354-35 |



**Applications:**

They provide a bigger surface area. Very steady spinning position with additional turbulences.

**BOLA Practical Tipp**

Uwe Hossfeld » application engineering

**Removing magnetic stirring bars**

Even for aggressive liquids you can use our magnetic stirring bar retriever which is also available with a very strong magnet.

see page 56

**SUITABLE:** page **56**
Powerful magnetic stirring bar retrievers

## BOLA Magnetic Stirring Bar Set

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

Consisting of the most common magnetic stirring bars and a retriever with a length of 150 mm. Each one piece of:

Cylindrical 10 x 6, 15 x 4,5, 20 x 6, 25 x 6, 30 x 6, 40 x 8, 50 x 8, 60 x 9;
Pivot ring 15 x 5, 25 x 6, 40 x 8;
Triangular 25 x 8, 40 x 14

FDA conform

| Dimensions of box mm | | | Cat. No.: |
|---|---|---|---|
| 175 x 110 x 30 | | | C 348-10 |

**Applications:**

Ideal for beginners, for testing different kinds and dimensions of magnetic stirring bars

## BOLA Triangular Magnetic Stirring Bars

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

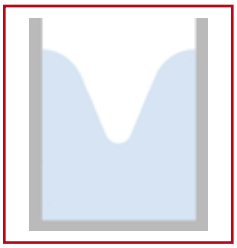
PTFE-encapsulated magnetic core (Alnico 5), universal chemical resistance.

FDA conform

| Length mm | Dia. mm | Edge length mm | Cat. No.: |
|---|---|---|---|
| 12 | 8 | 6 | C 357-03 |
| 20 | 8 | 8 | C 357-06 |
| 25 | 8 | 8 | C 357-09 |
| 25 | 14 | 15 | C 357-12 |
| 35 | 10 | 10 | C 357-15 |
| 40 | 14 | 15 | C 357-18 |
| 50 | 12 | 12 | C 357-21 |
| 55 | 14 | 15 | C 357-24 |
| 80 | 17 | 16 | C 357-27 |
| 130 | 38 | 44 | C 357-30 |

**Applications:**

For big vessels, strong turbulence at relatively low speeds. Useful for mixing reagents which resist dissolving or for avoiding any residues at the bottom of the vessels.



## BOLA Egg-Shaped Magnetic Stirring Bars

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

PTFE-encapsulated magnetic core (Alnico 5), universal chemical resistance.

FDA conform

| Length mm | Dia. mm | Suitable for round bottom flasks (DIN 12 348) ml | Cat. No.: |
|---|---|---|---|
| 20 | 10 | 25 | C 358-02 |
| 25 | 12 | 50 | C 358-04 |
| 30 | 15 | 100 | C 358-06 |
| 35 | 15 | 250 | C 358-08 |
| 40 | 20 | 500 | C 358-10 |
| 50 | 20 | 1.000 | C 358-12 |
| 65 | 20 | 4.000 | C 358-14 |
| 70 | 20 | 10.000 | C 358-16 |

**Applications:**

Ideal for stirring in round bottom flasks. Shape mimics that of the flasks and assures complete mixing.

## BOLA Power Magnetic Stirring Bars

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| PTFE | from -200°C to + 250°C | +++ universal |

Product description:

PTFE-encapsulated magnetic core made of a very strong magnetic material (rare earth magnet samarium-cobalt), torque loads transmitted are about 4 times larger than those of conventional magnetic stirring bars. No risk of demagnetization, sterilisable, extremely smooth surface avoiding contaminations, universal chemical resistance.

FDA conform

| Length mm | Dia. mm | | Cat. No.: |
|---|---|---|---|
| 20 | 8 | | C 365-20 |
| 40 | 14 | | C 365-40 |
| 50 | 19 | | C 365-50 |

**Applications:**

They are mainly used for agitating viscous liquids or for bridging larger distances between the magnetic stirring machine and the magnetic stirring bar. Optimum mixing in vessels with a big volume or in tall graduated cylinders.

## BOLA INNOVATION

**Power Magnetic Stirring Bars**

The Samarium-Cobalt rare-earth magnet is encapsulated in PTFE. Compared with common magnetic stirring bars, its torque is four times higher. These stirring bars are ideal for mixing highly viscous liquids.

## BOLA Ultra Magnetic Stirring Bars

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| PTFE | from -200°C to + 250°C | +++ universal |

Product description:

PTFE-encapsulated magnetic core (Alnico 5), extremely smooth and seamless surfaces, no substance can penetrate, universal chemical resistance.

FDA conform

| Length mm | Dia. mm | | Cat. No.: |
|---|---|---|---|
| 10 | 6 | | C 353-10 |
| 15 | 5 | | C 353-15 |
| 20 | 7 | | C 353-20 |
| 25 | 5 | | C 353-25 |
| 30 | 5 | | C 353-30 |
| 40 | 7 | | C 353-40 |

**Applications:**

They are mainly used for high-purity work or trace analysis.

## BOLA Magnetic Stirring Bar Retrievers

BESTSELLER

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

PTFE-encapsulated stirring bar retriever with strong permanent magnet (Alnico 5), universal chemical resistance.

FDA conform

| Length mm | Lower end dia. mm | Bar dia. mm | Cat. No.: |
|---|---|---|---|
| 150 | 10 | 8 | **C 372-02** |
| 200 | 10 | 8 | **C 372-04** |
| 250 | 10 | 8 | **C 372-06** |
| 300 | 10 | 8 | **C 372-08** |
| 350 | 10 | 8 | **C 372-10** |
| 400 | 10 | 8 | **C 372-12** |
| 600 | 10 | 8 | **C 372-18** |

**Applications:**

For the removal of stirring bars from aggressive liquids, prevents loss of stirring bars.

## BOLA Jumbo Magnetic Stirring Bar Retrievers

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200 °C to +250 °C** | **+++ universal** |

Product description:

PTFE-encapsulated stirring bar retriever with extra strong permanent magnet (Neodym), universal chemical resistance.

NEW

| Length mm | Lower end dia. mm | Bar dia. mm | Cat. No. |
|---|---|---|---|
| 700 | 16 | 12 | **C 371-16** |

**Applications:**

For the removal of stirring bars from aggressive liquids. Especially for big and heaving stirring bars up to 400 g.

## BOLA Glass Magnetic Stirring Bars

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **Glass** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

Magnetic core (Alnico 5) encapsulated in borosilicate glass, cylindrical shape, extremely smooth surface prevents from penetration of substances, non-porous, non-contaminating, universal chemical resistance.

FDA conform

| Length mm | Dia. mm | | Cat. No.: |
|---|---|---|---|
| 15 | 8 | | C 351-03 |
| 20 | 8 | | C 351-06 |
| 25 | 8 | | C 351-09 |
| 30 | 8 | | C 351-12 |
| 40 | 8 | | C 351-15 |
| 55 | 8 | | C 351-19 |

**Applications:**

They are mainly used for high-purity work or trace analysis.

## BOLA Colour Magnetic Stirring Bars

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

Magnetic core (Alnico 5) encapsulated with coloured PTFE, universal chemical resistance.

| Length mm | Dia. mm | Colour | Cat. No.: |
|---|---|---|---|
| 13 | 8 | yellow | C 368-08 |
| 25 | 8 | yellow | C 368-12 |
| 38 | 8 | yellow | C 368-16 |
| 50 | 8 | yellow | C 368-20 |
| 13 | 8 | blue | C 368-28 |
| 25 | 8 | blue | C 368-32 |
| 38 | 8 | blue | C 368-36 |
| 50 | 8 | blue | C 368-40 |
| 13 | 8 | red | C 368-48 |
| 25 | 8 | red | C 368-52 |
| 38 | 8 | red | C 368-56 |
| 50 | 8 | red | C 368-60 |

**Applications:**

For better distinction.

## BOLA Star Head Magnetic Stirring Bars

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

PTFE-encapsulated magnetic core (Alnico 5), universal chemical resistance.

FDA conform

| Dia. mm | Height mm | | Cat. No.: |
|---|---|---|---|
| 10 | 8 | | C 360-04 |
| 14 | 10 | | C 360-07 |
| 17 | 13 | | C 360-10 |
| 22 | 15 | | C 360-13 |
| 30 | 12 | | C 360-16 |
| 35 | 12 | | C 360-19 |
| 40 | 14 | | C 360-22 |
| 58 | 15 | | C 360-25 |

**Applications:**

Optimum stirring in tall, narrow diameter vessels due to symmetrical fins on both sides. Ideal stirring bar for cuvettes or test tubes.

## BOLA Dumbbell-Shaped Magnetic Stirring Bars

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

PTFE-encapsulated magnetic core (Alnico 5), universal chemical resistance.

FDA conform

| Length mm | Dia. of discs mm | | Cat. No.: |
|---|---|---|---|
| 37 | 20 | | C 359-03 |
| 55 | 20 | | C 359-06 |

**Applications:**

Stable discs on both sides provide an excellent stirring.

## BOLA Center Magnetic Stirring Bars

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

PTFE-encapsulated magnetic core (Alnico 5), conically tapered ends, universal chemical resistance.

FDA conform

| Length mm | Dia. mm | | Cat. No.: |
|---|---|---|---|
| 20 | 7 | | C 367-20 |
| 30 | 8 | | C 367-30 |
| 40 | 8 | | C 367-40 |
| 50 | 8 | | C 367-50 |

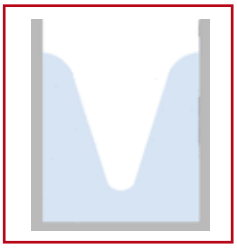
**Applications:**

Extremely steady mixing due to small center seat.

**HELPFUL:** page **253**
Detailed information on magnetic stirring

## BOLA Crosshead Magnetic Stirring Bars

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |



Product description:

PTFE-encapsulated magnetic core (Alnico 5), universal chemical resistance.

FDA conform

| Length x Width mm | Height mm | | Cat. No.: |
|---|---|---|---|
| 10 x 10 | 5 | | C 369-10 |
| 19 x 19 | 9 | | C 369-19 |
| 25 x 25 | 13 | | C 369-25 |
| 32 x 32 | 14 | | C 369-32 |
| 38 x 38 | 15 | | C 369-38 |

**Applications:**

Safe and quiet mixing, optimum stirring due to stable position

## BOLA Beakerliner

| Material: | Temperature resistance: | Chemical resistance: | Vacuum: | autoclave: |
|---|---|---|---|---|
| **PTFE** | **from -200 °C to +250 °C** | **+++ universal** | **suitable** | **121°** |

NEW

FDA conform

Product description:

PTFE-encapsulated magnetic core (Alnico 5) axially mounted in a guide cage made of PTFE, universal chemical resistance.

| for Beakers low from ml | cage O.D. mm | cage height mm | stirring bar length mm | Cat. No. |
|---|---|---|---|---|
| 250, 400 | 67 | 21 | 50 x 8 | C 362-08 |
| 600, 800, 1.000 | 74 | 29 | 60 x 10 | C 362-12 |
| 2.000 | 103 | 32 | 80 x 10 | C 362-16 |
| 3.000, 5.000 | 125 | 48 | 106 x 25 | C 362-20 |

**Applications:**

No shear action on the bottom of the beaker, smooth running in glass beakers also on an uneven bottom. The cage acts like a baffel and thus provides optimum mixing results.

### BOLA INNOVATION

**Beakerliner**

A magnetic stirring bar mounted in a guide cage prevents shear action on the bottom of the beaker. The liquid is mixed carefully. Easy handling since the cage can easily be inserted or removed.

## BOLA Tandem Magnetic Stirring Bars

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

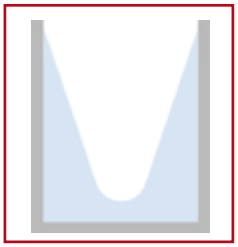
FDA conform

Product description:

PTFE-encapsulated magnetic cores (Alnico 5), center bore for receiving the BOLA Bearing Neck or a glass neck (available from a glassblower), universal chemical resistance. Bearing neck not included in delivery.

| Magnetic stirring bar length x O.D. mm | Bearing neck dia. mm | Recommended height of neck mm | Block dimensions mm | Cat. No.: |
|---|---|---|---|---|
| 40 x 10 | 8 | 15 | 34 x 14 x 14 | C 363-26 |
| 55 x 12 | 8 | 19 | 44 x 18 x 14 | C 363-30 |
| 110 x 24 | 12 | 37 | 84 x 36 x 36 | C 363-36 |
| 155 x 24 | 12 | 37 | 84 x 36 x 36 | C 363-39 |

Extremely strong mixing of the product, ideal transmission of the magnetic force of the stirrer to the tandem magnetic stirring bar. Reduction of running surface to a ring minimizes friction and increases lifespan. Tandem magnetic stirring bars do not touch the bottom and therefore do not wear.



## BOLA Bearing Necks

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE / compound** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

Very hard PTFE-PEEK compound, for receiving a BOLA Tandem Magnetic Stirring Bar, center fixing on the bottom of the vessel by means of glue (we recommend silicone; hardened in water), universal chemical resistance.

FDA conform

| Dia. of neck mm | Lower dia. mm | Usable height mm | Suitable for Cat. No.: | Cat. No.: |
|---|---|---|---|---|
| 8 | 25 | 19 | C 363-26 and C 363-30 | **C 364-08** |
| 12 | 25 | 37 | C 363-36 and C 363-39 | **C 364-16** |

## BOLA Culture Bottles

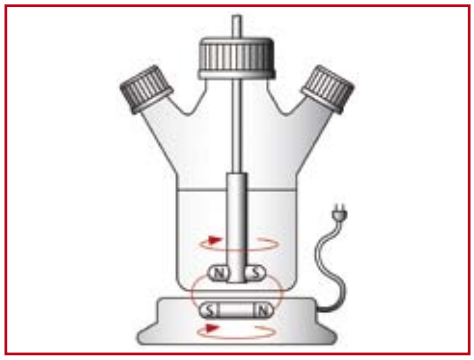
| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

- » Bottle made of borosilicate glass
- » Screw cover for center neck made of PP with glass fibre
- » Screw caps for sidearms made of PPS
- » Stirrer made of PTFE and stainless steel is continuously adjustable in height from the outside
- » Complete unit can be sterilized
- » Universal chemical resistance
- » Suitable for both low and high speeds (max. 1000 rpm)

FDA conform

| Usable volume ml | I.D. of center neck mm | Thread of bottle GL | Thread of sidearms GL | Cat. No.: |
|---|---|---|---|---|
| 50 | 30 | 45 | 2 x 14 | **C 420-03** |
| 125 | 30 | 45 | 2 x 18 | **C 420-05** |




**Applications:**

- » Stirring unit is driven by a common magnetic stirrer
- » Magnetism causes rotation
- » For gentle mixing of cell cultures
- » The sidearms can be connected to tubing, probes or sensors (suitable laboratory screw joints can be found on page 67)

## BOLA Tweezers

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

Precast tweezers made of PTFE with pointed or blunt ends. Universal chemical resistance.

FDA conform

| | Length mm | | | Pointed end Cat. No.: |
|---|---|---|---|---|
| A | 100 | | | **H 909-02** |
| | 150 | | | **H 909-04** |
| | 200 | | | **H 909-06** |

| | Length mm | | | Blunt end Cat. No.: |
|---|---|---|---|---|
| B | 100 | | | **H 912-02** |
| | 150 | | | **H 912-04** |
| | 200 | | | **H 912-06** |



## BOLA Double Spatulas

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

Spatulas made of PTFE with tapered ends. Universal chemical resistance.

FDA conform

| Length mm | Width of ends mm | | Cat. No.: |
|---|---|---|---|
| 120 | 16 | | **H 915-02** |
| 150 | 16 | | **H 915-04** |
| 180 | 16 | | **H 915-06** |

|« »|
Special **Request**?
+49 (0) 9346-9286-0

## BOLA Scrapers

| Material: | Temperature resistance: | Chemical resistance: |
|---|---|---|
| **PTFE** | **from -200°C to + 250°C** | **+++ universal** |

Product description:

Scrapers made of PTFE with tapered end. Ideal handling due to big handle and wide blade. Universal chemical resistance.

FDA conform

| Total length mm | Width of blade mm | Dia. of handle mm | Cat. No.: |
|---|---|---|---|
| 160 | 50 | 20 | **H 916-02** |
| 200 | 90 | 20 | **H 916-06** |
| 200 | 120 | 20 | **H 916-08** |

**Applications:**

For a very gentle peeling of products.