


























Systematic solutions for linking technology

Metal processing · Linking technology



| | Product section | Standard | Steel |  | | Page |
|----|--|---|-----------------------|---|---|-------------------|
| | Contents | | | | | 2-3 |
| | Metal processing / Linking technology Service and services package Assembly | | | | | 4-11 |
| | Technology Steel type recording Surface coating List of the machines | | | | | 12 13 14-15 |
| | Quality | | | | | 16 |
| 1 | Assortment boxes | | • | • |  | 17-20 |
| 2 | Folding spring bolts (suitable for clevises) | | • | |  | 21-22 |
| 3 | Clevises | DIN 71752 ISO 8140 CETOP RP 102 P | • | |  | 23-24 |
| 4 | Bolts with pin hole or with groove (suitable for clevises) | | • | |  | 25-28 |
| 5 | Clevises made of stainless steel | DIN 71752 ISO 8140 CETOP RP 102 P | | • |  | 29-30 |
| 6 | Bolts made of stainless steel with pin hole or with groove (suitable for clevises) | | | • |  | 31-35 |
| 7 | Clevises with male thread | | • | • |  | 36 |
| 8 | Clevises with elongated hole | | • | • |  | 37 |
| 9 | Clevises with hardened cross hole | | • | |  | 38 |
| 10 | Mating pieces for clevises | | • | • |  | 39 |
| 11 | Clevis joints Clevis joints (according to DIN 71751) Clevis joint combinations Joint combinations Joint rods | (DIN 71751) | • • • • • | • • • • • |  | 40-47 |

Content_01
08/2011

| | Product section | Standard | Steel |  |  | Page |
|----|---|--|--------------------------------------|---|---|-------------|
| 12 | Bolts according to DIN/EN/ISO | EN 22340 / ISO 2340 EN 22341 / ISO 2341 (DIN 1433, DIN 1434, DIN 1435, DIN 1436, DIN 1443, DIN 1444) DIN 1445 | • | • |  | 48-52 |
| 13 | Retainers for shafts with groove SL-retainers KL-retainers Locking washers DIN 6799 Bayonet clips Retainig rings DIN 471 | DIN 6799 DIN 471 | • • • • • | • • • |  | 53-57 |
| 14 | Retainers for shafts without groove Spring washers Spring washers with cap Duo clips | | • • • | • • |  | 58-61 |
| 15 | Assembly tools for retainers | | | |  | 62-63 |
| 16 | Angle joints Ball studs Rivet studs Ball sockets Axial joints | DIN 71802 DIN 71803 DIN 71803 DIN 71805 | • • • • • | • • • • • |  | 64-75 |
| 17 | Rod ends Pivoting bearings Rod ends hydraulic | (DIN 648) DIN ISO 12240-4 CETOP RP 103 P DIN ISO 12240-1 DIN 24338 ISO 6982 DIN 24555 ISO 8133 | • • • • • • • • | • • • |  | 76-114 |
| 18 | Knuckle eyes | | • | • |  | 115 |
| 19 | Cardan joints | DIN 808 | • | • |  | 116 |
| 20 | Taper keys with gip head Tangential keys Tangential keys Parallel keys Woodruff keys Set collars Axle holders Nuts for T-slots | DIN 6887 DIN 268 DIN 271 DIN 6885 DIN 6888 DIN 705 DIN 15058 DIN 508 | • • • • • • • • | • • • |  | 117- 124 |

Content_02
08/2011

Welcome to mbo

Consistent efforts towards more quality and customer-oriented thinking have made us what we are today

▶ Anton Osswald (†2004) set up the company 40 years ago with the aim of producing and selling linking elements such as bolts and clevises for industrial use. It was clear from the beginning that only tested products of the highest quality were capable of fulfilling their specific tasks. This philosophy is even more relevant today at mbo. The latest manufacturing methods and consistent monitoring of the entire production processes provide our customers with the security of receiving quality products that meet the strictest of requirements.

In addition to the 12,000 standard parts that are immediately retrievable at all times, we also offer our customers tailor-made articles or assemblies that are for example specifically developed for special application purposes. Finding ideal solutions for materials, surfaces or geometries is our speciality that we are delighted to offer you. In this way, we are able to produce your individual application options. This makes us much more than just a parts supplier. We are partners to industry.



▲ Joint combination with clevis joint and mating piece for clevises



▲ Processing centres



▶ Our production and storage hall with more than 8000 m²

Excerpts from our production range: ▼

Mating piece for clevises



Ball socket



Ball stud



Folding spring bolt



Clevis (long version)



Clevis (short version)



Our products

Standard parts and special solutions from a single source

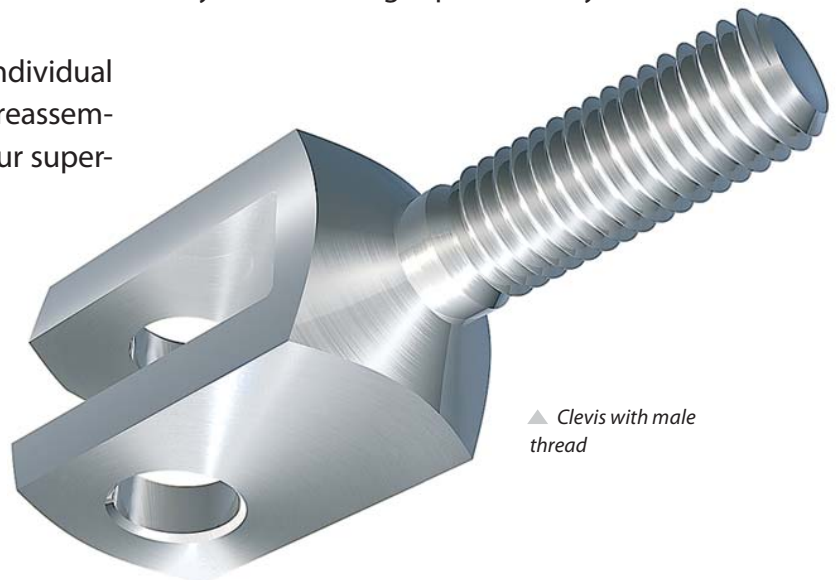
► We keep more than 12,000 standard parts readily available for you in stock. All parts are manufactured in accordance with the particularly rigorous mbo quality standards. The parts are also particularly economical thanks to their outstanding price/performance ratio. We will be pleased to manufacture for you anything we do not have in stock.

Speak to our specialists about your individual requirements, special solutions or preassembled subassemblies. You can call on our super-

lative development expertise which has been built up over a period of 40 years.

New manufacturing possibilities enable us to meet your quantity, geometry or precision requirements with ease. We can manufacture with great efficiency precision parts.

Linking technology is our profession; that's why we are the right partner for you.



▲ Clevis with male thread

Further examples from our production: (from right to left)

- KL-retainer
- Spring washer
- Locking washer DIN 6799
- Bolt with head and hole
- Large picture: Joint rod combination with clevis joint and rod end



Clevis with male thread



Clevis with elongated hole



Bolt with head and groove



Our service and services package

Customer-specific solutions are at the forefront for us

► We know what the customer expects. Quality alone is not the only criteria; flexibility and service also turn a supplier into a partner. We want to be your partner in every respect. That is why your wishes are our priority. This starts from the delivery date, which is arranged to meet your requirements as far as possible.

Assembly

All subassemblies are realised and delivered according to your individual requirements. We guarantee professional assembly. Preassembled parts are installed faster and more easily. This reduces the amount of time and effort expended at your own production site and thereby increases efficiency.



Packing

You decide how and in what units the products are packed. You tell us both the size of the packing and the shipping mode. We mark the products according to your requirements or provide the delivery with a specific bar code.

We will do our utmost to meet your requirements.

And if you need a part that is not in our delivery program, we will make it for you. Send us a drawing or talk to one of our specialists.

We have set ourselves the highest criteria with respect to flexibility and service and we will meet them.

▼ Joint rods combination with clevis joint and angle joint



▼ Axial joint



▼ Threaded bolt



▼ Eye bolt



▼ SL-retainer



▼ Knuckle eye



▼ Rod end with female thread



▼ Angle joint





Our Team

Your contact partner

A friendly and trained team is waiting for your call. Our employees do not only implement your orders but can also meet your individual requirements with the highest levels of flexibility and specialist competence. This competence ranges from simple appointment scheduling to customer-specific packaging requests to technical consultancy.

■ Gerlinde Ruck

Sales Management
Telephone extension - 121
g.ruck@mbo-osswald.de

You can reach your specific contact partner by telephoning

+ 49 (0) 9345 670 + Extension

We look forward to hearing from you.

■ Stephanie Kemmer

Assistant Sales Management/Export
Telephone extension - 122
s.kemmer@mbo-osswald.de

■ Tanja Woelk

Export
Telephone extension - 134
t.woelk@mbo-osswald.de

■ Daniel Fleuchaus

Offer Processing
Telephone extension - 143
d.fleuchaus@mbo-osswald.de

■ Daniela Reinhart

Offer Processing
Telephone extension - 123
d.reinhart@mbo-osswald.de

■ Lothar Winkler

Sales Promotion &
Marketing Management
Telephone extension - 131
l.winkler@mbo-osswald.de

■ Edith Konrad

QA Management
Telephone extension - 182
e.konrad@mbo-osswald.de

We implement your ideas economically

Customer-specific solutions are at the forefront for us

► We shall now be able to meet your wishes for individual drawing parts more quickly, more precisely and more economically. New inhouse parts production will enable us to manufacture superior-quality special workpieces and parts with a hitherto unexperienced level of efficiency and precision.

Our new machinery is characterised by high flexibility, unique repeat accuracy and short machining times. These qualities enable you economically to manufacture both simple workpieces made from **machining steel** and geometrically complex parts made from high-strength steels with close-tolerance dimension and surface specifications.

New:

Corrosion-resistant steel
Sea-water-resistant steel
High-temperature steel
High-strength steel
Duplex steel

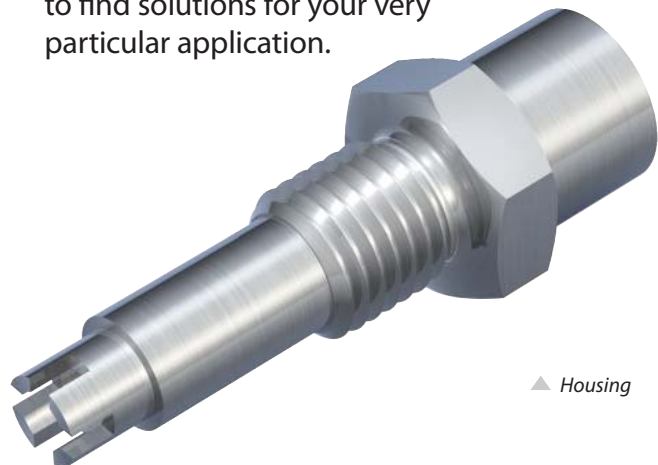
We can manufacture for you rod and shaft parts with diameters

**of 4 – 65 mm, up to a
total length of 650 mm.**

In particular, cross-holes, turned grooves, millings, multiple-edge turning and complicated geometries can be executed.

Whether you require pilot, small-lot or mass production of your special part, we guarantee short delivery times and especially economical manufacture.

We are now more than ever the right partner for you for the production of superior-quality special workpieces and parts. We are on hand with the latest technology and our know-how to find solutions for your very particular application.



▲ Housing

Feel free to contact
your mbo partner

■ Jürgen Schüssler

Mechanical Engineer
Tel. +49 (0) 9345 670 -132
j.schuessler@mbo-osswald.de



Efficient production of precision parts

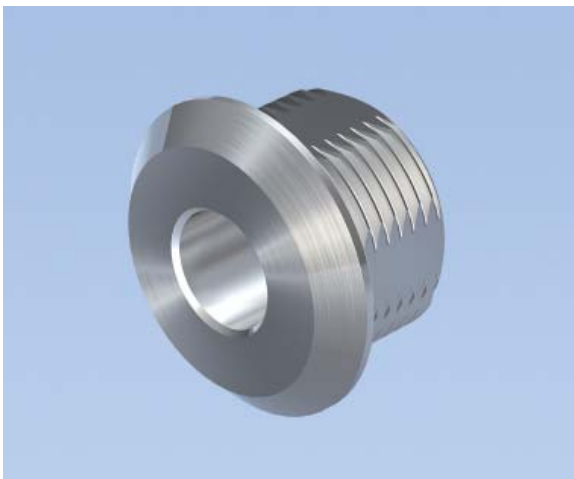
Examples from our production



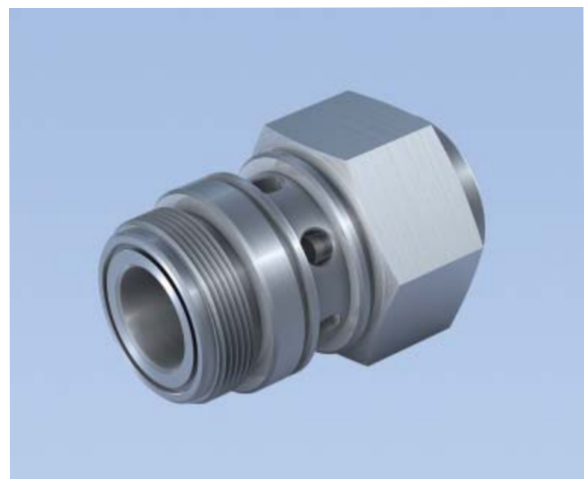
▲ *Eye bolt*



▲ *Eye screw*



▲ *Guide pin*



▲ *Threaded fitting with hexagon*



▲ *Tube adapter*



▲ *Hexagon threaded pin*



▲ High-speed automatic lathe:
economical production with maximum precision



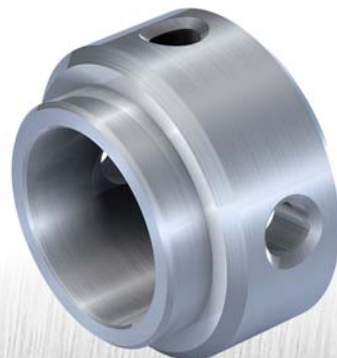
▲ Complete machining of mechanical components:
flexibility and short machining times for efficient production



▲ Our team of experts will implement your requirements for developing
completely new linking elements or specific assemblies



▲ New machinery for implementing your ideas





How to find us

Centrally located in the attractive Taubertal valley, close to the important North-South and West-East transport connections.



Systematic solutions for linking technology

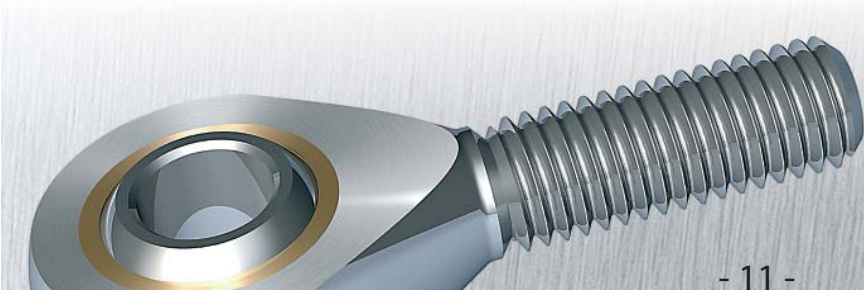
mbo Osswald GmbH & Co KG

Metal processing · Linking technology

Steingasse 13 · D-97900 Kulsheim - Steinbach

Tel.: +49 (0) 9345 - 670-0 · Fax: +49 (0) 9345 - 6255

www.mbo-osswald.com · info@mbo-osswald.de



| Material standard | Germany (DE) DIN | France (FR) AFNOR NF | UK B.S. | Spain (ES) UNE |
|-------------------|---------------------|-------------------------|------------|-------------------|
| 1.0402 | C22 | XC 25 | 070M20 | F.112 |
| 1.0503 | C45 | XC 45 | 080M46 | F.114 |
| 1.0715 | 11SMn30+C | - | 230M07 | F.2111 |
| 1.0718 | 11SMnPb30+C | S250Pb | - | F.2112 |
| 1.0757 | 46SPb20 | - | - | - |
| 1.3505 | 100Cr6 | 100Cr6 | 25135 | F.1310 |
| 1.4006 | X12Cr13 | Z10C13 | 410C21 | F.3401 |
| 1.4021 | X20Cr13 | Z20C13 | 420S37 | F.3402 |
| 1.4028 | X30Cr13 | - | 420S45 | F.3403 |
| 1.4034 | X46Cr13 | Z44C14 | - | F.3405 |
| 1.4057 | X17CrNi16-2 | Z15CN16-02 | 431S29 | F.3427 |
| 1.4104 | X14CrMoS17 | Z13CF17 | - | F.3117 |
| 1.4125 | X105CrMo17 | Z100CD17 | - | - |
| 1.4301 | X5CrNi18-10 | Z4CN19-10FF | 304S17 | F.3541 |
| 1.4305 | X8CrNiS18-9 | Z8CNF18-09 | 303S22 | F.3508 |
| 1.4401 | X5CrNiMo17-12-2 | Z6CND17-11 | 316S17 | F.3543 |
| 1.4404 | X2CrNiMo17-12-2 | Z3CND18.12.02 | 316S11 | F.3533 |
| 1.4462 | X2CrNiMoN22-5-3 | Z2CND17-12 | 318S13 | - |
| 1.4571 | X6CrNiMoTi17-12-2 | Z6CNDT17-12 | 320S18 | F.3535 |
| 1.7225 | 42CrMo4 | 42CrMo4 | 708M40 | F.1252 |
| 2.0561 | CuZn40Al1 | - | - | - |
| 2.1030 | CuSn8 | - | - | - |

| Material standard | Sweden (SE) SS 14 | Italy (IT) UNI | USA SAE/AISI | Czech Rep. (CZ) | |
|-------------------|----------------------|-------------------|-----------------|-----------------|-------|
| | | | | CSN | Type |
| 1.0402 | 1450 | C21 | M 1023 | 41 2024 (1984) | 12024 |
| 1.0503 | 1650 | C45 | Aisi 1043 | 41 2050 (1976) | 12050 |
| 1.0715 | - | - | - | 41 1109 (1974) | 11109 |
| 1.0718 | 1914 | CF9SMnPb28 | 12L13 | - | - |
| 1.0757 | - | - | - | - | - |
| 1.3505 | 2258 | 100Cr6 | Aisi 52100 | 41 4109 (1976) | 14109 |
| 1.4006 | 2302 | X10Cr13 | Aisi 410 | 41 7021 (1980) | 17021 |
| 1.4021 | 2303 | X20Cr13 | Aisi 420 | - | - |
| 1.4028 | - | - | - | 41 7023 (1976) | 17023 |
| 1.4034 | - | X40Cr14 | - | - | - |
| 1.4057 | 2321 | X16CrNi16 | Aisi 431 | - | - |
| 1.4104 | 2383 | X10CrS17 | Aisi 430F | - | - |
| 1.4125 | - | - | Aisi 440C | - | - |
| 1.4301 | 2332 | X5CrNi1810 | Aisi 304 | 41 7240 (1972) | 17240 |
| 1.4305 | 2346 | X10CrNiS1809 | Aisi 303 | - | - |
| 1.4401 | 2347 | X5CrNiMo1712 | Aisi 316 | 41 7646 (1972) | 17346 |
| 1.4404 | 2348 | X2CrNiMo1712 | Aisi 316L | - | - |
| 1.4462 | 2377 | - | Aisi 318LN | - | - |
| 1.4571 | 2350 | X6CrNiMoTi1712 | Aisi 316Ti | - | - |
| 1.7225 | 2244 | 42CrMo4 | Aisi 4140 | 41 5142 (1977) | 15142 |
| 2.0561 | - | - | - | - | - |
| 2.1030 | - | - | - | - | - |

Technology_01
12/2012

| Coating type | Passivation | Conforming to Directives - EU 2000/53/EC (Used Car Directive) - EU 2002/53/EC (RoHS) - German Electrical and Electronic Equipment Act (ElektroG) | | Not suitable for product group |
|---------------------------|--|---|----|--|
| | | Yes | No | |
| plating (galvanic) | | | | |
| Fe//Zn...c B | thin layer transparent | x | | |
| Fe//Zn...c C | thin layer yellow | | x | |
| Fe//ZnNi//Cn//T0 or T2 | thick layer Cr III transparent | x | | |
| Fe//ZnFe//Cn//T0 or T2 | thick layer Cr III transparent | x | | |
| Fe//ZnFe//Fn//T2 | thick layer Cr III black + sealing (recommended) | x | | products prone to bonding and bundling |
| Fe//ZnNi//Fn//T0 or T2 | black Cr III | x | | |
| mechanical | | | | |
| Fe//Zn...M | thick layer Cr III | x | | products with threads and fits |
| Fe//Zn...M yellow | thin layer yellow | | x | |
| organic/inorganic | | | | |
| Delta Seal | silver | x | | products with threads and fits, products prone to bonding and bundling |
| Delta Seal/Deltatone | black | x | | |
| Deltamagni 565 | grey/green Cr VI-free | x | | |
| Dacromet | | | x | |
| Geomet | | x | | |

Note:

Suitability for coating is product and quantity-dependent and must be technically and commercially checked in each individual case. The coating types mentioned represent only a selection of the possibilities available.

Technology_02
08/2011

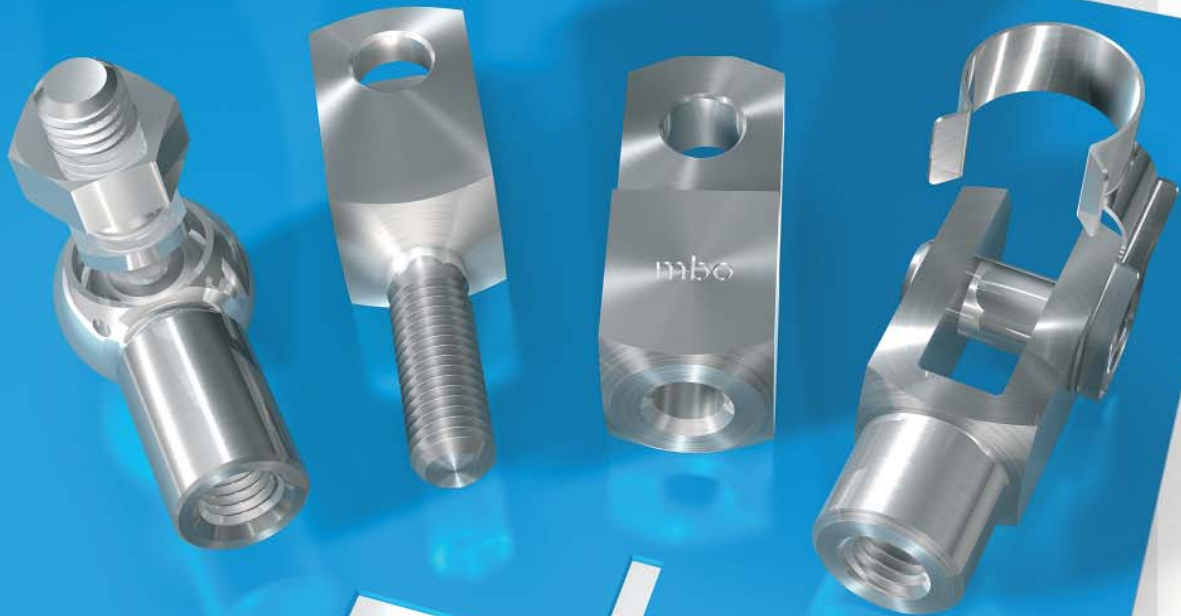
| Equipment of manufacture/sector | Products/Process |
|----------------------------------|--|
| Production line | Clevises according to DIN 71752 from G 4 x 8 up to G 50 x 96 Clevises according to CETOP standard Clevises according to drawing |
| Production line/Special machines | Folding spring bolts for clevises from FKB 4 x 8 up to FKB 20 x 40 |
| Production line | Angle joints according to DIN 71802 Ball studs according to DIN 71803 Ball sockets according to DIN 71805 |
| Automatic lathe | Single spindle Index, Traub from diameter 4 x 15 long up to diameter 60 x 150 long Single-spindle - CNC Complex machining (opposed spindle; cross machining, driven tools) from \varnothing 4 to \varnothing 65 x 650 long Multi spindle - Pittler (L) 6 spindle up to \varnothing 63 8 spindle up to \varnothing 32 Length upon request |
| Second-operation lathe | for lathe work and punched parts Rorschach FA3 up to \varnothing 12 x 100 long Weiler, Boley up to \varnothing 30 x 100 long |
| Riveting machine | Automatic and half-automatic mounting of bolts and axes by riveting |
| Hardening (external) | by induction Nitrocarburisation Cementing |
| Surface | Conservation/oiling Coating (external): • phosphating • galvanic zinc coating bichromated / blue passivated • mechanic zinc coating bichromated / blue passivated • chemical nickel plating • electrical polishing • coating Delta magni |

Technology_03
08/2011

| Equipment of manufacture/sector | Products/Process |
|---------------------------------------|---|
| Blasting unit | Surface blasting (descaling, cleaning) Rösler RDT 100 |
| Vibratory grinding equipment | Burring / chamfering of the edges / polishing / conservation Rösler, Spaleck, Walther-Trowal including pre-selected cleaning stage with integrated water treatment and drying installation for the parts. Dimension of the parts: up to approx. diameter 100 x 200 long |
| Cleaning devices | Removing of the oil / removing of the cuttings / cleaning / conservation Steimel HBR 7; Dürr-Ecoclean full automatic cleaning equipment with 5 chambers including integrated cleaning and distilling stage with heat recovery |
| Metal cutting and processing machines | Milling / boring / friction / threading / lathing / marking / knurling / pressing in / flat and round grinding |
| Welding device | Methods: • protective gas • electrodes |
| Assembling/packing | • Part assembly • Packing according to customers' requirements in cartons, boxes, even neutral packing • Packing / packing into bags / labelling / counting Automatic packing machine for PE bags, width max. 240 mm Sealing welding machines High-precision counting scales Sartorius and Mettler-Toledo |
| Special versions | to customer specifications |

Technology_04
08/2011

We produce quality



mbo®

► to make your connections secure

The high quality standard of our products is the result of a consistently pursued quality policy influencing every area of our company. From the arrival of the raw materials there to the delivery of the finished product, the latest technology and perfected know-how at our company ensure ideal production conditions and a clear-cut technological lead.

Our high quality standard is applied not only to our products, but also to our dealings with our customers. A competent and friendly team gives you every possible support and handles your order precisely in keeping with your requirements and deadlines. If we don't have the part you want in stock, we'll make it for you. That's what we understand by cooperation.



Systematic solutions for linking technology

® mbo Osswald GmbH & Co KG
Metal processing · Linking technology
Steingasse 13
D - 97900 Kuelstheim-Steinbach

Tel.: +49 (0) 9345/670-0
Fax: +49 (0) 9345/62 55
Internet: www.mbo-osswald.com
e-mail: info@mbo-osswald.com

Quality_01
08/2011



We have 12 different standard assortment boxes available. In case you have special requirements regarding the content of the assortment boxes or other combinations, i.e. stainless steel or other surface - just ask! We can prepare and deliver special assortment boxes to your requirements upon request.

Furthermore your can reorder each part of the assortment boxes separately!



The following assortment boxes are proposed as standard offers:

(Subject to change; Offers without engagement)

1.) Clevises

- Clevises according to DIN 71752 (surface protection galvanised white)
- mbo standard 02 (see mbo catalogue page 03_01/page 23)
- Order number: 1002 0416/013
- Content: 216 parts
- Range:

| | | |
|------------------------|------------------------|------------------------|
| G 4 x 8 M4 (50 pcs.) | G 4 x 16 M4 (50 pcs.) | G 5 x 10 M5 (20 pcs.) |
| G 5 x 20 M5 (20 pcs.) | G 6 x 12 M6 (20 pcs.) | G 6 x 24 M6 (20 pcs.) |
| G 8 x 16 M8 (10 pcs.) | G 8 x 32 M8 (10 pcs.) | G 10 x 20 M10 (4 pcs.) |
| G 10 x 40 M10 (4 pcs.) | G 12 x 24 M12 (4 pcs.) | G 12 x 48 M12 (4 pcs.) |

2.) Folding spring bolts

- Folding spring bolts suitable for clevises (surface protection galvanised white)
- mbo standard 01 (see mbo catalogue page 02_01/page 21)
- Order number: 1001 0420/014
- Content: 325 parts
- Range:

| | | |
|----------------------|-----------------------|----------------------|
| FKB 4 x 8 (100 pcs.) | FKB 5 x 10 (50 pcs.) | FKB 5 x 20 (50 pcs.) |
| FKB 6 x 12 (30 pcs.) | FKB 6 x 24 (30 pcs.) | FKB 8 x 16 (20 pcs.) |
| FKB 8 x 32 (15 pcs.) | FKB 10 x 20 (10 pcs.) | FKB 10 x 40 (8 pcs.) |
| FKB 12 x 24 (8 pcs.) | FKB 12 x 48 (4 pcs.) | |

01_01
08/2011



3.) Cotter bolts for clevises

- Cotter bolts suitable for clevises/clevis joints (surface protection galvanised white)
- mbo standard BGL/BNL (see mbo catalogue page 04_02/page 26)
- Order number: 1034 0420/013
- Content: 390 parts
- Range:

| | | |
|--------------------------|--------------------------|--------------------------|
| 4 x 12 x 10 (100 pcs.) | 5 x 15 x 12.3 (100 pcs.) | 6 x 18 x 15.3 (100 pcs.) |
| 8 x 23 x 19.5 (40 pcs.) | 10 x 29 x 24.5 (10 pcs.) | 12 x 35 x 29.5 (10 pcs.) |
| 14 x 40 x 32.5 (10 pcs.) | 16 x 45 x 38.2 (5 pcs.) | 18 x 50 x 43.5 (5 pcs.) |
| 20 x 53 x 47 (10 pcs.) | | |

4.) Washers and cotter pins

- Washers according to DIN 125-A and cotter pins according to DIN 94-St suitable for bolts/clevises/clevis joints (surface protection galvanised white)
- mbo standard 04
- Order number: 1004 0420/013
- Content: 1480 parts
- Range:

| Washers according to DIN 125-A | | | |
|------------------------------------|---------------------|-------------------|---------------------|
| A 4.3 (100 pcs.) | A 5.3 (100 pcs.) | A 6.4 (100 pcs.) | A 8.4 (100 pcs.) |
| A 10.5 (100 pcs.) | A 13.0 (100 pcs.) | A 15.0 (100 pcs.) | A 17.0 (30 pcs.) |
| A 19.0 (25 pcs.) | A 21.0 (25 pcs.) | | |
| Cotter pins according to DIN 94-St | | | |
| 1 x 10 (200 pcs.) | 1.6 x 16 (100 pcs.) | 2 x 16 (100 pcs.) | 3.2 x 20 (100 pcs.) |
| 4 x 32 (100 pcs.) | 5 x 45 (100 pcs.) | | |

5.) Cotter bolts

- Cotter bolts according to DIN 1434 (surface protection galvanised white) with small head and pin hole
- mbo standard BGL/BNL
- Order number: 1434 0614/013
- Content: 100 parts
- Range:

| | | |
|-------------------------|------------------------|-------------------------|
| 6 x 18 x 15.3 (10 pcs.) | 6 x 25 x 22 (10 pcs.) | 8 x 23 x 19.5 (10 pcs.) |
| 8 x 28 x 25 (10 pcs.) | 10 x 35 x 30 (10 pcs.) | 10 x 45 x 40 (10 pcs.) |
| 12 x 35 x 30 (10 pcs.) | 12 x 50 x 45 (10 pcs.) | 14 x 40 x 35 (10 pcs.) |
| 14 x 50 x 45 (10 pcs.) | | |

6.) Angle joints

- Angle joints according to DIN 71802 / form CS (surface protection galvanised white)
- mbo standard 03 (see mbo catalogue section 16/page 64-75)
- Order number: 1003 0819/013
- Content: 72 parts
- Range:

| | | |
|------------------------|--------------------|------------------------|
| CS 8 M5 (20 pcs.) | CS 10 M6 (20 pcs.) | CS 13 M8 (20 pcs.) |
| CS 16 M10 (2 pcs.) | CS 16 M12 (4 pcs.) | CS 19 M14x1.5 (2 pcs.) |
| CS 19 M14x2.0 (2 pcs.) | CS 19 M16 (2 pcs.) | |

01_02
08/2011



7.) Bolts with groove

- Bolts with groove for retainers suitable for clevises/clevis joints (surface protection galvanised white)
- mbo standard BEG/BEN (see mbo catalogue page 04_01/page 25)
- Order number: 1077 0420/013
- Content: 220 parts
- Range:

| | | |
|--------------------------|----------------------------|---------------------------|
| 4 x 10.5 x 8.5 (50 pcs.) | 5 x 13 x 10.5 (50 pcs.) | 6 x 15.5 x 12.5 (50 pcs.) |
| 8 x 20 x 16.5 (20 pcs.) | 10 x 25 x 20.5 (10 pcs.) | 12 x 30 x 24.5 (10 pcs.) |
| 14 x 33 x 27.5 (10 pcs.) | 16 x 38.5 x 32.5 (15 pcs.) | 20 x 46 x 40.5 (5 pcs.) |

8.) SL-retainers

- SL-retainers suitable for bolts with groove/clevises/clevis joints (surface protection phosphatised oiled)
- mbo standard 08 (see mbo catalogue page 13_01/page 53)
- Order number: 1008 0416/002
- Content: 560 parts
- Range:

| | | | |
|--------------|--------------|--------------|--------------|
| 4 (100 pcs.) | 5 (100 pcs.) | 6 (100 pcs.) | 8 (100 pcs.) |
| 10 (40 pcs.) | 12 (40 pcs.) | 14 (40 pcs.) | 16 (40 pcs.) |

9.) KL-retainers

- KL-retainers suitable for bolts with groove/clevises/clevis joints (surface protection phosphatised oiled)
- mbo standard 09 (see mbo catalogue page 13_02/page 54)
- Order number: 1009 0324/002
- Content: 880 parts
- Range:

| | | | |
|---------------|--------------|---------------|--------------|
| 3 (100 pcs.) | 4 (100 pcs.) | 5 (100 pcs.) | 6 (100 pcs.) |
| 8 (100 pcs.) | 10 (80 pcs.) | 12 (100 pcs.) | 14 (80 pcs.) |
| 16 (100 pcs.) | 24 (20 pcs.) | | |



01_03
08/2011



**10.) Locking washers DIN 6799**

- Locking washers according to DIN 6799 for shafts and bolts with groove (surface protection mechanically galvanised white)
- mbo standard 6799 (see mbo catalogue page 13_03/page 55)
- Order number: 6799 2312/200
- Content: 3100 parts
- Range:

| | | | |
|----------------|----------------|--------------|--------------|
| 2.3 (500 pcs.) | 3.2 (500 pcs.) | 4 (500 pcs.) | 5 (300 pcs.) |
| 6 (300 pcs.) | 7 (200 pcs.) | 8 (200 pcs.) | 9 (200 pcs.) |
| 10 (200 pcs.) | 12 (200 pcs.) | | |

11.) Spring washers without cap

- Spring washers without cap for slick shafts (surface protection mechanically galvanised white)
- mbo standard 28 (see mbo catalogue page 14_01/page 58)
- Order number: 1028 1625/205
- Content: 3450 parts
- Range:

| | | | |
|----------------|---------------|--------------|--------------|
| 1.6 (500 pcs.) | 2 (500 pcs.) | 3 (400 pcs.) | 4 (300 pcs.) |
| 4.8 (300 pcs.) | 5 (300 pcs.) | 6 (200 pcs.) | 7 (200 pcs.) |
| 8 (200 pcs.) | 10 (200 pcs.) | 12 (50 pcs.) | 14 (50 pcs.) |
| 15 (50 pcs.) | 16 (100 pcs.) | 20 (50 pcs.) | 24 (50 pcs.) |

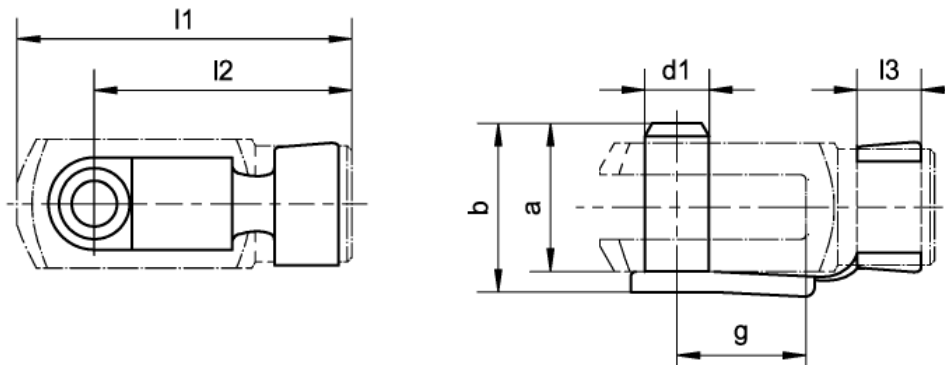
12.) Spring washers with cap

- Spring washers with cap for slick shafts (surface protection mechanically galvanised white)
- mbo standard 29 (see mbo catalogue page 14_02/page 59)
- Order number: 1029 1625/205
- Content: 1310 parts
- Range:

| | | | |
|----------------|--------------|--------------|--------------|
| 1.6 (200 pcs.) | 2 (200 pcs.) | 3 (200 pcs.) | 4 (100 pcs.) |
| 4.8 (100 pcs.) | 5 (100 pcs.) | 6 (100 pcs.) | 7 (100 pcs.) |
| 8 (50 pcs.) | 10 (25 pcs.) | 12 (25 pcs.) | 14 (20 pcs.) |
| 15 (20 pcs.) | 16 (20 pcs.) | 17 (20 pcs.) | 20 (10 pcs.) |
| 24 (10 pcs.) | 25 (10 pcs.) | | |

**Assortment boxes containing other parts from our range are possible.
Do not hesitate to contact us.**

01_04
08/2011



Mounting and removal is possible without tools!

Example for ordering: Folding spring bolt
suitable for clevis G 10 x 20 DIN 71752, electroplated galvanised white;
FKB 10 x 20 galvanised white
Order number: 10 01 0010 8001/014

| Identifier FKB | Order number | Suitable for clevis | d1 h11 | g | a | b | l1 ≈ | l2 ≈ | l3 ≈ | Mass (kg) per 100 pieces |
|----------------|---------------------|---------------------|-----------|----|-----|-------|---------|---------|---------|--------------------------------|
| 4 x 8 | 10 01 0004 8001/... | G 4 x 8 | 4 | 8 | 9.5 | 11.25 | 19 | 15 | 4.5 | 0.145 |
| 5 x 10 | 10 01 0005 8001/... | G 5 x 10 | 5 | 10 | 12 | 13.7 | 23 | 19 | 5.5 | 0.254 |
| 5 x 20 | 10 01 0005 8002/... | G 5 x 20 | | 20 | | 13.8 | 33 | 29 | | 0.31 |
| 6 x 12 | 10 01 0006 8001/... | G 6 x 12 | 6 | 12 | 14 | 16.2 | 28 | 23 | 6.5 | 0.458 |
| 6 x 24 | 10 01 0006 8002/... | G 6 x 24 | | 24 | | 16.3 | 40 | 35 | | 0.516 |
| 8 x 16 | 10 01 0008 8001/... | G 8 x 16 | 8 | 16 | 19 | 21.6 | 37 | 30 | 8 | 1.059 |
| 8 x 32 | 10 01 0008 8002/... | G 8 x 32 | | 32 | | 21.6 | 52 | 46 | | 1.155 |
| 10 x 20 | 10 01 0010 8001/... | G 10 x 20 | 10 | 20 | 23 | 26 | 46 | 38 | 10 | 1.938 |
| 10 x 40 | 10 01 0010 8002/... | G 10 x 40 | | 40 | | 26.3 | 66 | 58 | | 2.046 |
| 12 x 24 | 10 01 0012 8001/... | G 12 x 24 | 12 | 24 | 28 | 31.1 | 53 | 45 | 12 | 3.306 |
| 12 x 48 | 10 01 0012 8002/... | G 12 x 48 | | 48 | | 31.2 | 78 | 69 | | 3.5 |
| 14 x 28 | 10 01 0014 8001/... | G 14 x 28 | 14 | 28 | 31 | 34.1 | 62 | 52 | 14 | 4.722 |
| 14 x 56 | 10 01 0014 8002/... | G 14 x 56 | | 56 | | 34 | 92 | 82 | | 5.076 |
| 16 x 32 | 10 01 0016 8001/... | G 16 x 32 | 16 | 32 | 36 | 39.5 | 73 | 62 | 16 | 6.94 |
| 16 x 64 | 10 01 0016 8002/... | G 16 x 64 | | 64 | | 39.2 | 103 | 92 | | 7.44 |
| 20 x 40 | 10 01 0020 8001/... | G 20 x 40 | 20 | 40 | 45 | 50 | 87.5 | 71.5 | 16 | 13 |

Material:

Bolt: 1.0718 (11SMnPb30+C),
tensile strength approx. 460-810 N/mm²
alternative: C45 or C45Pb induction-hardened
(of manufacturer's choice),
hardening depth: approx. 0.5 mm
alternative: 1.0718 hardend by soft nitriding,
hardening depth: approx. 0.03 mm

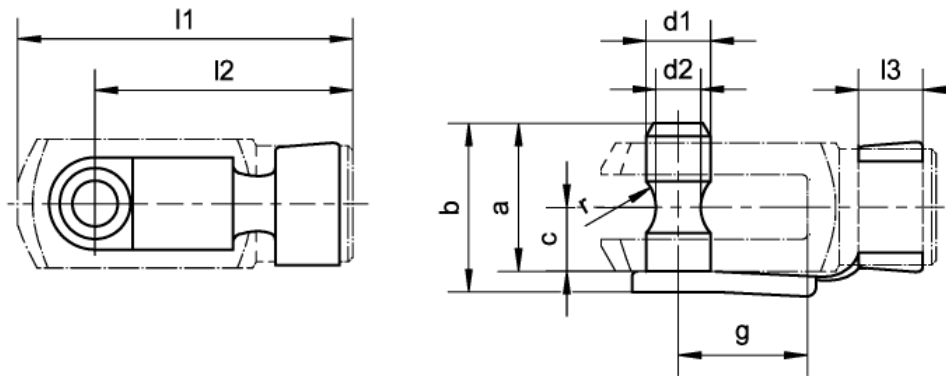
Spring: C60 up to Ck75 hardened and annealed to
approx. 430-500 HV

Surface protection:

| Identifier | Supplement to order number |
|---|----------------------------|
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 8 µm) | .../014 |
| electr. galvanised yellow (layer min. 8 µm) | .../024 |

Special versions upon request

02_01
08/2011



Mounting and removal is possible without tools!

Example for ordering: Folding spring bolt with groove
suitable for clevis G 10 x 20 DIN 71752, electroplated galvanised yellow;
FKBR 10 x 20 galvanised yellow
Order number: 10 01 0010 9001/024

| Identifier FKBR | Order number | Suitable for clevis | d1 h11 | d2 | c | r | g | a | b | l1 ≈ | l2 ≈ | l3 ≈ | Mass (kg) per 100 pieces |
|--------------------|---------------------|------------------------|-----------|-----|----|-----|----|-----|-------|---------|---------|---------|--------------------------------|
| 4 x 8 | 10 01 0004 9001/... | G 4 x 8 | 4 | 3 | 4 | 2.5 | 8 | 9.5 | 11.25 | 19 | 15 | 4.5 | 0.156 |
| 5 x 10 | 10 01 0005 9001/... | G 5 x 10 | 5 | 4 | 5 | 3 | 10 | 12 | 13.7 | 23 | 19 | 5.5 | 0.239 |
| 5 x 20 | 10 01 0005 9002/... | G 5 x 20 | | | | | 20 | | 13.8 | | | | |
| 6 x 12 | 10 01 0006 9001/... | G 6 x 12 | 6 | 4.5 | 6 | 4 | 12 | 14 | 16.2 | 28 | 23 | 6.5 | 0.438 |
| 6 x 24 | 10 01 0006 9002/... | G 6 x 24 | | | | | 24 | | 16.3 | | | | 35 |
| 8 x 16 | 10 01 0008 9001/... | G 8 x 16 | 8 | 6 | 8 | 5 | 16 | 19 | 21.6 | 37 | 30 | 8 | 0.999 |
| 8 x 32 | 10 01 0008 9002/... | G 8 x 32 | | | | | 32 | | 21.6 | | | | 46 |
| 10 x 20 | 10 01 0010 9001/... | G 10 x 20 | 10 | 7 | 10 | 6 | 20 | 23 | 26 | 46 | 38 | 10 | 1.779 |
| 10 x 40 | 10 01 0010 9002/... | G 10 x 40 | | | | | 40 | | 26.3 | | | | 58 |
| 12 x 24 | 10 01 0012 9001/... | G 12 x 24 | 12 | 9 | 12 | 8 | 24 | 28 | 31.1 | 53 | 45 | 12 | 2.982 |
| 12 x 48 | 10 01 0012 9002/... | G 12 x 48 | | | | | 48 | | 31.2 | | | | 69 |
| 16 x 32 | 10 01 0016 9001/... | G 16 x 32 | 16 | 12 | 16 | 12 | 32 | 36 | 39.5 | 73 | 62 | 16 | 6.12 |
| 20 x 40 | 10 01 0020 9001/... | G 20 x 40 | 20 | 16 | 20 | 16 | 40 | 45 | 50 | 87.5 | 71.5 | 16 | 12.9 |

Material:

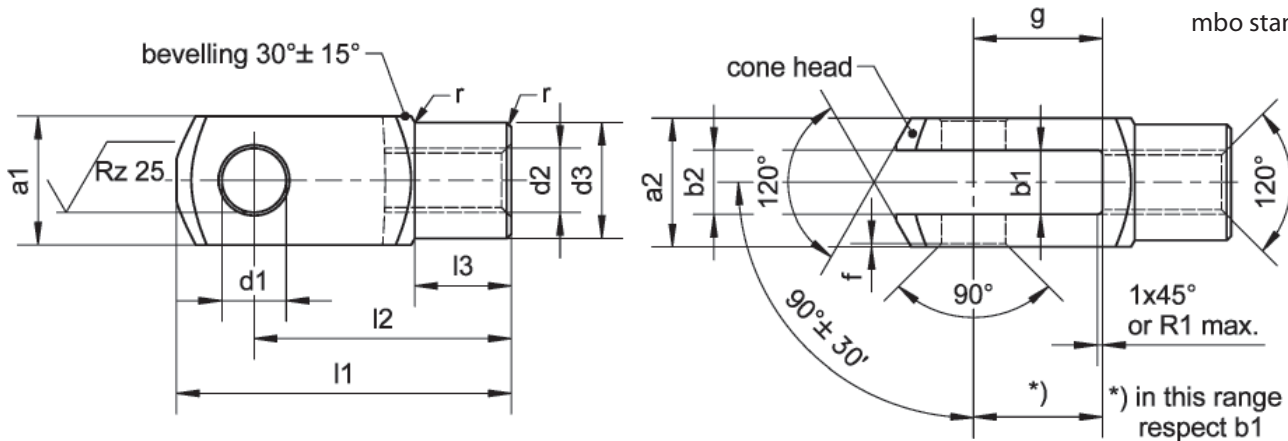
Bolt: 1.0718 (11SMnPb30+C),
tensile strength approx. 460-810 N/mm²
alternative: C45 or C45Pb induction-hardened
(of manufacturer's choice),
hardening depth: approx. 0.5 mm
alternative: 1.0718 hardened by soft nitriding,
hardening depth: approx. 0.03 mm
Spring: C60 up to Ck75 hardened and annealed to
approx. 430-500 HV

Surface protection:

| Identifier | Supplement to order number |
|---|-------------------------------|
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 8 µm) | .../014 |
| electr. galvanised yellow (layer min. 8 µm) | .../024 |

Special versions upon request

02_02
08/2011



Example for ordering: Clevis according to DIN 71752
d1=10 mm, slot length g=40 mm, with metric fine-pitch thread d2=M 10x1.25, el. galvanised white;
Clevis G 10x40, M 10x1.25 galvanised white
Order number: 14 02 0010 0040/013

| Size | Order number | d1 H9 | g ±0.5 | a1 ²⁾ h11 | a2 +0.3 -0.16 | b1 B13 | b2 Perm. variation | d2 ¹⁾ | | d3 ±0.3 | f ±0.2 | l1 ±0.5 | l2 Perm. variation | l3 ±0.2 | r ³⁾ | Mass (7.85 kg/dm ³) kg≈ | |
|-------------------------|---------------------|----------|-----------|-------------------------|---------------------|-----------|--------------------------|-------------------|----------------------|------------|-----------|------------|--------------------------|------------|-----------------|---|-------|
| | | | | | | | | Regular thread | Fine-pitch thread | | | | | | | | |
| G 4x8 ⁴⁾ | 10 02 0004 0008/... | 4 | 8 | 8 | 4 | B13 | | M 4x0.7 | | 8 | 0.5 | 21 | ±0.3 | 6 | 0.5 | 0.005 | |
| G 4x16 | 10 02 0004 0016/... | 4 | 16 | 8 | 4 | | | M 4x0.7 | | 8 | 0.5 | 29 | | 24 | 6 | 0.5 | 0.007 |
| G 5x10 | 10 02 0005 0010/... | 5 | 10 | 10 | 5 | | | M 5x0.8 | | 9 | 0.5 | 26 | | 20 | 7.5 | 0.5 | 0.009 |
| G 5x20 | 10 02 0005 0020/... | 5 | 20 | 10 | 5 | | | M 5x0.8 | | 9 | 0.5 | 36 | | 30 | 7.5 | 0.5 | 0.013 |
| G 6x12 ⁴⁾ | 10 02 0006 0012/... | 6 | 12 | 12 | 6 | | | M 6x1 | | 10 | 0.5 | 31 | | 24 | 9 | 0.5 | 0.015 |
| G 6x24 | 10 02 0006 0024/... | 6 | 24 | 12 | 6 | | | M 6x1 | | 10 | 0.5 | 43 | | 36 | 9 | 0.5 | 0.021 |
| G 8x16 ⁴⁾ | 10 02 0008 0016/... | 8 | 16 | 16 | 8 | | | M 8x1.25 | | 14 | 0.5 | 42 | | 32 | 12 | 0.5 | 0.037 |
| G 8x16FG | 12 02 0008 0016/... | 8 | 16 | 16 | 8 | | | M 8x1 | M 8x1 | 14 | 0.5 | 42 | | 32 | 12 | 0.5 | 0.037 |
| G 8x32 | 10 02 0008 0032/... | 8 | 32 | 16 | 8 | | | M 8x1.25 | | 14 | 0.5 | 58 | | 48 | 12 | 0.5 | 0.054 |
| G 8x32FG | 12 02 0008 0032/... | 8 | 32 | 16 | 8 | | | M 8x1 | M 8x1 | 14 | 0.5 | 58 | | 48 | 12 | 0.5 | 0.054 |
| G 10x20 | 10 02 0010 0020/... | 10 | 20 | 20 | 10 | | | M 10x1.5 | | 18 | 0.5 | 52 | | 40 | 15 | 0.5 | 0.074 |
| G 10x20FG ⁴⁾ | 14 02 0010 0020/... | 10 | 20 | 20 | 10 | | | M 10x1.25 | | 18 | 0.5 | 52 | | 40 | 15 | 0.5 | 0.074 |
| G 10x40 | 10 02 0010 0040/... | 10 | 40 | 20 | 10 | M 10x1.5 | | 18 | 0.5 | 72 | 60 | 15 | 0.5 | 0.116 | | | |
| G 10x40FG | 14 02 0010 0040/... | 10 | 40 | 20 | 10 | M 10x1.25 | | 18 | 0.5 | 72 | 60 | 15 | 0.5 | 0.116 | | | |
| G 12x24 | 10 02 0012 0024/... | 12 | 24 | 24 | 12 | M 12x1.75 | | 20 | 0.5 | 62 | 48 | 18 | 0.5 | 0.121 | | | |
| G 12x24FG ⁴⁾ | 14 02 0012 0024/... | 12 | 24 | 24 | 12 | M 12x1.25 | | 20 | 0.5 | 62 | 48 | 18 | 0.5 | 0.121 | | | |
| G 12x48 | 10 02 0012 0048/... | 12 | 48 | 24 | 12 | M 12x1.75 | | 20 | 0.5 | 86 | 72 | 18 | 0.5 | 0.175 | | | |
| G 12x48FG | 14 02 0012 0048/... | 12 | 48 | 24 | 12 | M 12x1.25 | | 20 | 0.5 | 86 | 72 | 18 | 0.5 | 0.175 | | | |
| G 14x28 | 10 02 0014 0028/... | 14 | 28 | 27 | 14 | M 14x2 | | 24 | 1 | 72 | 56 | 22.5 | 1 | 0.178 | | | |
| G 14x28FG | 16 02 0014 0028/... | 14 | 28 | 27 | 14 | M 14x1.5 | | 24 | 1 | 72 | 56 | 22.5 | 1 | 0.178 | | | |
| G 14x56 | 10 02 0014 0056/... | 14 | 56 | 27 | 14 | M 14x2 | | 24 | 1 | 101 | 85 | 22.5 | 1 | 0.258 | | | |
| G 14x56FG | 16 02 0014 0056/... | 14 | 56 | 27 | 14 | M 14x1.5 | | 24 | 1 | 101 | 85 | 22.5 | 1 | 0.258 | | | |
| G 16x32 | 10 02 0016 0032/... | 16 | 32 | 32 | 16 | M 16x2 | | 26 | 1 | 83 | 64 | 24 | 1 | 0.282 | | | |
| G 16x32FG ⁴⁾ | 16 02 0016 0032/... | 16 | 32 | 32 | 16 | M 16x1.5 | | 26 | 1 | 83 | 64 | 24 | 1 | 0.282 | | | |
| G 16x64 | 10 02 0016 0064/... | 16 | 64 | 32 | 16 | M 16x2 | | 26 | 1 | 115 | 96 | 24 | 1 | 0.411 | | | |
| G 16x64FG | 16 02 0016 0064/... | 16 | 64 | 32 | 16 | M 16x1.5 | | 26 | 1 | 115 | 96 | 24 | 1 | 0.411 | | | |

1) code for thread:
regular thread no code
regular thread, left-handed LH
fine-pitch thread FG
fine-pitch thread, left-handed FGLH

2) for semifinished products, tolerance h11 according to DIN 178
3) radius or 45° beveling (of manufacturer's choice)
4) these clevises comply in terms of mating dimensions with DIN ISO 8140 and CETOP RP102P (the external shape differs)

Material:

1.0718 (11SMnPb30+C)

Retaining:

with folding spring bolts (mbo catalogue section 2/page 21-22) or with bolts (mbo catalogue section 4/page 25-28) and retainers (mbo catalogue section 13/page 53-57), or washers and cotter pins;

also see clevis joint combinations
(mbo catalogue section 11/page 40-47)

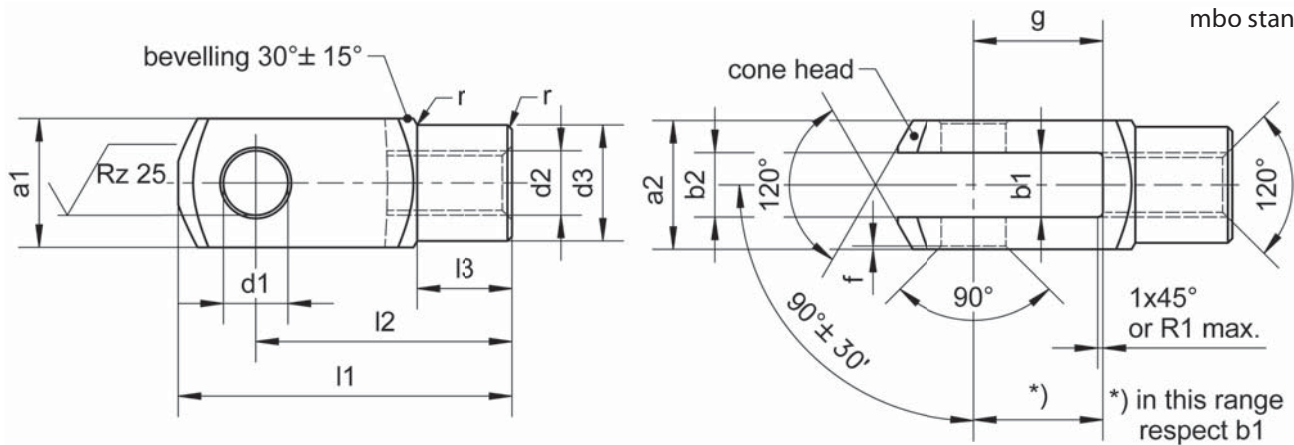
Surface protection:

| Identifier | Supplement to order number |
|---|----------------------------|
| bright | .../003 |
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 5 µm) | .../013 |
| electr. galvanised yellow (layer min. 5 µm) | .../023 |

Special versions upon request

03_01
12/2012





Example for ordering: Clevis according to CETOP RP102P with bore $d_1 = 35$ mm and slot length $g = 54$ mm, with metric fine-pitch thread $d_2 = M 36 \times 2$, electroplated galvanised white; Clevis G 35x54, M 36x2 galvanised white
Order number: 18 02 0036 3554/013

| Size | Order number | d_1 H9 | g ± 0.5 | $a_1^{2)}$ h11 | a_2 $+0.5$ -0.2 | b_1 B13 | b_2 Perm. variation | $d_2^{1)}$ | | d_3 ± 0.3 | f ± 0.2 | l_1 ± 0.5 | l_2 Perm. variation | l_3 ± 0.3 | $r^3)$ ± 0.5 | Mass (7.85 kg/dm ³) kg \approx |
|-------------------------|---------------------|-------------|------------------|-------------------|---------------------------|--------------|-----------------------------|-------------------|----------------------|--------------------|------------------|--------------------|-----------------------------|--------------------|---------------------|--|
| | | | | | | | | Regular thread | Fine-pitch thread | | | | | | | |
| G 18x36 | 10 02 0018 0036/... | 18 | 36 | 36 | 18 | | | M 18x2.5 | | 30 | 1 | 94 | 72 | 27 | 1.5 | 0.390 |
| G 18x36FG | 16 02 0018 0036/... | 18 | 36 | 36 | 18 | | | | M 18x1.5 | 30 | 1 | 94 | 72 | 27 | 1.5 | 0.390 |
| G 20x40 | 10 02 0020 0040/... | 20 | 40 | 40 | 20 | | | M 20x2.5 | | 34 | 1 | 105 | 80 | 30 | 1.5 | 0.550 |
| G 20x40FG ⁴⁾ | 16 02 0020 0040/... | 20 | 40 | 40 | 20 | | | | M 20x1.5 | 34 | 1 | 105 | 80 | 30 | 1.5 | 0.550 |
| G 20x80 | 10 02 0020 0080/... | 20 | 80 | 40 | 20 | | | M 20x2.5 | | 34 | 1 | 145 | 120 | 30 | 1.5 | 0.800 |
| G 20x80FG | 16 02 0020 0080/... | 20 | 80 | 40 | 20 | | | | M 20x1.5 | 34 | 1 | 145 | 120 | 30 | 1.5 | 0.800 |
| G 25x50 | 10 02 0024 2550/... | 25 | 50 | 50 | 25 | | | M 24x3 | | 42 | 1.5 | 132 | 100 | 36 | 1.5 | 1.100 |
| G 25x50FG ⁴⁾ | 18 02 0024 2550/... | 25 | 50 | 50 | 25 | | | | M 24x2 | 42 | 1.5 | 132 | 100 | 36 | 1.5 | 1.100 |
| G 28x56 | 10 02 0027 2856/... | 28 | 56 | 55 | 28 | | | M 27x3 | | 48 | 1.5 | 148 | 112 | 40 | 2 | 1.500 |
| G 28x56FG | 18 02 0027 2856/... | 28 | 56 | 55 | 28 | | | | M 27x2 | 48 | 1.5 | 148 | 112 | 40 | 2 | 1.500 |
| G 30x54FG ⁴⁾ | 18 02 0027 3054/... | 30 | 54 | 55 | 30 | | | | M 27x2 | 48 | 1.5 | 148 | 110 | 40 | 2 | 1.440 |
| G 30x60 | 10 02 0030 0060/... | 30 | 60 | 60 | 30 | +0.7 | | M 30x3.5 | | 52 | 1.5 | 160 | 120 | 42 | 2 | 1.970 |
| G 30x60FG | 18 02 0030 0060/... | 30 | 60 | 60 | 30 | +0.15 | | | M 30x2 | 52 | 1.5 | 160 | 120 | 42 | 2 | 1.970 |
| G 35x54FG | 18 02 0036 3554/... | 35 | 54 | 70 | 35 | | | | M 36x2 | 60 | 2 | 188 | 144 | 54 | 3 | 2.930 |
| G 35x72 | 10 02 0036 3572/... | 35 | 72 | 70 | 35 | | | M 36x4 | | 60 | 2 | 188 | 144 | 54 | 3 | 2.930 |
| G 35x72FG ⁴⁾ | 18 02 0036 3572/... | 35 | 72 | 70 | 35 | | | | M 36x2 | 60 | 2 | 188 | 144 | 54 | 3 | 2.930 |
| G 36x72 | 10 02 0036 0072/... | 35 | 72 | 70 | 36 | | | M 36x4 | | 60 | 2 | 188 | 144 | 54 | 3 | 2.930 |
| G 36x72FG | 18 02 0036 0072/... | 35 | 72 | 70 | 36 | | | | M 36x2 | 60 | 2 | 188 | 144 | 54 | 3 | 2.930 |
| G 40x84 | 10 02 0042 4084/... | 40 | 84 | 85 | 40 | | | M 42x4.5 | | 70 | 3 | 232 | 168 | 63.5 | 5 | 5.640 |
| G 40x84FG ⁴⁾ | 18 02 0042 4084/... | 40 | 84 | 85 | 40 | | | | M 42x2 | 70 | 3 | 232 | 168 | 63.5 | 5 | 5.640 |
| G 42x84 | 10 02 0042 0084/... | 42 | 84 | 85 | 42 | | | M 42x4.5 | | 70 | 3 | 232 | 168 | 63.5 | 5 | 5.340 |
| G 42x84FG | 18 02 0042 0084/... | 42 | 84 | 85 | 42 | | | | M 42x2 | 70 | 3 | 232 | 168 | 63.5 | 5 | 5.340 |
| G 50x96 | 10 02 0048 5096/... | 50 | 96 | 96 | 50 | | | M 48x5 | | 82 | 3 | 265 | 192 | 73 | 5 | 7.860 |
| G 50x96FG ⁴⁾ | 18 02 0048 5096/... | 50 | 96 | 96 | 50 | | | | M 48x2 | 82 | 3 | 265 | 192 | 73 | 5 | 7.860 |

1) code for thread:

regular thread no code
regular thread, left-handed LH
fine-pitch thread FG
fine-pitch thread, left-handed FGLH

2) for semifinished products, tolerance h11 or h12 according to DIN 178

3) radius or 45° beveling (of manufacturer's choice)

4) these clevises comply in terms of mating dimensions with DIN ISO 8140 and CETOP RP102P (the external shape differs)

Material:

1.0718 (11SMnPb30+C)

Retaining:

with folding spring bolts (mbo catalogue section 2/page 21-22) or with bolts (mbo catalogue section 4/page 25-28) and retains (mbo catalogue section 13/page 53-57), or washers and cotter pins;

also see clevis joint combinations

(mbo catalogue section 11/page 40-47)

Surface protection:

| Identifier | Supplement to order number |
|---|----------------------------|
| bright | .../003 |
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 5 µm) | .../013 |
| electr. galvanised yellow (layer min. 5 µm) | .../023 |

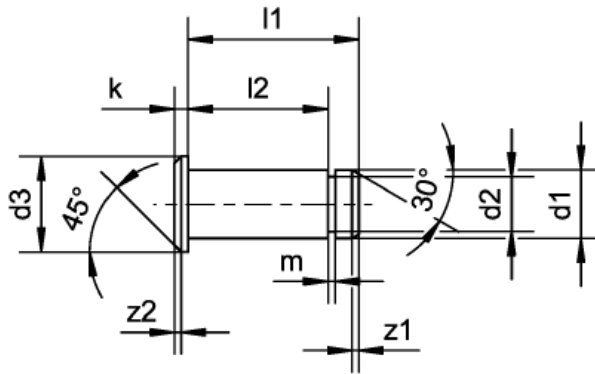
Special versions upon request

03_02
12/2012





head version of
manufacturer's choice



Example for ordering: Bolt version BEG of diameter $d1 = 10$ mm,
length $l1 = 25$ mm and length $l2 = 20.5$ mm, electroplated galvanised white;
Bolt BEG 10 x 25 x 20.5 galvanised white
Order number: 10 77 0000 0010/013

| Identifier | Order number | Suitable retainer | | | Nom. size $d1$ $h11$ | Head- \emptyset $d3$ | Length | | k $js14$ | d2 -0.2 | m $+0.1$ | z1 \approx | z2 \approx | Mass (kg) per 100 pieces |
|----------------------|---------------------|-------------------|------------------|------------------------|----------------------|------------------------|-----------|-----------|---------------|------------|----------|--------------|--------------|--------------------------|
| | | KL ¹⁾ | SL ²⁾ | DIN 6799 ³⁾ | | | l1 $js15$ | l2 $+0.3$ | | | | | | |
| BEG 4 x 10.5 x 8.5 | 10 77 0000 0004/... | 4 | 4 | 3.2 | 4 | 6 $h14$ | 10.5 | 8.5 | 1 | 3.2 $h11$ | 0.64 | 0.5 | 0.5 | 0.12 |
| BEG 5 x 13 x 10.5 | 10 77 0000 0005/... | 5 | 5 | 4 | 5 | 8 $h14$ | 13 | 10.5 | 1.5 | 4 | 0.74 | 0.5 | 0.5 | 0.24 |
| BEG 6 x 15.5 x 12.5 | 10 77 0000 0006/... | 6 | 6 | 5 | 6 | 9 $h14$ | 15.5 | 12.5 | 1.5 | 5 | 0.74 | 1 | 0.5 | 0.42 |
| BEG 8 x 20 x 16.5 | 10 77 0000 0008/... | 8 | 8 | 6 | 8 | 12 $h14$ | 20 | 16.5 | 2 | 6 | 0.94 | 0.5 | 1 | 0.90 |
| BEG 10 x 25 x 20.5 | 10 77 0000 0010/... | 10 | 10 | 8 | 10 | 14 $h14$ | 25 | 20.5 | 2 | 8 | 1.05 | 1 | 1 | 1.70 |
| BEG 12 x 30 x 24.5 | 10 77 0000 0012/... | 12 | 12 | 9 | 12 | 17 $h14$ | 30 | 24.5 | 3 | 9 | 1.15 | 1 | 1.5 | 2.95 |
| BEN 14 x 33 x 27.5 | 10 07 0000 0014/... | 14 | 14 | 10 | 14 | 20 | 33 | 27.5 | ≈ 2.5 | 10 $h11$ | 1.25 | 1.25 | - | 4.10 |
| BEG 16 x 38.5 x 32.5 | 10 77 0000 0016/... | 16 | 16 | 12 | 16 | 21 | 38.5 | 32.5 | 3 | 12 $h11$ | 1.35 | 1.5 | 1.5 | 6.70 |
| BEN 18 x 42 x 36.5 | 10 07 0000 0018/... | 16 | - | - | 18 | 25 | 42 | 36.5 | ≈ 3.5 | 13 $h11$ | 1.35 | 1.5 | - | 8.95 |
| BEN 20 x 46 x 40.5 | 10 07 0000 0020/... | 24 | - | 19 | 20 | 28 | 46 | 40.5 | ≈ 4 | 17.5 $h11$ | 1.8 | 1.5 | - | 12.10 |
| BEN 25 x 57 x 50.5 | 10 07 0000 0025/... | 24 | - | 19 | 25 | 34 | 57 | 50.5 | ≈ 5.5 | 18 $h11$ | 1.8 | 1.5 | - | 23.10 |

1) mbo standard 09 (see mbo catalogue page 13_02/page 54)
2) mbo standard 08 (see mbo catalogue page 13_01/page 53)
3) mbo standard 6799 (see mbo catalogue page 13_03/page 55)

BEN = Bolts with groove and riveted head
BEG = Bolts with groove, lathe work head

Material:

1.0718 (11SMnPb30+C)
alternative: hardened

Surface protection:

| Identifier | Supplement to order number |
|--|----------------------------|
| bright | .../003 |
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 5 μ m) | .../013 |
| electr. galvanised yellow (layer min. 5 μ m) | .../023 |

Retaining:

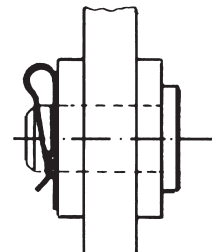
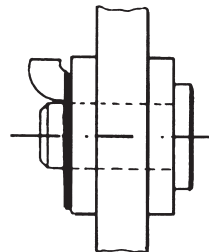
with retainers
(mbo catalogue section 13/page 53-57);
also see clevis joint combinations
(mbo catalogue section 11/page 40-47)

Special versions upon request

Examples of application:

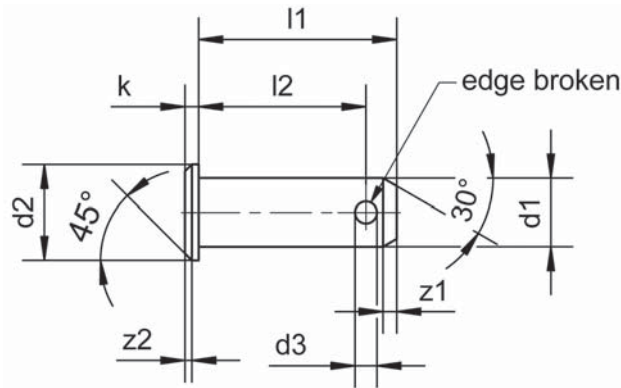
mbo standard 09
KL-retainer
(see mbo catalogue page 13_02/page 54)

mbo standard 08
SL-retainer
(see mbo catalogue page 13_01/page 53)





head version of
manufacturer's choice



Example for ordering: Bolt version BGL of diameter $d1 = 10$ mm,
length $l1 = 29$ mm and length $l2 = 24.5$ mm, electroplated galvanised white;
Bolt BGL 10 x 29 x 24.5 galvanised white
Order number: 34 00 0000 0010/013

| Identifier | Order number | Nom. size $\varnothing d1$ h11 | Head- \varnothing $d2$ | $d3$ H14 | Length | | k js14 | z1 ≈ | z2 ≈ | Mass (kg) per 100 pieces |
|--------------------|---------------------|--------------------------------------|-----------------------------|-------------|------------|------------|-----------|---------|---------|--------------------------------|
| | | | | | l1 js15 | l2 +0.5 | | | | |
| BGL 4 x 12 x 10 | 34 00 0000 0004/... | 4 | 6 h14 | 1 | 12 | 10 | 1 | 1 | 0.5 | 0.13 |
| BGL 5 x 15 x 12.3 | 34 00 0000 0005/... | 5 | 8 h14 | 1.2 | 15 | 12.3 | 1.5 | 1 | 0.5 | 0.26 |
| BGL 6 x 18 x 15.3 | 34 00 0000 0006/... | 6 | 9 h14 | 1.6 | 18 | 15.3 | 1.5 | 1.5 | 0.5 | 0.46 |
| BGL 8 x 23 x 19.5 | 34 00 0000 0008/... | 8 | 12 h14 | 2 | 23 | 19.5 | 2 | 2 | 1 | 1.00 |
| BGL 10 x 29 x 24.5 | 34 00 0000 0010/... | 10 | 14 h14 | 3.2 | 29 | 24.5 | 2 | 2 | 1 | 1.90 |
| BGL 12 x 35 x 29.5 | 34 00 0000 0012/... | 12 | 17 h14 | 4 | 35 | 29.5 | 3 | 2.5 | 1.5 | 3.40 |
| BGL 14 x 40 x 32.5 | 34 00 0000 0014/... | 14 | 19 h14 | 4 | 40 | 32.5 | 3 | 2.5 | 1.5 | 5.30 |
| BGL 16 x 45 x 38.2 | 34 00 0000 0016/... | 16 | 21 h14 | 4 | 45 | 38.2 | 3 | 2.5 | 1.5 | 7.30 |
| BNL 18 x 50 x 43.5 | 54 00 0000 0018/... | 18 | 25 | 5 | 50 | 43.5 | ≈ 3.5 | 3 | - | 10.40 |
| BNL 20 x 53 x 47 | 54 00 0000 0020/... | 20 | 28 | 5 | 53 | 47 | ≈ 4 | 3 | - | 13.90 |
| BNL 25 x 67 x 59 | 54 00 0000 0025/... | 25 | 34 | 6.3 | 67 | 59 | ≈ 5.5 | 4 | - | 26.60 |
| BNL 28 x 72 x 63.2 | 54 00 0000 0028/... | 28 | 34 | 6.3 | 72 | 63.2 | ≈ 5.5 | 4 | - | 36.10 |
| BNL 30 x 67 x 59* | 54 30 0067 0059/... | 30 | 36 | 6.3 | 67 | 59 | ≈ 5.5 | 4 | - | 38.30 |
| BNL 30 x 77 x 68.2 | 54 00 0000 0030/... | 30 | 36 | 6.3 | 77 | 68.2 | ≈ 5.5 | 4 | - | 42.80 |
| BNL 35 x 87 x 76.5 | 54 00 0000 0035/... | 35 | 45 | 8 | 87 | 76.5 | ≈ 7 | 5 | - | 67.70 |
| BGL 40 x 100 x 90 | 34 00 0000 0040/... | 40 | 48 h14 | 8 | 100 | 90 | 6 | 5 | - | 103.50 |
| BGL 42 x 100 x 90 | 34 00 0000 0042/... | 42 | 48 h14 | 8 | 100 | 90 | 7 | 5 | - | 115.10 |
| BGL 50 x 115 x 103 | 34 00 0000 0050/... | 50 | 58 h14 | 10 | 115 | 103 | 7 | 6 | - | 184.60 |

*) suitable for clevis G 30 x 54 according to CETOP standard

BNL = Bolts with pin hole and riveted head
BGL = Bolts with pin hole, lathe work head

Material:

1.0718 (11SMnPb30+C)
alternative: hardened

Retaining:

with washers and cotter pins;
also see clevis joint combinations
(mbo catalogue page 11_02/page 41 and 11_03/page 42)

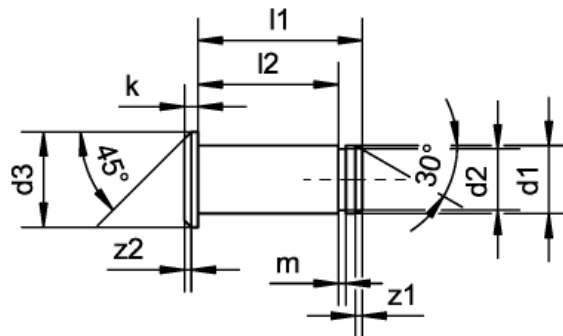
Surface protection:

| Identifier | Supplement to order number |
|---|----------------------------|
| bright | .../003 |
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 5 µm) | .../013 |
| electr. galvanised yellow (layer min. 5 µm) | .../023 |

Special versions upon request

04_02
12/2012





Example for ordering: Bolt with groove suitable for retaining ring DIN 471, of diameter $d_1 = 10$ mm, length $l_1 = 24$ mm and length $l_2 = 20.5$ mm, bright;
Bolt BEG 10 x 24 x 20.5 bright
Order number: 10 79 0000 0010/003

| Identifier | Order number | Suitable retainer DIN 471 ¹⁾ | Nom. size d_1 h11 | Head- \varnothing d_3 h14 | Length | | k js15 | d_2 h10 | m H13 | z1 ≈ | z2 ≈ | Mass (kg) per 100 pieces |
|---------------------|---------------------|--|---------------------------|--|------------|------------|-----------|--------------|----------|---------|---------|--------------------------------|
| | | | | | l1 +0.3 | l2 +0.3 | | | | | | |
| BEG 4 x 10 x 8.5 | 10 79 0000 0004/... | 4 | 4 | 6 | 10 | 8.5 | 1 | 3.8 | 0.5 | 0.5 | 0.5 | 0.1 |
| BEG 5 x 12.5 x 10.5 | 10 79 0000 0005/... | 5 | 5 | 8 | 12.5 | 10.5 | 1.5 | 4.8 | 0.7 | 0.5 | 0.5 | 0.2 |
| BEG 6 x 15.5 x 12.5 | 10 79 0000 0006/... | 6 | 6 | 9 | 15.5 | 12.5 | 1.5 | 5.7 | 0.8 | 0.75 | 0.5 | 0.4 |
| BEG 8 x 20.5 x 16.5 | 10 79 0000 0008/... | 8 | 8 | 12 | 20.5 | 16.5 | 2 | 7.6 | 0.9 | 1 | 1 | 0.8 |
| BEG 10 x 24 x 20.5 | 10 79 0000 0010/... | 10 | 10 | 14 | 24 | 20.5 | 2 | 9.6 | 1.1 | 1 | 1 | 1.6 |
| BEG 12 x 28 x 24.5 | 10 79 0000 0012/... | 12 | 12 | 17 | 28 | 24.5 | 3 | 11.5 h11 | 1.1 | 1.25 | 1.5 | 2.8 |
| BEG 14 x 32 x 27.5 | 10 79 0000 0014/... | 14 | 14 | 19 | 32 | 27.5 | 3 | 13.4 h11 | 1.1 | 1.25 | 1.5 | 4.3 |
| BEG 16 x 37 x 32.5 | 10 79 0000 0016/... | 16 | 16 | 21 | 37 | 32.5 | 3 | 15.2 h11 | 1.1 | 1.5 | 1.5 | 6.3 |
| BEG 20 x 46 x 40.5 | 10 79 0000 0020/... | 20 | 20 | 26 | 46 | 40.5 | 4 | 19 h11 | 1.3 | 1.5 | 2 | 12.3 |

1) see mbo catalogue page 13_05/page 57)

BEG = Bolts with groove, lathe work head

Material:

1.0718 (11SMnPb30+C)
alternative: hardened

Retaining:

with retaining rings DIN 471
(mbo catalogue page 13_05/page 57);
also see clevis joint combinations
(mbo catalogue page 11_06/page 45)

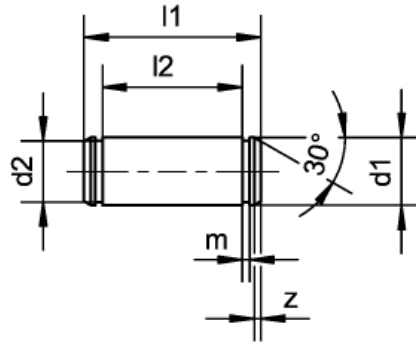
Surface protection:

| Identifier | Supplement to order number |
|---|----------------------------|
| bright | .../003 |
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 5 µm) | .../013 |
| electr. galvanised yellow (layer min. 5 µm) | .../023 |

Special versions upon request



04_03
12/2012



Example for ordering: Bolt with groove, without head suitable for retaining ring DIN 471, of diameter $d_1 = 10$ mm, length $l_1 = 25$ mm and length $l_2 = 20.5$ mm, phosphatised oiled;
Bolt BE 10 x 25 x 20.5 phosphatised oiled
Order number: 10 78 0000 0010/002

| Identifier | Order number | Suitable retainer DIN 471 ¹⁾ | Nom. size d_1 h11 | Length | | d_2 h10 | m H13 | z ≈ | Mass (kg) per 100 pieces |
|---------------------|---------------------|--|---------------------------|---------------|---------------|--------------|----------|--------|--------------------------------|
| | | | | l_1 +0.3 | l_2 +0.3 | | | | |
| BE 4 x 12 x 8.5 | 10 78 0000 0004/... | 4 | 4 | 12 | 8.5 | 3.8 | 0.5 | 0.5 | 0.1 |
| BE 5 x 15 x 10.5 | 10 78 0000 0005/... | 5 | 5 | 15 | 10.5 | 4.8 | 0.7 | 0.5 | 0.2 |
| BE 6 x 17 x 12.5 | 10 78 0000 0006/... | 6 | 6 | 17 | 12.5 | 5.7 | 0.8 | 0.75 | 0.4 |
| BE 8 x 22 x 16.5 | 10 78 0000 0008/... | 8 | 8 | 22 | 16.5 | 7.6 | 0.9 | 1 | 0.8 |
| BE 10 x 25 x 20.5 | 10 78 0000 0010/... | 10 | 10 | 25 | 20.5 | 9.6 | 1.1 | 1 | 1.6 |
| BE 12 x 31 x 24.5 | 10 78 0000 0012/... | 12 | 12 | 31 | 24.5 | 11.5 h11 | 1.1 | 1.25 | 2.6 |
| BE 14 x 34 x 27.5 | 10 78 0000 0014/... | 14 | 14 | 34 | 27.5 | 13.4 h11 | 1.1 | 1.25 | 3.9 |
| BE 16 x 40 x 32.5 | 10 78 0000 0016/... | 16 | 16 | 40 | 32.5 | 15.2 h11 | 1.1 | 1.5 | 6.0 |
| BE 20 x 50 x 40.5 | 10 78 0000 0020/... | 20 | 20 | 50 | 40.5 | 19 h11 | 1.3 | 1.5 | 11.6 |
| BE 25 x 60 x 50.5 | 10 78 0000 0025/... | 25 | 25 | 60 | 50.5 | 23.9 h12 | 1.3 | 1.5 | 22.9 |
| BE 30 x 65 x 55.5* | 10 78 0000 3054/... | 30 | 30 | 65 | 55.5 | 28.6 h12 | 1.6 | 2 | 35.6 |
| BE 35 x 84 x 70.5 | 10 78 0000 0035/... | 35 | 35 | 84 | 70.5 | 33 h12 | 1.6 | 2 | 62.8 |
| BE 40 x 104.3 x 89 | 10 78 0000 0040/... | 40 | 40 | 104.3 | 89 | 37.5 h12 | 1.85 | 2 | 102.1 |
| BE 42 x 104.3 x 89 | 10 78 0000 0042/... | 42 | 42 | 104.3 | 89 | 39.5 h12 | 1.85 | 2 | 112.6 |
| BE 50 x 117.3 x 100 | 10 78 0000 0050/... | 50 | 50 | 117.3 | 100 | 47 h12 | 2.15 | 3 | 179 |

1) see mbo catalogue page 13_05/page 57)

*) suitable for clevis G 30 x 54 according to CETOP standard

Material:

1.0718 (11SMnPb30+C)

alternative: hardened

Retaining:

with retaining rings DIN 471

(mbo catalogue page 13_05/page 57);

also see clevis joint combinations

(mbo catalogue page 11_06/page 45)



Surface protection:

| Identifier | Supplement to order number |
|---|----------------------------|
| bright | .../003 |
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 5 µm) | .../013 |
| electr. galvanised yellow (layer min. 5 µm) | .../023 |

Special versions upon request

04_04
12/2012



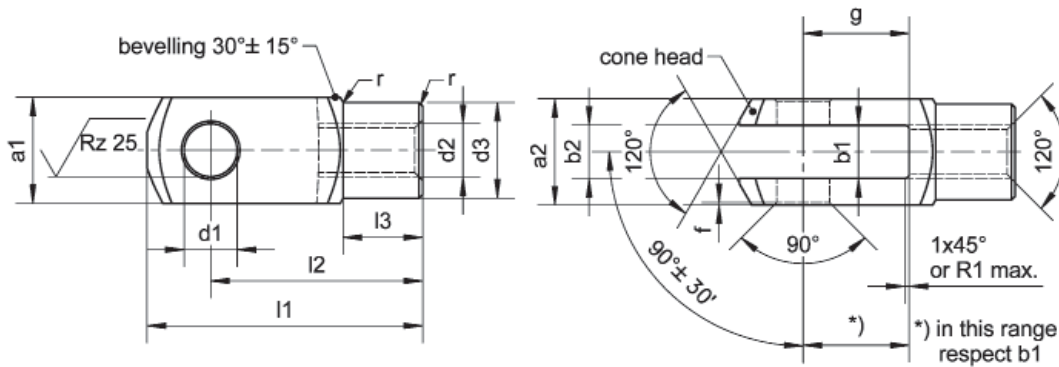


Clevises DIN 71752/DIN ISO 8140

and according to CETOP RP102P



mbo standard 02
1.4305



Example for ordering: Clevis according to DIN 71752 d1 = 10 mm and slot length g = 40 mm, stainless steel version, material 1.4305, with metric fine-pitch thread d2 = M 10x1.25;
Clevis G 10x40, M 10x1.25 stainless steel 1.4305
Order number: 14 02 4305 1040/000

| Size | Order number | d1 H9 | g ±0.5 | a1 ²⁾ h11 | a2 +0.3 -0.16 | b1 B13 | b2 Perm. variation | d2 ¹⁾ | | d3 ±0.3 | f ±0.2 | l1 ±0.5 | l2 Perm. variation | l3 ±0.2 | r ³⁾ | Mass (7.85 kg/dm ³) kg ≈ | |
|-------------------------|---------------------|----------|-----------|-------------------------|---------------------|-----------|--------------------------|-------------------|----------------------|------------|-----------|------------|--------------------------|------------|-----------------|--|-------|
| | | | | | | | | Regular thread | Fine-pitch thread | | | | | | | | |
| G 4x8 ⁴⁾ | 10 02 4305 0408/000 | 4 | 8 | 8 | | 4 | B13 | M 4x0.7 | | 8 | 0.5 | 21 | ±0.3 | 6 | 0.5 | 0.005 | |
| G 4x16 | 10 02 4305 0416/000 | 4 | 16 | 8 | | 4 | | M 4x0.7 | | 8 | 0.5 | 29 | | 24 | 6 | 0.5 | 0.007 |
| G 5x10 | 10 02 4305 0510/000 | 5 | 10 | 10 | | 5 | | M 5x0.8 | | 9 | 0.5 | 26 | | 20 | 7.5 | 0.5 | 0.009 |
| G 5x20 | 10 02 4305 0520/000 | 5 | 20 | 10 | | 5 | | M 5x0.8 | | 9 | 0.5 | 36 | 30 | 7.5 | 0.5 | 0.013 | |
| G 6x12 ⁴⁾ | 10 02 4305 0612/000 | 6 | 12 | 12 | | 6 | | M 6x1 | | 10 | 0.5 | 31 | 24 | 9 | 0.5 | 0.015 | |
| G 6x24 | 10 02 4305 0624/000 | 6 | 24 | 12 | | 6 | | M 6x1 | | 10 | 0.5 | 43 | 36 | 9 | 0.5 | 0.021 | |
| G 8x16 ⁴⁾ | 10 02 4305 0816/000 | 8 | 16 | 16 | | 8 | | M 8x1.25 | | 14 | 0.5 | 42 | 32 | 12 | 0.5 | 0.037 | |
| G 8x16FG | 12 02 4305 0816/000 | 8 | 16 | 16 | | 8 | | M 8x1.25 | M 8x1 | 14 | 0.5 | 42 | 32 | 12 | 0.5 | 0.037 | |
| G 8x32 | 10 02 4305 0832/000 | 8 | 32 | 16 | | 8 | | M 8x1.25 | | 14 | 0.5 | 58 | 48 | 12 | 0.5 | 0.054 | |
| G 8x32FG | 12 02 4305 0832/000 | 8 | 32 | 16 | | 8 | | M 8x1.25 | M 8x1 | 14 | 0.5 | 58 | 48 | 12 | 0.5 | 0.054 | |
| G 10x20 | 10 02 4305 1020/000 | 10 | 20 | 20 | | 10 | | M 10x1.5 | | 18 | 0.5 | 52 | 40 | 15 | 0.5 | 0.074 | |
| G 10x20FG ⁴⁾ | 14 02 4305 1020/000 | 10 | 20 | 20 | | 10 | | M 10x1.5 | M 10x1.25 | 18 | 0.5 | 52 | 40 | 15 | 0.5 | 0.074 | |
| G 10x40 | 10 02 4305 1040/000 | 10 | 40 | 20 | | 10 | | M 10x1.5 | | 18 | 0.5 | 72 | 60 | 15 | 0.5 | 0.116 | |
| G 10x40FG | 14 02 4305 1040/000 | 10 | 40 | 20 | | 10 | | M 10x1.5 | M 10x1.25 | 18 | 0.5 | 72 | 60 | 15 | 0.5 | 0.116 | |
| G 12x24 | 10 02 4305 1224/000 | 12 | 24 | 24 | | 12 | | M 12x1.75 | | 20 | 0.5 | 62 | 48 | 18 | 0.5 | 0.121 | |
| G 12x24FG ⁴⁾ | 14 02 4305 1224/000 | 12 | 24 | 24 | | 12 | | M 12x1.75 | M 12x1.25 | 20 | 0.5 | 62 | 48 | 18 | 0.5 | 0.121 | |
| G 12x48 | 10 02 4305 1248/000 | 12 | 48 | 24 | | 12 | M 12x1.75 | | 20 | 0.5 | 86 | 72 | 18 | 0.5 | 0.175 | | |
| G 12x48FG | 14 02 4305 1248/000 | 12 | 48 | 24 | | 12 | M 12x1.75 | M 12x1.25 | 20 | 0.5 | 86 | 72 | 18 | 0.5 | 0.175 | | |
| G 14x28 | 10 02 4305 1428/000 | 14 | 28 | 27 | | 14 | M 14x2 | | 24 | 1 | 72 | 56 | 22.5 | 1 | 0.178 | | |
| G 14x28FG ⁴⁾ | 16 02 4305 1428/000 | 14 | 28 | 27 | | 14 | M 14x2 | M 14x1.5 | 24 | 1 | 72 | 56 | 22.5 | 1 | 0.178 | | |
| G 14x56 | 10 02 4305 1456/000 | 14 | 56 | 27 | | 14 | M 14x2 | | 24 | 1 | 101 | 85 | 22.5 | 1 | 0.258 | | |
| G 14x56FG | 16 02 4305 1456/000 | 14 | 56 | 27 | | 14 | M 14x2 | M 14x1.5 | 24 | 1 | 101 | 85 | 22.5 | 1 | 0.258 | | |
| G 16x32 | 10 02 4305 1632/000 | 16 | 32 | 32 | | 16 | M 16x2 | | 26 | 1 | 83 | 64 | 24 | 1 | 0.282 | | |
| G 16x32FG ⁴⁾ | 16 02 4305 1632/000 | 16 | 32 | 32 | | 16 | M 16x2 | M 16x1.5 | 26 | 1 | 83 | 64 | 24 | 1 | 0.282 | | |
| G 16x64 | 10 02 4305 1664/000 | 16 | 64 | 32 | | 16 | M 16x2 | | 26 | 1 | 115 | 96 | 24 | 1 | 0.411 | | |
| G 16x64FG | 16 02 4305 1664/000 | 16 | 64 | 32 | | 16 | M 16x2 | M 16x1.5 | 26 | 1 | 115 | 96 | 24 | 1 | 0.411 | | |

Clevises similar to DIN 71752 / supplement DIN ISO 8140 and according to CETOP RP102P

| Size | Order number | d1 H9 | g ±0.5 | a1 ²⁾ h11 | a2 +0.5 -0.2 | b1 B13 | b2 Perm. variation | d2 ¹⁾ | | d3 ±0.3 | f ±0.2 | l1 ±0.5 | l2 Perm. variation | l3 ±0.3 | r ³⁾ | Mass (7.85 kg/dm ³) kg ≈ | |
|-------------------------|---------------------|----------|-----------|-------------------------|--------------------|-----------|--------------------------|-------------------|----------------------|------------|-----------|------------|--------------------------|------------|-----------------|--|-------|
| | | | | | | | | Regular thread | Fine-pitch thread | | | | | | | | |
| G 20x40 | 10 02 4305 2040/000 | 20 | 40 | 40 | | 20 | +0.7 +0.15 | M 20x2.5 | | 34 | 1 | 105 | ±0.4 | 30 | 1.5 | 0.550 | |
| G 20x40FG ⁴⁾ | 16 02 4305 2040/000 | 20 | 40 | 40 | | 20 | | M 20x2.5 | M 20x1.5 | 34 | 1 | 105 | | 80 | 30 | 1.5 | 0.550 |
| G 20x80 | 10 02 4305 2080/000 | 20 | 80 | 40 | | 20 | | M 20x2.5 | | 34 | 1 | 145 | | 120 | 30 | 1.5 | 0.800 |
| G 20x80FG | 16 02 4305 2080/000 | 20 | 80 | 40 | | 20 | | M 20x2.5 | M 20x1.5 | 34 | 1 | 145 | | 120 | 30 | 1.5 | 0.800 |
| G 25x50 | 10 02 4305 2550/000 | 25 | 50 | 50 | | 25 | | M 24x3 | | 42 | 1.5 | 132 | 100 | 36 | 1.5 | 1.100 | |
| G 25x50FG ⁴⁾ | 18 02 4305 2550/000 | 25 | 50 | 50 | | 25 | | M 24x3 | M 24x2 | 42 | 1.5 | 132 | 100 | 36 | 1.5 | 1.100 | |
| G 30x54FG | 18 02 0027 3054/000 | 30 | 54 | 55 | | 30 | | M 27x2 | | 48 | 1.5 | 148 | 110 | 40 | 2 | 1.440 | |

- 1) code for thread:
regular thread no code
regular thread, left-handed LH
fine-pitch thread FG
fine-pitch thread, left-handed FGLH
- 2) for semifinished products, tolerance h11 according to DIN 178
- 3) radius or 45° beveling (of manufacturer's choice)
- 4) these clevises comply in terms of mating dimensions with DIN ISO 8140 and CETOP RP102P (the external shape differs)

Material:
stainless steel 1.4305 (X8CrNiS18-9)

Retaining:
with bolts (mbo catalogue section 6/page 31-35) and

locking washers DIN 6799 (mbo catalogue page 13_03/
page 55) or washers and cotter pins; also see clevis joint
combinations (mbo catalogue section 11/page 40-47)

Special versions upon request

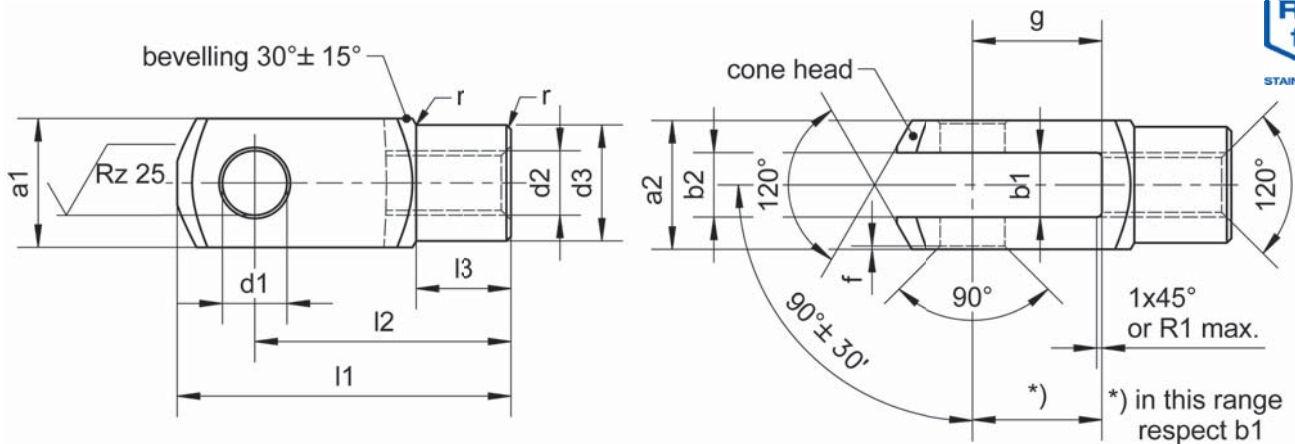
05_01
08/2011

mbo Osswald GmbH & Co KG
Metal processing · Linking technology

www.mbo-osswald.com · info@mbo-osswald.de
Tel: + 49 (0) 9345-670-0 · Fax: + 49 (0) 9345-6255



General tolerances
DIN ISO 2768-medium
Subject to technical
alterations
We accept no responsibility for
incorrect or incomplete details or
information given



Example for ordering: Clevis according to DIN 71752 d1 = 10 mm and slot length g = 20 mm, stainless steel version, material 1.4404, with metric regular thread d2 = M 10x1.5;
Clevis G 10x20 M 10x1.5 stainless steel 1.4404
Order number: 10 02 4404 1020/4404

| Size | Order number | d1 H9 | g ±0.5 | a1 ²⁾ h11 | a2 +0.3 -0.16 | b1 B13 | b2 Perm. variation | d2 ¹⁾ | | d3 ±0.3 | f ±0.2 | l1 ±0.5 | l2 Perm. variation | l3 ±0.2 | r ³⁾ | Mass (7.85 kg/dm ³) kg ≈ | |
|-------------------------|----------------------|----------|-----------|-------------------------|---------------------|---------------|--------------------------|-------------------|----------------------|------------|-----------|------------|--------------------------|------------|-----------------|--|-------|
| | | | | | | | | Regular thread | Fine-pitch thread | | | | | | | | |
| G 4x8 ⁴⁾ | 10 02 4404 0408/4404 | 4 | 8 | 8 | 4 | B13 | | M 4x0.7 | | 8 | 0.5 | 21 | ±0.3 | 6 | 0.5 | 0.005 | |
| G 5x10 | 10 02 4404 0510/4404 | 5 | 10 | 10 | 5 | | | M 5x0.8 | | 9 | 0.5 | 26 | | 20 | 7.5 | 0.5 | 0.009 |
| G 6x12 ⁴⁾ | 10 02 4404 0612/4404 | 6 | 12 | 12 | 6 | | | M 6x1 | | 10 | 0.5 | 31 | | 24 | 9 | 0.5 | 0.015 |
| G 8x16 ⁴⁾ | 10 02 4404 0816/4404 | 8 | 16 | 16 | 8 | | | M 8x1.25 | | 14 | 0.5 | 42 | | 32 | 12 | 0.5 | 0.037 |
| G 10x20 | 10 02 4404 1020/4404 | 10 | 20 | 20 | 10 | | | M 10x1.5 | | 18 | 0.5 | 52 | | 40 | 15 | 0.5 | 0.074 |
| G 10x20FG ⁴⁾ | 14 02 4404 1020/4404 | 10 | 20 | 20 | 10 | +0.7 +0.15 | | M 10x1.25 | | 18 | 0.5 | 52 | 40 | 15 | 0.5 | 0.074 | |
| G 12x24 | 10 02 4404 1224/4404 | 12 | 24 | 24 | 12 | | | M 12x1.75 | | 20 | 0.5 | 62 | 48 | 18 | 0.5 | 0.121 | |
| G 12x24FG ⁴⁾ | 14 02 4404 1224/4404 | 12 | 24 | 24 | 12 | | | M 12x1.25 | | 20 | 0.5 | 62 | 48 | ±0.4 | 18 | 0.5 | 0.121 |
| G 14x28 | 10 02 4404 1428/4404 | 14 | 28 | 27 | 14 | | | M 14x2 | | 24 | 1 | 72 | 56 | 22.5 | 1 | 0.178 | |
| G 14x28FG | 16 02 4404 1428/4404 | 14 | 28 | 27 | 14 | | | M 14x1.5 | | 24 | 1 | 72 | 56 | 22.5 | 1 | 0.178 | |
| G 16x32 | 10 02 4404 1632/4404 | 16 | 32 | 32 | 16 | | | M 16x2 | | 26 | 1 | 83 | 64 | 24 | 1 | 0.282 | |
| G 16x32FG ⁴⁾ | 16 02 4404 1632/4404 | 16 | 32 | 32 | 16 | | | M 16x1.5 | | 26 | 1 | 83 | 64 | 24 | 1 | 0.282 | |

Clevises similar to DIN 71752 / supplement DIN ISO 8140 and according to CETOP RP102P

| Size | Order number | d1 H9 | g ±0.5 | a1 ²⁾ h11 | a2 +0.5 -0.2 | b1 B13 | b2 Perm. variation | d2 ¹⁾ | | d3 ±0.3 | f ±0.2 | l1 ±0.5 | l2 Perm. variation | l3 ±0.3 | r ³⁾ ±0.5 | Mass (7.85 kg/dm ³) kg ≈ | |
|-------------------------|----------------------|----------|-----------|-------------------------|--------------------|---------------|--------------------------|-------------------|----------------------|------------|-----------|------------|--------------------------|------------|-------------------------|--|-------|
| | | | | | | | | Regular thread | Fine-pitch thread | | | | | | | | |
| G 20x40 | 10 02 4404 2040/4404 | 20 | 40 | 40 | 20 | +0.7 +0.15 | | M 20x2.5 | | 34 | 1 | 105 | 80 | ±0.4 | 30 | 1.5 | 0.550 |
| G 20x40FG ⁴⁾ | 16 02 4404 2040/4404 | 20 | 40 | 40 | 20 | | | M 20x1.5 | | 34 | 1 | 105 | 80 | | 30 | 1.5 | 0.550 |

1) code for thread:

- regular thread: no code
- regular thread, left-handed: LH
- fine-pitch thread: FG
- fine-pitch thread, left-handed: FGLH

2) for semifinished products, tolerance h11 according to DIN 178

3) radius or 45° beveling (of manufacturer's choice)

4) these clevises comply in terms of mating dimensions with DIN ISO 8140 and CETOP RP102P (the external shape differs)

Material:

stainless steel 1.4404 (X2CrNiMo17-12-2)

Retaining:

with cotter bolts (mbo catalogue page 06_03/page 33) and washers and cotter pins; also see clevis joint combinations (mbo catalogue page 11_02/page 41)

Clevises (long version) upon request

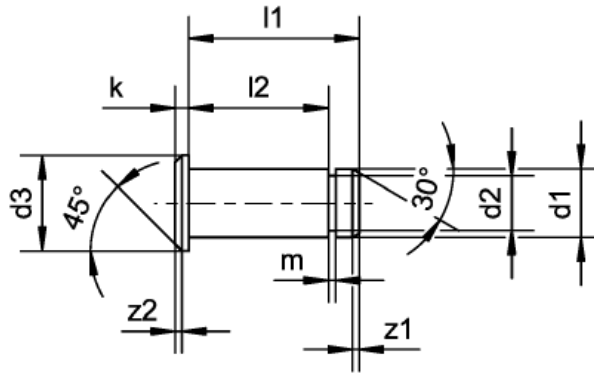
Special versions upon request

05_02
08/2011





head version of
manufacturer's choice



Example for ordering: Bolt version BEG of diameter $d_1 = 10$ mm, stainless steel version, material 1.4305, length $l_1 = 25$ mm and length $l_2 = 20.5$ mm;
Bolt BEG 10 x 25 x 20.5 stainless steel 1.4305
Order number: 10 77 4305 0010/000

| Identifier | Order number | Suitable retainer DIN 6799 stainless steel ¹⁾ | Nom. size d_1 h_{11} | Head- \varnothing d_3 | Length | | k js_{14} | d_2 h_{11} | m $+0.1$ | z1 \approx | z2 \approx | Mass (kg) per 100 pieces |
|----------------------|---------------------|--|--------------------------------|---------------------------------|-----------------|--------------|----------------|-------------------|-------------|-----------------|-----------------|--------------------------------|
| | | | | | l1 js_{15} | l2 $+0.3$ | | | | | | |
| BEG 4 x 10.5 x 8.5 | 10 77 4305 0004/000 | 3.2 | 4 | 6 h_{14} | 10.5 | 8.5 | 1 | 3.2 | 0.64 | 0.5 | 0.5 | 0.12 |
| BEG 5 x 13 x 10.5 | 10 77 4305 0005/000 | 4 | 5 | 8 h_{14} | 13 | 10.5 | 1.5 | 4 | 0.74 | 0.5 | 0.5 | 0.24 |
| BEG 6 x 15.5 x 12.5 | 10 77 4305 0006/000 | 5 | 6 | 9 h_{14} | 15.5 | 12.5 | 1.5 | 5 -0.2 | 0.74 | 1 | 0.5 | 0.42 |
| BEG 8 x 20 x 16.5 | 10 77 4305 0008/000 | 6 | 8 | 12 h_{14} | 20 | 16.5 | 2 | 6 -0.2 | 0.94 | 0.5 | 1 | 0.90 |
| BEG 10 x 25 x 20.5 | 10 77 4305 0010/000 | 8 | 10 | 14 h_{14} | 25 | 20.5 | 2 | 8 | 1.05 | 1 | 1 | 1.70 |
| BEN 12 x 29.5 x 24.5 | 10 07 4305 0012/000 | 9 | 12 | 16 | 29.5 | 24.5 | ≈ 2.5 | 9 | 1.15 | 1.25 | - | 2.95 |
| BEN 14 x 32.5 x 27.5 | 10 07 4305 0014/000 | 10 | 14 | 20 | 32.5 | 27.5 | ≈ 2.5 | 10 | 1.25 | 1.25 | - | 4.10 |
| BEN 16 x 38.5 x 32.5 | 10 07 4305 0016/000 | 12 | 16 | 20 | 38.5 | 32.5 | ≈ 3.5 | 12 | 1.35 | 1.5 | - | 6.20 |
| BEN 20 x 46 x 40.5 | 10 07 4305 0020/000 | 19 | 20 | 28 | 46 | 40.5 | ≈ 4 | 19 | 1.8 | 1.5 | - | 12.10 |
| BEN 25 x 57 x 50.5 | 10 07 4305 0025/000 | 19 | 25 | 34 | 57 | 50.5 | ≈ 5.5 | 19 | 1.8 | 1.5 | - | 23.10 |

1) see mbo catalogue page 13_03/page 55)

BEN = Bolts with groove and riveted head
BEG = Bolts with groove, lathe work head

Material:

stainless steel 1.4305 (X8CrNiS18-9)

Special versions upon request

Retaining:

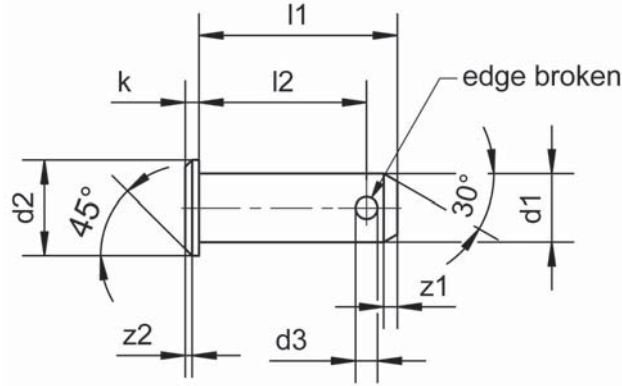
with locking washers DIN 6799 stainless steel
(mbo catalogue page 13_03/page 55);
also see clevis joint combinations
(mbo catalogue page 11_04/page 43)

06_01
08/2011





head version of
manufacturer's choice



Example for ordering: Bolt version BGL of diameter $d_1 = 10$ mm, stainless steel version, material 1.4305, length $l_1 = 29$ mm and length $l_2 = 24.5$ mm;
Bolt BGL 10 x 29 x 24.5 stainless steel 1.4305
Order number: 34 00 4305 0010/000

| Identifier | Order number | Nom. size $\varnothing d_1$ h11 | Head- \varnothing d_2 | d_3 H14 | Length | | k js14 | z1 ≈ | z2 ≈ | Mass (kg) per 100 pieces |
|--------------------|---------------------|---------------------------------------|------------------------------|--------------|------------|------------|-----------|---------|---------|--------------------------------|
| | | | | | l1 js15 | l2 +0.5 | | | | |
| BGL 4 x 12 x 10 | 34 00 4305 0004/000 | 4 | 6 h14 | 1 | 12 | 10 | 1 | 1 | 0.5 | 0.13 |
| BGL 5 x 15 x 12.3 | 34 00 4305 0005/000 | 5 | 8 h14 | 1.2 | 15 | 12.3 | 1.5 | 1 | 0.5 | 0.26 |
| BGL 6 x 18 x 15.3 | 34 00 4305 0006/000 | 6 | 9 h14 | 1.6 | 18 | 15.3 | 1.5 | 1.5 | 0.5 | 0.46 |
| BGL 8 x 23 x 19.5 | 34 00 4305 0008/000 | 8 | 12 h14 | 2 | 23 | 19.5 | 2 | 2 | 1 | 1.00 |
| BGL 10 x 29 x 24.5 | 34 00 4305 0010/000 | 10 | 14 h14 | 3.2 | 29 | 24.5 | 2 | 2 | 1 | 1.90 |
| BNL 12 x 35 x 29.5 | 54 00 4305 0012/000 | 12 | 16 | 4 | 35 | 29.5 | ≈ 2.5 | 2.5 | - | 3.40 |
| BNL 14 x 40 x 32.5 | 54 00 4305 0014/000 | 14 | 20 | 4 | 40 | 32.5 | ≈ 3 | 2.5 | - | 4.10 |
| BNL 16 x 45 x 38.2 | 54 00 4305 0016/000 | 16 | 20 | 4 | 45 | 38.2 | ≈ 3 | 2.5 | - | 7.20 |
| BNL 20 x 53 x 47 | 54 00 4305 0020/000 | 20 | 28 | 5 | 53 | 47 | ≈ 4 | 3 | - | 13.90 |
| BNL 25 x 67 x 59 | 54 00 4305 0025/000 | 25 | 34 | 6.3 | 67 | 59 | ≈ 5 | 4 | - | 26.60 |
| BNL 30 x 67 x 59 | 54 30 0067 0059/000 | 30 | 36 | 6.3 | 67 | 59 | ≈ 5.5 | 4 | - | 38.30 |

BNL = Bolts with pin hole and riveted head

BGL = Bolts with pin hole, lathe work head

Material:

stainless steel 1.4305 (X8CrNiS18-9)

Special versions upon request

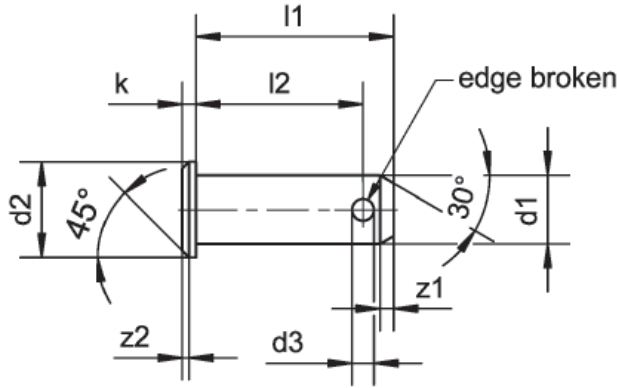
Retaining:

with washers and cotter pins stainless steel;
also see clevis joint combinations
(mbo catalogue page 11_02/page 41 and 11_03/page 42)

06_02
08/2011



head version of
manufacturer's choice



Example for ordering: Bolt version BGL of diameter $d_1 = 10$ mm, stainless steel version, material 1.4404, length $l_1 = 29$ mm and length $l_2 = 24.5$ mm;
Bolt BGL 10 x 29 x 24.5 stainless steel 1.4404
Order number: 34 00 4404 0010/4404

| Identifier | Order number | Nom. size $\varnothing d_1$ h11 | Head- \varnothing d_2 h14 | d_3 H14 | Length | | k js14 | z1 ≈ | z2 ≈ | Mass (kg) per 100 pieces |
|--------------------|----------------------|---------------------------------------|-------------------------------------|--------------|------------|------------|-----------|---------|---------|--------------------------------|
| | | | | | l1 js15 | l2 +0.5 | | | | |
| BGL 4 x 12 x 10 | 34 00 4404 0004/4404 | 4 | 6 | 1 | 12 | 10 | 1 | 1 | 0.5 | 0.13 |
| BGL 5 x 15 x 12.3 | 34 00 4404 0005/4404 | 5 | 8 | 1.2 | 15 | 12.3 | 1.5 | 1 | 0.5 | 0.26 |
| BGL 6 x 18 x 15.3 | 34 00 4404 0006/4404 | 6 | 9 | 1.6 | 18 | 15.3 | 1.5 | 1.5 | 0.5 | 0.46 |
| BGL 8 x 23 x 19.5 | 34 00 4404 0008/4404 | 8 | 12 | 2 | 23 | 19.5 | 2 | 2 | 1 | 1.00 |
| BGL 10 x 29 x 24.5 | 34 00 4404 0010/4404 | 10 | 14 | 3.2 | 29 | 24.5 | 2 | 2 | 1 | 1.90 |
| BGL 12 x 35 x 29.5 | 34 00 4404 0012/4404 | 12 | 17 | 4 | 35 | 29.5 | 3 | 2.5 | 1.5 | 3.40 |
| BGL 14 x 40 x 32.5 | 34 00 4404 0014/4404 | 14 | 19 | 4 | 40 | 32.5 | 3 | 2.5 | 1.5 | 4.10 |
| BGL 16 x 45 x 38.2 | 34 00 4404 0016/4404 | 16 | 21 | 4 | 45 | 38.2 | 3 | 2.5 | 1.5 | 7.20 |
| BGL 20 x 53 x 47 | 34 00 4404 0020/4404 | 20 | 26 | 5 | 53 | 47 | 4 | 3 | 2 | 13.90 |

BGL = Bolts with pin hole, lathe work head

Material:

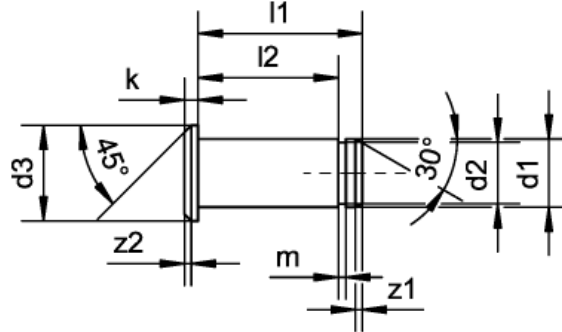
stainless steel 1.4404 (X2CrNiMo17-12-2)

Special versions upon request

Retaining:

with washers and cotter pins stainless steel;
also see clevis joint combinations
(mbo catalogue page 11_02/page 41)

06_03
08/2011



Example for ordering: Bolt with groove suitable for retaining ring DIN 471, stainless steel version, material 1.4305, of diameter $d_1 = 10$ mm, length $l_1 = 24$ mm and length $l_2 = 20.5$ mm;
Bolt BEG 10 x 24 x 20.5 stainless steel 1.4305
Order number: 10 79 4305 0010/000

| Identifier | Order number | Suitable retainer DIN 471 stainless steel ¹⁾ | Nom. size d_1 h_{11} | Head- \varnothing d_3 h_{14} | Length | | k js_{15} | d_2 h_{10} | m H_{13} | z_1 \approx | z_2 \approx | Mass (kg) per 100 pieces |
|---------------------|---------------------|---|--------------------------------|---|-----------------|-----------------|------------------|-------------------|-----------------|--------------------|--------------------|--------------------------------|
| | | | | | l_1 $+0.3$ | l_2 $+0.3$ | | | | | | |
| BEG 4 x 10 x 8.5 | 10 79 4305 0004/000 | 4 | 4 | 6 | 10 | 8.5 | 1 | 3.8 | 0.5 | 0.5 | 0.5 | 0.1 |
| BEG 5 x 12.5 x 10.5 | 10 79 4305 0005/000 | 5 | 5 | 8 | 12.5 | 10.5 | 1.5 | 4.8 | 0.7 | 0.5 | 0.5 | 0.2 |
| BEG 6 x 15.5 x 12.5 | 10 79 4305 0006/000 | 6 | 6 | 9 | 15.5 | 12.5 | 1.5 | 5.7 | 0.8 | 0.75 | 0.5 | 0.4 |
| BEG 8 x 20.5 x 16.5 | 10 79 4305 0008/000 | 8 | 8 | 12 | 20.5 | 16.5 | 2 | 7.6 | 0.9 | 1 | 1 | 0.8 |
| BEG 10 x 24 x 20.5 | 10 79 4305 0010/000 | 10 | 10 | 14 | 24 | 20.5 | 2 | 9.6 | 1.1 | 1 | 1 | 1.6 |
| BEG 12 x 28 x 24.5 | 10 79 4305 0012/000 | 12 | 12 | 17 | 28 | 24.5 | 3 | 11.5 h_{11} | 1.1 | 1.25 | 1.5 | 2.8 |
| BEG 14 x 32 x 27.5 | 10 79 4305 0014/000 | 14 | 14 | 19 | 32 | 27.5 | 3 | 13.4 h_{11} | 1.1 | 1.25 | 1.5 | 4.3 |
| BEG 16 x 37 x 32.5 | 10 79 4305 0016/000 | 16 | 16 | 21 | 37 | 32.5 | 3 | 15.2 h_{11} | 1.1 | 1.5 | 1.5 | 6.3 |
| BEG 20 x 46 x 40.5 | 10 79 4305 0020/000 | 20 | 20 | 26 | 46 | 40.5 | 4 | 19 h_{11} | 1.3 | 1.5 | 2 | 12.3 |

1) see mbo catalogue page 13_05/page 57)

BEG = Bolts with groove, lathe work head

Material:

stainless steel 1.4305 (X8CrNiS18-9)

Retaining:

with retaining rings DIN 471 made of stainless steel
(mbo catalogue page 13_05/page 57);
also see clevis joint combinations
(mbo catalogue page 11_06/page 45)

Special versions upon request



06_04
07/2012

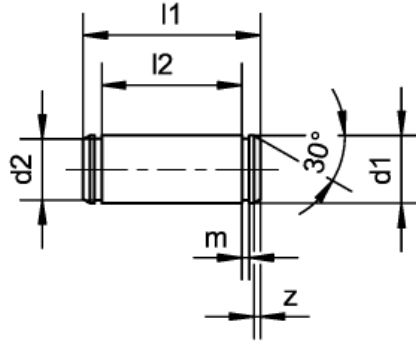


Bolts with groove, suitable for clevises

without head, for retaining rings DIN 471



mbo standard 78
BE 1.4305



Example for ordering: Bolt with groove, without head, suitable for retaining ring DIN 471, stainless steel version, material 1.4305, of diameter $d_1 = 10$ mm, length $l_1 = 25$ mm and length $l_2 = 20.5$ mm;
Bolt BE 10 x 25 x 20.5 stainless steel 1.4305
Order number: 10 78 4305 0010/000

| Identifier | Order number | Suitable retainer DIN 471 stainless steel ¹⁾ | Nom. size d_1 h_{11} | Length | | d_2 h_{10} | m H_{13} | z ≈ | Mass (kg) per 100 pieces |
|-------------------|---------------------|---|--------------------------------|---------------|---------------|-------------------|---------------|--------|--------------------------------|
| | | | | l_1 +0.3 | l_2 +0.3 | | | | |
| BE 4 x 12 x 8.5 | 10 78 4305 0004/000 | 4 | 4 | 12 | 8.5 | 3.8 | 0.5 | 0.5 | 0.1 |
| BE 5 x 15 x 10.5 | 10 78 4305 0005/000 | 5 | 5 | 15 | 10.5 | 4.8 | 0.7 | 0.5 | 0.2 |
| BE 6 x 17 x 12.5 | 10 78 4305 0006/000 | 6 | 6 | 17 | 12.5 | 5.7 | 0.8 | 0.75 | 0.4 |
| BE 8 x 22 x 16.5 | 10 78 4305 0008/000 | 8 | 8 | 22 | 16.5 | 7.6 | 0.9 | 1 | 0.8 |
| BE 10 x 25 x 20.5 | 10 78 4305 0010/000 | 10 | 10 | 25 | 20.5 | 9.6 | 1.1 | 1 | 1.6 |
| BE 12 x 31 x 24.5 | 10 78 4305 0012/000 | 12 | 12 | 31 | 24.5 | 11.5 h_{11} | 1.1 | 1.25 | 2.6 |
| BE 14 x 34 x 27.5 | 10 78 4305 0014/000 | 14 | 14 | 34 | 27.5 | 13.4 h_{11} | 1.1 | 1.25 | 3.9 |
| BE 16 x 40 x 32.5 | 10 78 4305 0016/000 | 16 | 16 | 40 | 32.5 | 15.2 h_{11} | 1.1 | 1.5 | 6.0 |
| BE 20 x 50 x 40.5 | 10 78 4305 0020/000 | 20 | 20 | 50 | 40.5 | 19 h_{11} | 1.3 | 1.5 | 11.6 |
| BE 25 x 60 x 50.5 | 10 78 4305 0025/000 | 25 | 25 | 60 | 50.5 | 23.9 h_{12} | 1.3 | 1.5 | 22.9 |

1) see mbo catalogue page 13_05/page 57)

Material:

stainless steel 1.4305 (X8CrNiS18-9)

Special versions upon request

Retaining:

with retaining rings DIN 471 made of stainless steel
(mbo catalogue page 13_05/page 57);
also see clevis joint combinations
(mbo catalogue page 11_06/page 45)



06_05
08/2011

mbo Osswald GmbH & Co KG

Metal processing · Linking technology

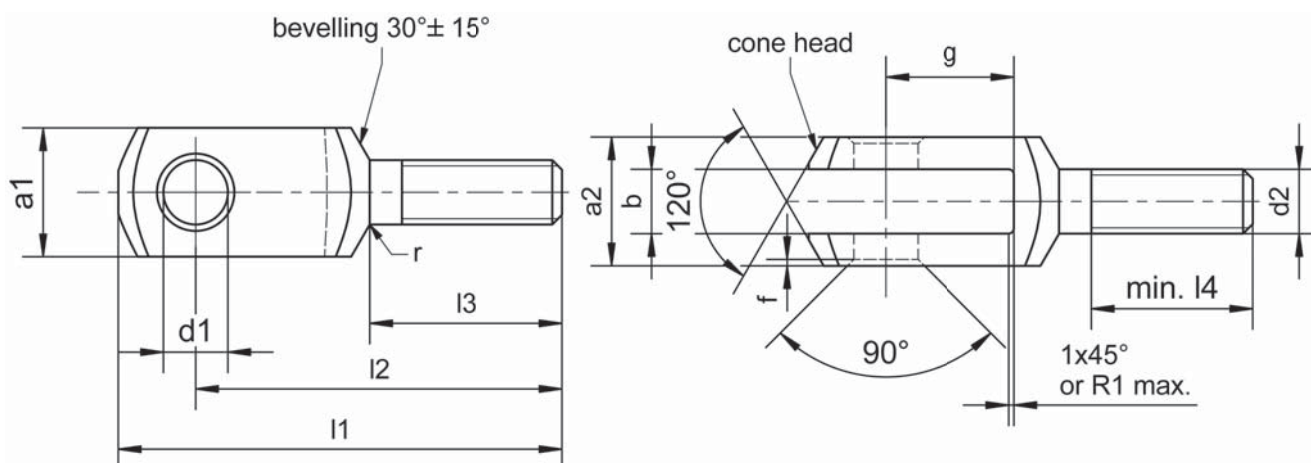
www.mbo-osswald.com · info@mbo-osswald.de
Tel: + 49 (0) 9345-670-0 · Fax: + 49 (0) 9345-6255



General tolerances
DIN ISO 2768-medium

Subject to technical
alterations

We accept no responsibility for
incorrect or incomplete details or
information given



Example for ordering: Clevis with male thread $d_1 = 10$ mm, slot length $g = 20$ mm, with metric regular thread $d_2 = M 10 \times 1.5$, electroplated galvanised white; Clevis with male thread G 10x20, M 10x1.5 galvanised white
Order number: 10 42 0010 0020/013

| Size | Order number | d_1 H9 | g ± 0.5 | $a_1^{2)}$ h11 | a_2 $+0.3$ -0.16 | b $+0.7$ -0.15 | $d_2^{1)}$ | | f ± 0.2 | l_1 ± 0.2 | l_2 ± 0.4 | l_3 ± 0.2 | l_4 | $r^{3)}$ | Mass (7.85 kg/dm ³) kg \approx |
|---------|---------------------|-------------|------------------|-------------------|----------------------------|--------------------------|----------------|-------------------|------------------|--------------------|--------------------|--------------------|-------|----------|--|
| | | | | | | | Regular thread | Fine-pitch thread | | | | | | | |
| G 6x12 | 10 42 0006 0012/... | 6 | 12 | 12 | 6 | M 6x1 | - | 0.5 | 44 | 37 | 20 | 15 | 0.8 | 0.015 | |
| G 8x16 | 10 42 0008 0016/... | 8 | 16 | 16 | 8 | M 8x1.25 | - | 0.5 | 57 | 47 | 25 | 20 | 0.8 | 0.036 | |
| G 10x20 | 10 42 0010 0020/... | 10 | 20 | 20 | 10 | M 10x1.5 | - | 0.5 | 69 | 57 | 30 | 25 | 0.8 | 0.068 | |
| G 12x24 | 10 42 0012 0024/... | 12 | 24 | 24 | 12 | M 12x1.75 | - | 0.5 | 82 | 68 | 35 | 30 | 0.8 | 0.122 | |
| G 14x28 | 10 42 0014 0028/... | 14 | 28 | 27 | 14 | M 14x2 | - | 1 | 94 | 78 | 40 | 35 | 1.2 | 0.171 | |
| G 16x32 | 10 42 0016 0032/... | 16 | 32 | 32 | 16 | M 16x2 | - | 1 | 108 | 89 | 45 | 40 | 1.2 | 0.288 | |
| G 20x40 | 10 42 0020 0040/... | 20 | 40 | 40 | 20 | M 20x2.5 | - | 1 | 134 | 109 | 55 | 50 | 1.5 | 0.550 | |

1) code for thread:
regular thread

no code

2) for semifinished products, tolerance h11 according to DIN 178
3) radius or 45° beveling (of manufacturer's choice)

Material:

1.0718 (11SMnPb30+C)

alternative: stainless steel 1.4305 (X8CrNiS18-9)
(supplement to order number .../000)



Surface protection:

| Identifier | Supplement to order number |
|---|----------------------------|
| bright | .../003 |
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 5 µm) | .../013 |
| electr. galvanised yellow (layer min. 5 µm) | .../023 |

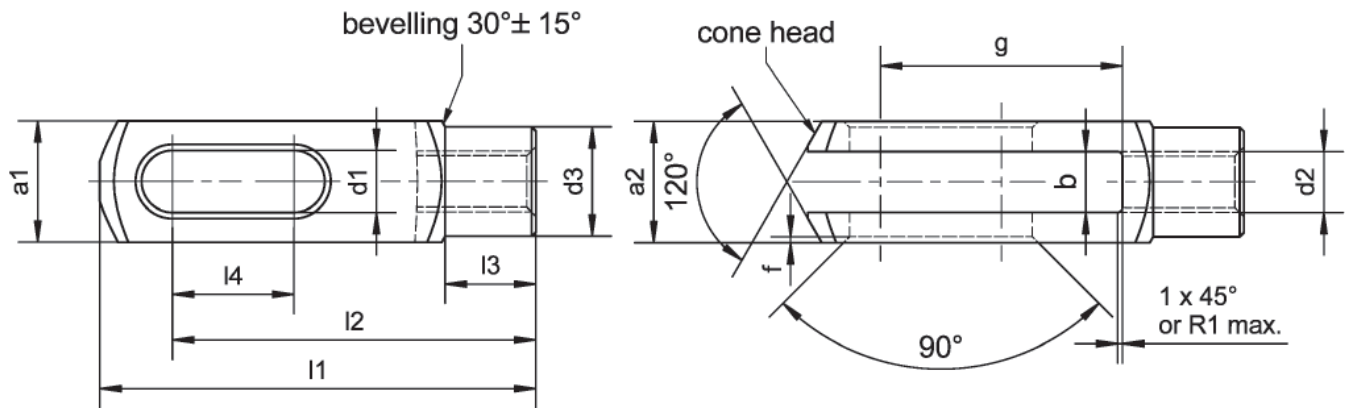
Retaining:

with bolts (mbo catalogue section 4/page 25-28 and mbo catalogue section 6/page 31-35) and retainers (mbo catalogue section 13/page 53-57), or washers and cotter pins; also see clevis joint combinations (mbo catalogue section 11/page 40-47)

Special versions upon request

07_01
12/2012





Example for ordering: Clevis with elongated hole, d1 = 10.2 mm, slot length g = 40 mm, with metric fine-pitch thread d2 = M 10x1.25, electroplated galvanised white; Clevis with elongated hole G 10x40, M 10x1.25 galvanised white
Order number: 14 22 0010 0040/013

| Size | Order number | d1 ±0.1 | g ±0.5 | a1 ²⁾ h11 | a2 +0.5 -0.2 | b +0.7 +0.1 | d2 ¹⁾ | | d3 ±0.2 | f ±0.2 | l1 ±0.5 | l2 ±0.4 | l3 ±0.2 | l4 ±0.4 | Mass (kg) per piece |
|-----------|---------------------|------------|-----------|-------------------------|--------------------|-------------------|-------------------|----------------------|------------|-----------|------------|------------|------------|------------|---------------------------|
| | | | | | | | Regular thread | Fine-pitch thread | | | | | | | |
| G 6x24 | 10 22 0006 0024/... | 6.2 | 24 | 12 | 6 | M 6x1 | | 10 | 0.5 | 43 | 36 | 9 | 12 | 0.017 | |
| G 8x32 | 10 22 0008 0032/... | 8.2 | 32 | 16 | 8 | M 8x1.25 | | 14 | 0.5 | 58 | 48 | 12 | 16 | 0.043 | |
| G 8x32FG | 12 22 0008 0032/... | 8.2 | 32 | 16 | 8 | | M 8x1 | 14 | 0.5 | 58 | 48 | 12 | 16 | 0.043 | |
| G 10x40 | 10 22 0010 0040/... | 10.2 | 40 | 20 | 10 | M 10x1.5 | | 18 | 0.5 | 72 | 60 | 15 | 20 | 0.086 | |
| G 10x40FG | 14 22 0010 0040/... | 10.2 | 40 | 20 | 10 | | M 10x1.25 | 18 | 0.5 | 72 | 60 | 15 | 20 | 0.086 | |
| G 12x48 | 10 22 0012 0048/... | 12.2 | 48 | 24 | 12 | M 12x1.75 | | 20 | 0.5 | 86 | 72 | 18 | 24 | 0.141 | |
| G 12x48FG | 14 22 0012 0048/... | 12.2 | 48 | 24 | 12 | | M 12x1.25 | 20 | 0.5 | 86 | 72 | 18 | 24 | 0.141 | |
| G 14x56 | 10 22 0014 0056/... | 14.2 | 56 | 27 | 14 | M 14x2 | | 24 | 1 | 101 | 85 | 22.5 | 28 | 0.208 | |
| G 14x56FG | 16 22 0014 0056/... | 14.2 | 56 | 27 | 14 | | M 14x1.5 | 24 | 1 | 101 | 85 | 22.5 | 28 | 0.208 | |
| G 16x64 | 10 22 0016 0064/... | 16.2 | 64 | 32 | 16 | M 16x2 | | 26 | 1 | 115 | 96 | 24 | 32 | | |
| G 16x64FG | 16 22 0016 0064/... | 16.2 | 64 | 32 | 16 | | M 16x1.5 | 26 | 1 | 115 | 96 | 24 | 32 | | |

1) code for thread:
regular thread
regular thread, left-handed
fine-pitch thread
fine-pitch thread, left-handed

no code
LH
FG
FGLH

2) for semifinished products, tolerance h11 according to DIN 178

Material:

1.0718 (11SMnPb30+C)
alternative: stainless steel 1.4305 (X8CrNiS18-9)
(supplement to order number .../000)



Retaining:

with bolts (mbo catalogue section 4/page 25-28 and mbo catalogue section 6/page 31-35) and retainers (mbo catalogue section 13/page 53-57), or washers and cotter pins; also see clevis joint combinations (mbo catalogue section 11/page 40-47)

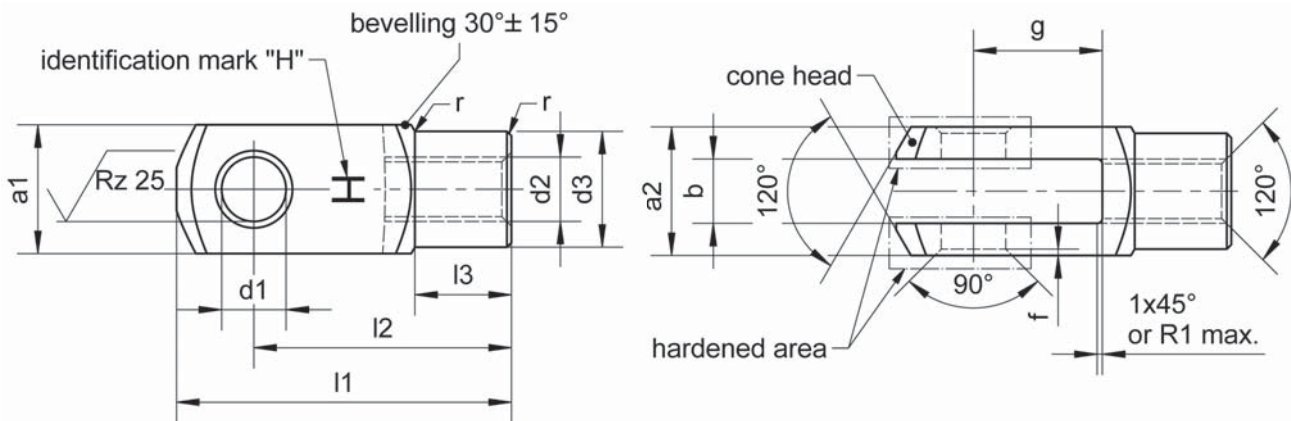
Surface protection:

| Identifier | Supplement to order number |
|---|----------------------------|
| bright | .../003 |
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 5 µm) | .../013 |
| electr. galvanised yellow (layer min. 5 µm) | .../023 |

Special versions upon request

08_01
12/2012





Example for ordering: Clevis with hardened cross hole, $d1 = 10$ mm,
slot length $g = 20$ mm, with metric fine-pitch thread $d2 = M 10 \times 1.25$, electr. galvanised white;
Clevis with hardened cross hole G 10x20, M 10x1.25 galvanised white
Order number: 14 20 0010 0020/013

| Size | Order number | d1 H9 | g ±0.5 | a1 ²⁾ h11 | a2 +0.5 -0.2 | b +0.7 +0.1 | d2 ¹⁾ | | d3 ±0.2 | f ±0.2 | l1 ±0.5 | l2 ±0.4 | l3 ±0.2 | Mass (kg) per piece |
|-----------|---------------------|----------|-----------|-------------------------|--------------------|-------------------|-------------------|----------------------|------------|-----------|------------|------------|------------|---------------------------|
| | | | | | | | Regular thread | Fine-pitch thread | | | | | | |
| G 4x8 | 10 20 0004 0008/... | 4 | 8 | 8 | 4 | M 4x0.7 | | 8 | 0.5 | 21 | 16 | 6 | 0.005 | |
| G 5x10 | 10 20 0005 0010/... | 5 | 10 | 10 | 5 | M 5x0.8 | | 9 | 0.5 | 26 | 20 | 7.5 | 0.009 | |
| G 6x12 | 10 20 0006 0012/... | 6 | 12 | 12 | 6 | M 6x1 | | 10 | 0.5 | 31 | 24 | 9 | 0.015 | |
| G 8x16 | 10 20 0008 0016/... | 8 | 16 | 16 | 8 | M 8x1.25 | | 14 | 0.5 | 42 | 32 | 12 | 0.037 | |
| G 8x16FG | 12 20 0008 0016/... | 8 | 16 | 16 | 8 | | M 8x1 | 14 | 0.5 | 42 | 32 | 12 | 0.037 | |
| G 10x20 | 10 20 0010 0020/... | 10 | 20 | 20 | 10 | M 10x1.5 | | 18 | 0.5 | 52 | 40 | 15 | 0.074 | |
| G 10x20FG | 14 20 0010 0020/... | 10 | 20 | 20 | 10 | | M 10x1.25 | 18 | 0.5 | 52 | 40 | 15 | 0.074 | |
| G 12x24 | 10 20 0012 0024/... | 12 | 24 | 24 | 12 | M 12x1.75 | | 20 | 0.5 | 62 | 48 | 18 | 0.121 | |
| G 12x24FG | 14 20 0012 0024/... | 12 | 24 | 24 | 12 | | M 12x1.25 | 20 | 0.5 | 62 | 48 | 18 | 0.121 | |
| G 14x28 | 10 20 0014 0028/... | 14 | 28 | 27 | 14 | M 14x2 | | 24 | 1 | 72 | 56 | 22.5 | 0.178 | |
| G 14x28FG | 16 20 0014 0028/... | 14 | 28 | 27 | 14 | | M 14x1.5 | 24 | 1 | 72 | 56 | 22.5 | 0.178 | |
| G 16x32 | 10 20 0016 0032/... | 16 | 32 | 32 | 16 | M 16x2 | | 26 | 1 | 83 | 64 | 24 | 0.282 | |
| G 16x32FG | 16 20 0016 0032/... | 16 | 32 | 32 | 16 | | M 16x1.5 | 26 | 1 | 83 | 64 | 24 | 0.282 | |
| G 20x40 | 10 20 0020 0040/... | 20 | 40 | 40 | 20 | M 20x2.5 | | 34 | 1 | 105 | 80 | 30 | 0.550 | |
| G 20x40FG | 16 20 0020 0040/... | 20 | 40 | 40 | 20 | | M 20x1.5 | 34 | 1 | 105 | 80 | 30 | 0.550 | |

1) code for thread:
regular thread no code
regular thread, left-handed LH
fine-pitch thread FG
fine-pitch thread, left-handed FGLH

2) for semifinished products, tolerance h11 according to DIN 178

Material:

1.0718 (11SMnPb30+C)
hardness 60 ± 2 HRC
hardening depth: min. 0.3 mm

Surface protection:

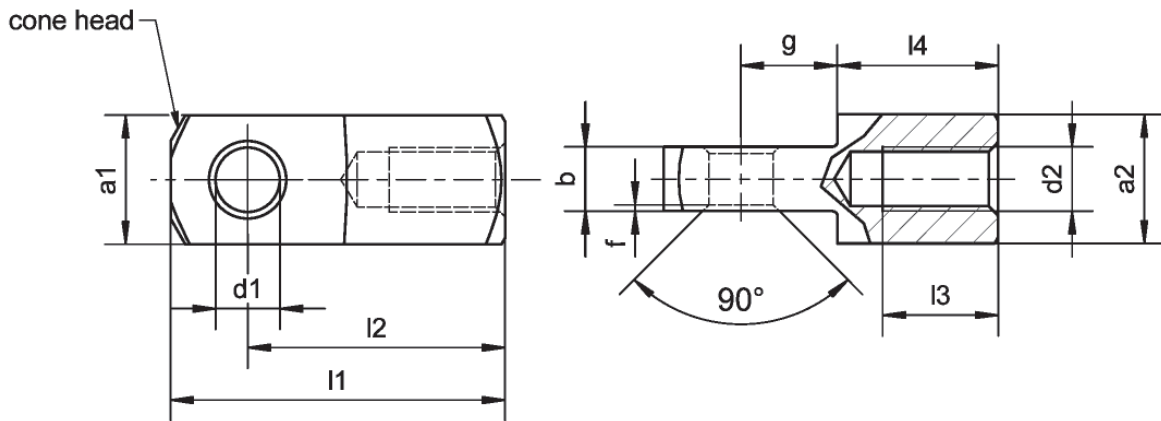
| Identifier | Supplement to order number |
|---|----------------------------|
| bright | .../003 |
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 5 μm) | .../013 |
| electr. galvanised yellow (layer min. 5 μm) | .../023 |

Retaining:

with folding spring bolts hardened (mbo catalogue section 2/page 21-22) and with bolts hardened (mbo catalogue section 4/page 25-28) and retainers (mbo catalogue section 13/page 53-57), or washers and cotter pins; also see clevis joint combinations (mbo catalogue section 11/page 40-47)

Special versions upon request

09_01
12/2012



Example for ordering: Mating piece for clevises with female thread, metric regular thread d2 = M 10x1.5 suitable for clevis G 10x20 DIN 71752, electroplated galvanised white;
 Mating piece for clevises size 10, M 10x1.5 galvanised white
 Order number: 10 23 0010 0015/013

| Size | Order number | d1 H9 | g ±0.5 | a1 ²⁾ h11 | a2 ²⁾ h11 | b -0.2 | d2 ¹⁾ | | f ±0.2 | l1 ±0.5 | l2 ±0.3 | l3 | l4 ±0.2 | Mass (kg) per piece |
|------|---------------------|----------|-----------|-------------------------|-------------------------|-----------|-------------------|----------------------|-----------|------------|------------|------|------------|---------------------------|
| | | | | | | | Regular thread | Fine-pitch thread | | | | | | |
| 4 | 10 23 0004 0006/... | 4 | 6 | 8 | 4 | M 4x0.7 | | 0.5 | 21 | 16 | 6 | 10 | 0.006 | |
| 5 | 10 23 0005 0075/... | 5 | 7.5 | 10 | 5 | M 5x0.8 | | 0.5 | 26 | 20 | 8 | 12.5 | 0.012 | |
| 6 | 10 23 0006 0009/... | 6 | 9 | 12 | 6 | M 6x1 | | 0.5 | 31 | 24 | 11 | 15 | 0.021 | |
| 8 | 10 23 0008 0012/... | 8 | 12 | 16 | 8 | M 8x1.25 | | 0.5 | 42 | 32 | 14 | 20 | 0.051 | |
| 8 | 12 23 0008 0012/... | 8 | 12 | 16 | 8 | | M 8x1 | 0.5 | 42 | 32 | 14 | 20 | 0.051 | |
| 10 | 10 23 0010 0015/... | 10 | 15 | 20 | 10 | M 10x1.5 | | 0.5 | 52 | 40 | 18 | 25 | 0.098 | |
| 10 | 14 23 0010 0015/... | 10 | 15 | 20 | 10 | | M 10x1.25 | 0.5 | 52 | 40 | 18 | 25 | 0.098 | |
| 12 | 10 23 0012 0018/... | 12 | 18 | 24 | 12 | M 12x1.75 | | 0.5 | 62 | 48 | 22 | 30 | 0.168 | |
| 12 | 14 23 0012 0018/... | 12 | 18 | 24 | 12 | | M 12x1.25 | 0.5 | 62 | 48 | 22 | 30 | 0.167 | |
| 14 | 10 23 0014 0021/... | 14 | 21 | 27 | 14 | M 14x2 | | 1 | 72 | 56 | 25 | 35 | 0.247 | |
| 14 | 16 23 0014 0021/... | 14 | 21 | 27 | 14 | | M 14x1.5 | 1 | 72 | 56 | 25 | 35 | 0.245 | |
| 16 | 10 23 0016 0024/... | 16 | 24 | 32 | 16 | M 16x2 | | 1 | 83 | 64 | 30 | 40 | 0.397 | |
| 16 | 16 23 0016 0024/... | 16 | 24 | 32 | 16 | | M 16x1.5 | 1 | 83 | 64 | 30 | 40 | 0.395 | |
| 20 | 10 23 0020 0030/... | 20 | 30 | 40 | 20 | M 20x2.5 | | 1 | 105 | 80 | 38 | 50 | 0.783 | |
| 20 | 16 23 0020 0030/... | 20 | 30 | 40 | 20 | | M 20x1.5 | 1 | 105 | 80 | 38 | 50 | 0.776 | |

1) code for thread:
 regular thread no code
 regular thread, left-handed LH
 fine-pitch thread FG
 fine-pitch thread, left-handed FGLH

2) for semifinished products, tolerance h11 according to DIN 178

Material:

1.0718 (11SMnPb30+C)
 alternative: stainless steel 1.4305 (X8CrNiS18-9)
 (supplement to order number .../000)



Surface protection:

| Identifier | Supplement to order number |
|---|----------------------------|
| bright | .../003 |
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 5 µm) | .../013 |
| electr. galvanised yellow (layer min. 5 µm) | .../023 |

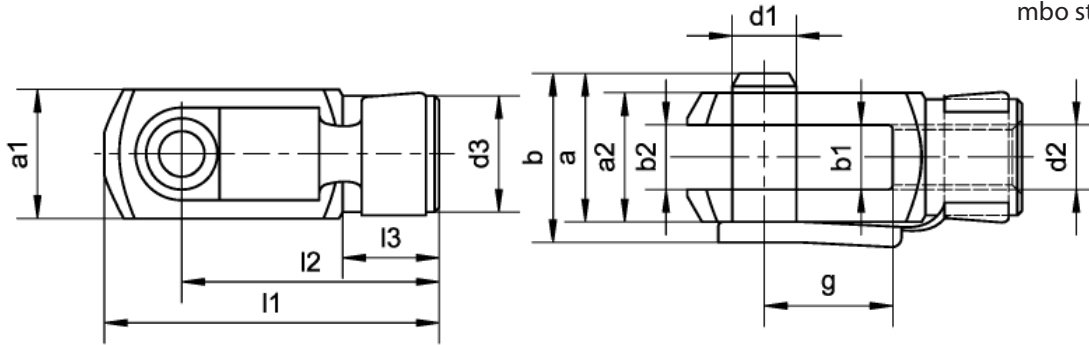
Joint combinations:

also see clevis joint combinations
 (mbo catalogue section 11/page 40-47)

Special versions upon request

10_01
 12/2012





Clevis joint mbo standard AFBK assembled, consisting of:

- Clevis mbo standard 02 (see mbo catalogue page 03_01/page 23 and 03_02/page 24)
- Folding spring bolt mbo standard 01 (see mbo catalogue page 02_01/page 21)

| Identifier | Order number | d1 | g | a | a1 | a2 ²⁾ | b | b1 B13 | b2 | d2 ¹⁾ | | l1 | l2 | l3 | Mass (kg) per piece | |
|--------------|---------------------|-----|------|-----|--------------|--------------------|----|-----------|-----------------|-------------------|----------------------|-----------|-------|-------|---------------------------|-------|
| | | h11 | ±0.5 | h11 | +0.5 -0.2 | Perm. variation | | | | Regular thread | Fine-pitch thread | | | | | ±0.5 |
| AFBK 4x8 | 10 02 0004 8001/... | 4 | 8 | 9.5 | 8 | 11.1 | 4 | B 13 | + 0.7 + 0.15 | | M 4x0.7 | 21 | 16 | ±0.3 | 6 | 0.006 |
| AFBK 5x10 | 10 02 0005 8001/... | 5 | 10 | 12 | 10 | 13.7 | 5 | | | | M 5x0.8 | 26 | 20 | | 7.5 | 0.012 |
| AFBK 5x20 | 10 02 0005 8002/... | 5 | 20 | 12 | 10 | 13.8 | 5 | | | | M 5x0.8 | 36 | 30 | | 7.5 | 0.016 |
| AFBK 6x12 | 10 02 0006 8001/... | 6 | 12 | 14 | 12 | 16.2 | 6 | | | | M 6x1 | 31 | 24 | 9 | 0.020 | |
| AFBK 6x24 | 10 02 0006 8002/... | 6 | 24 | 14 | 12 | 16.3 | 6 | | | | M 6x1 | 43 | 36 | 9 | 0.026 | |
| AFBK 8x16 | 10 02 0008 8001/... | 8 | 16 | 19 | 16 | 21.6 | 8 | | | | M 8x1.25 | 42 | 32 | 12 | 0.048 | |
| AFBK 8x16FG | 12 02 0008 8001/... | 8 | 16 | 19 | 16 | 21.6 | 8 | | | | | M 8x1 | 42 | 32 | 12 | 0.048 |
| AFBK 8x32 | 10 02 0008 8002/... | 8 | 32 | 19 | 16 | 21.6 | 8 | | | | M 8x1.25 | 58 | 48 | 12 | 0.066 | |
| AFBK 8x32FG | 12 02 0008 8002/... | 8 | 32 | 19 | 16 | 21.6 | 8 | | | | | M 8x1 | 58 | 48 | 12 | 0.066 |
| AFBK 10x20 | 10 02 0010 8001/... | 10 | 20 | 23 | 20 | 26 | 10 | | | | M 10x1.5 | 52 | 40 | 15 | 0.093 | |
| AFBK 10x20FG | 14 02 0010 8001/... | 10 | 20 | 23 | 20 | 26 | 10 | | | | | M 10x1.25 | 52 | 40 | 15 | 0.093 |
| AFBK 10x40 | 10 02 0010 8002/... | 10 | 40 | 23 | 20 | 26.3 | 10 | | | | M 10x1.5 | 72 | 60 | 15 | 0.136 | |
| AFBK 10x40FG | 14 02 0010 8002/... | 10 | 40 | 23 | 20 | 26.3 | 10 | | | | | M 10x1.25 | 72 | 60 | 15 | 0.136 |
| AFBK 12x24 | 10 02 0012 8001/... | 12 | 24 | 28 | 24 | 31.1 | 12 | | | | M 12x1.75 | 62 | 48 | 18 | 0.154 | |
| AFBK 12x24FG | 14 02 0012 8001/... | 12 | 24 | 28 | 24 | 31.1 | 12 | | | | | M 12x1.25 | 62 | 48 | 18 | 0.154 |
| AFBK 12x48 | 10 02 0012 8002/... | 12 | 48 | 28 | 24 | 31.2 | 12 | | | | M 12x1.75 | 86 | 72 | ±0.4 | 18 | 0.210 |
| AFBK 12x48FG | 14 02 0012 8002/... | 12 | 48 | 28 | 24 | 31.2 | 12 | | | M 12x1.25 | 86 | 72 | 18 | 0.210 | | |
| AFBK 14x28 | 10 02 0014 8001/... | 14 | 28 | 31 | 27 | 34.1 | 14 | | M 14x2 | 72 | 56 | 22.5 | 0.225 | | | |
| AFBK 14x28FG | 16 02 0014 8001/... | 14 | 28 | 31 | 27 | 34.1 | 14 | | | M 14x1.5 | 72 | 56 | 22.5 | 0.225 | | |
| AFBK 14x56 | 10 02 0014 8002/... | 14 | 56 | 31 | 27 | 34 | 14 | | M 14x2 | 101 | 85 | 22.5 | 0.309 | | | |
| AFBK 14x56FG | 16 02 0014 8002/... | 14 | 56 | 31 | 27 | 34 | 14 | | | M 14x1.5 | 101 | 85 | 22.5 | 0.309 | | |
| AFBK 16x32 | 10 02 0016 8001/... | 16 | 32 | 36 | 32 | 39.5 | 16 | | M 16x2 | 83 | 64 | 24 | 0.351 | | | |
| AFBK 16x32FG | 16 02 0016 8001/... | 16 | 32 | 36 | 32 | 39.5 | 16 | | | M 16x1.5 | 83 | 64 | 24 | 0.351 | | |
| AFBK 16x64 | 10 02 0016 8002/... | 16 | 64 | 36 | 32 | 39.2 | 16 | | M 16x2 | 115 | 96 | 24 | 0.485 | | | |
| AFBK 16x64FG | 16 02 0016 8002/... | 16 | 64 | 36 | 32 | 39.2 | 16 | | | M 16x1.5 | 115 | 96 | 24 | 0.485 | | |
| AFBK 20x40 | 10 02 0020 8001/... | 20 | 40 | 45 | 40 | 50 | 20 | | M 20x2.5 | 105 | 80 | 30 | 0.680 | | | |
| AFBK 20x40FG | 16 02 0020 8001/... | 20 | 40 | 45 | 40 | 50 | 20 | | | M 20x1.5 | 105 | 80 | 30 | 0.680 | | |

1) code for thread:
 regular thread no code
 regular thread, left-handed LH
 fine-pitch thread FG
 fine-pitch thread, left-handed FGLH

2) for semifinished products, tolerance h11 according to DIN 178

Material clevis:

1.0718 (11SMnPb30+C)

Material folding spring bolt:

Bolt: 1.0718 (11SMnPb30+C),
 tensile strength approx. 550-700 N/mm²
 Spring: C60 bis Ck75 hardened and annealed to
 approx. 430-500 HV

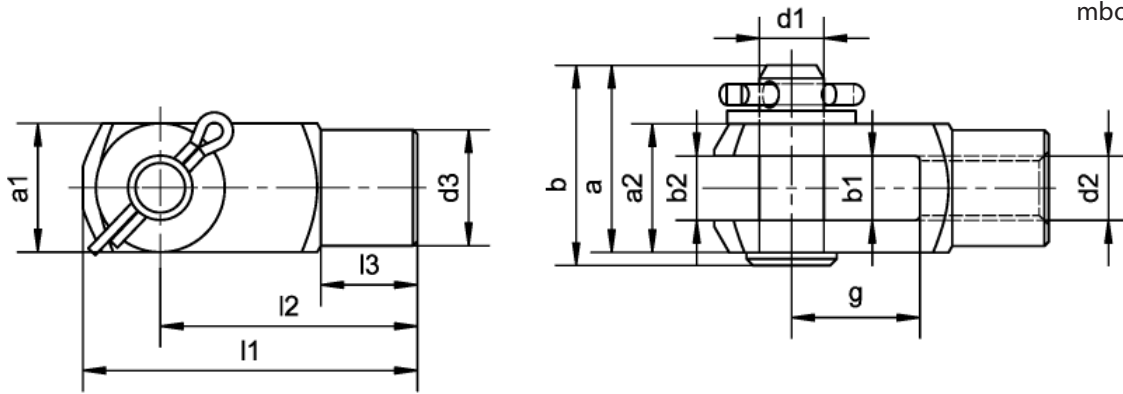
Surface protection:

| Identifier | Supplement to order number |
|---------------------------|-------------------------------|
| phosphatised oiled | .../002 |
| electr. galvanised white | .../013 |
| electr. galvanised yellow | .../023 |

Special versions upon request

11_01
08/2011





Clevis joint mbo standard A assembled, consisting of:

- Clevis mbo standard 02 (see mbo catalogue section 03/page 23-24 and 05/page 29-30)
- Bolt with pin hole mbo standard BNL/BGL (see mbo catalogue page 04_02/page 26, 06_02/page 32 and 06_03/page 33)
- Washer DIN 125 and cotter pin DIN 94

| Identifier | Order number | d1 h11 | g ±0.5 | a | a1 h11 | a2 ²⁾ +0.5 -0.2 | b | b1 B13 | b2 Perm. variation | d2 ¹⁾ | | d3 | l1 ±0.5 | l2 Perm. variation | l3 ±0.3 | Mass (kg) per piece | |
|------------|---------------------|-----------|-----------|----|-----------|----------------------------------|------|-----------|--------------------------|-------------------|----------------------|-----|------------|--------------------------|------------|---------------------------|-------|
| | | | | | | | | | | Regular thread | Fine-pitch thread | | | | | | |
| A 4x8* | 10 02 0004 6001/... | 4 | 8 | 12 | 8 | | 13 | 4 | B13 | M 4x0.7 | | 8 | 21 | 16 | ±0.3 | 6 | 0.007 |
| A 4x16 | 10 02 0004 6002/... | 4 | 16 | 12 | 8 | | 13 | 4 | | M 4x0.7 | | 8 | 29 | 24 | | 6 | 0.009 |
| A 5x10* | 10 02 0005 6001/... | 5 | 10 | 15 | 10 | | 16.5 | 5 | | M 5x0.8 | | 9 | 26 | 20 | 7.5 | 0.012 | |
| A 5x20 | 10 02 0005 6002/... | 5 | 20 | 15 | 10 | | 16.5 | 5 | | M 5x0.8 | | 9 | 36 | 30 | 7.5 | 0.016 | |
| A 6x12* | 10 02 0006 6001/... | 6 | 12 | 18 | 12 | | 19.5 | 6 | | M 6x1 | | 10 | 31 | 24 | 9 | 0.021 | |
| A 6x24 | 10 02 0006 6002/... | 6 | 24 | 18 | 12 | | 19.5 | 6 | | M 6x1 | | 10 | 43 | 36 | 9 | 0.027 | |
| A 8x16* | 10 02 0008 6001/... | 8 | 16 | 23 | 16 | | 25 | 8 | | M 8x1.25 | | 14 | 42 | 32 | 12 | 0.049 | |
| A 8x16FG | 12 02 0008 6001/... | 8 | 16 | 23 | 16 | | 25 | 8 | | | M 8x1 | 14 | 42 | 32 | 12 | 0.049 | |
| A 8x32 | 10 02 0008 6002/... | 8 | 32 | 23 | 16 | | 25 | 8 | | M 8x1.25 | | 14 | 58 | 48 | 12 | 0.066 | |
| A 8x32FG | 12 02 0008 6002/... | 8 | 32 | 23 | 16 | | 25 | 8 | | | M 8x1 | 14 | 58 | 48 | 12 | 0.066 | |
| A 10x20* | 10 02 0010 6001/... | 10 | 20 | 29 | 20 | | 31 | 10 | +0.7 +0.15 | M 10x1.5 | | 18 | 52 | 40 | ±0.4 | 15 | 0.098 |
| A 10x20FG* | 14 02 0010 6001/... | 10 | 20 | 29 | 20 | | 31 | 10 | | | M 10x1.25 | 18 | 52 | 40 | | 15 | 0.098 |
| A 10x40 | 10 02 0010 6002/... | 10 | 40 | 29 | 20 | | 31 | 10 | | M 10x1.5 | | 18 | 72 | 60 | 15 | 0.140 | |
| A 10x40FG | 14 02 0010 6002/... | 10 | 40 | 29 | 20 | | 31 | 10 | | | M 10x1.25 | 18 | 72 | 60 | 15 | 0.140 | |
| A 12x24* | 10 02 0012 6001/... | 12 | 24 | 35 | 24 | | 38 | 12 | | M 12x1.75 | | 20 | 62 | 48 | 18 | 0.164 | |
| A 12x24FG* | 14 02 0012 6001/... | 12 | 24 | 35 | 24 | | 38 | 12 | | | M 12x1.25 | 20 | 62 | 48 | 18 | 0.164 | |
| A 12x48 | 10 02 0012 6002/... | 12 | 48 | 35 | 24 | | 38 | 12 | | M 12x1.75 | | 20 | 86 | 72 | 18 | 0.218 | |
| A 12x48FG | 14 02 0012 6002/... | 12 | 48 | 35 | 24 | | 38 | 12 | | | M 12x1.25 | 20 | 86 | 72 | 18 | 0.218 | |
| A 14x28* | 10 02 0014 6001/... | 14 | 28 | 40 | 27 | | 43 | 14 | | M 14x2 | | 24 | 72 | 56 | 22.5 | 0.243 | |
| A 14x28FG* | 16 02 0014 6001/... | 14 | 28 | 40 | 27 | | 43 | 14 | | | M 14x1.5 | 24 | 72 | 56 | 22.5 | 0.243 | |
| A 14x56 | 10 02 0014 6002/... | 14 | 56 | 40 | 27 | | 43 | 14 | M 14x2 | | 24 | 101 | 85 | 22.5 | 0.323 | | |
| A 14x56FG | 16 02 0014 6002/... | 14 | 56 | 40 | 27 | | 43 | 14 | | M 14x1.5 | 24 | 101 | 85 | 22.5 | 0.323 | | |
| A 16x32* | 10 02 0016 6001/... | 16 | 32 | 45 | 32 | | 48.5 | 16 | M 16x2 | | 26 | 83 | 64 | 24 | 0.368 | | |
| A 16x32FG* | 16 02 0016 6001/... | 16 | 32 | 45 | 32 | | 48.5 | 16 | | M 16x1.5 | 26 | 83 | 64 | 24 | 0.368 | | |
| A 16x64 | 10 02 0016 6002/... | 16 | 64 | 45 | 32 | | 48.5 | 16 | M 16x2 | | 26 | 115 | 96 | 24 | 0.497 | | |
| A 16x64FG | 16 02 0016 6002/... | 16 | 64 | 45 | 32 | | 48.5 | 16 | | M 16x1.5 | 26 | 115 | 96 | 24 | 0.497 | | |
| A 20x40* | 10 02 0020 6001/... | 20 | 40 | 53 | 40 | | 57 | 20 | M 20x2.5 | | 34 | 105 | 80 | 30 | 0.713 | | |
| A 20x40FG* | 16 02 0020 6001/... | 20 | 40 | 53 | 40 | | 57 | 20 | | M 20x1.5 | 34 | 105 | 80 | 30 | 0.713 | | |

1) code for thread:
 regular thread no code
 regular thread, left-handed LH
 fine-pitch thread FG
 fine-pitch thread, left-handed FGLH

2) for semifinished products, tolerance h11 according to DIN 178
 3) Bolt: head version of manufacturer's choice
 * stainless steel 1.4404 (X2CrNiMo17-12-2) possible

Material:

1.0718 (11SMnPb30+C)
 alternative: stainless steel 1.4305 (X8CrNiS18-9)
 (supplement to order number .../000)
 * stainless steel 1.4404 (X2CrNiMo17-12-2)
 (supplement to order number .../4404)



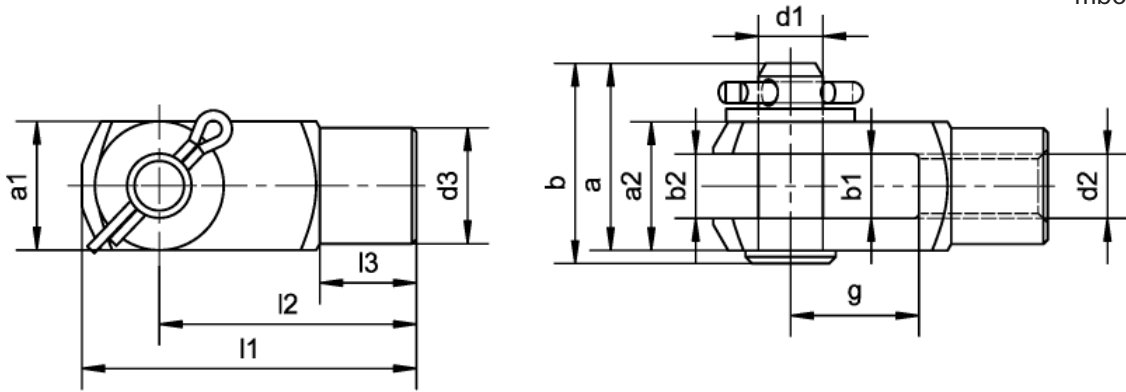
Surface protection:

| Identifier | Supplement to order number |
|---|----------------------------|
| bright | .../003 |
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 5 µm) | .../013 |
| electr. galvanised yellow (layer min. 5 µm) | .../023 |

Special versions upon request

11_02
12/2012





Clevis joint mbo standard A assembled, consisting of:

- Clevis mbo standard 02 (see mbo catalogue page 03_02/page 24 and 05_01/page 29)
- Bolt with pin hole mbo standard BNL/BGL (see mbo catalogue page 04_02/page 26 and 06_02/page 32)
- Washer DIN 125 and cotter pin DIN 94

| Identifier | Order number | d1 h11 | g ±0.5 | a | a1 h11 | a2 ²⁾ +0.5 -0.2 | b | b1 B13 | b2 Perm. variation | d2 ¹⁾ | | d3 | l1 ±0.5 | l2 Perm. variation | l3 ±0.3 | Mass (kg) per piece |
|--------------------------|---------------------|-----------|-----------|-----|-----------|----------------------------------|------|-----------|--------------------------|-------------------|----------------------|-----|------------|--------------------------|------------|---------------------------|
| | | | | | | | | | | Regular thread | Fine-pitch thread | | | | | |
| A 18x36 | 10 02 0018 6001/... | 18 | 36 | 50 | 36 | | 53.5 | 18 | +0.7 +0.15 | M 18x2.5 | | 30 | 94 | 72 | 27 | 0.516 |
| A 18x36FG | 16 02 0018 6001/... | 18 | 36 | 50 | 36 | | 53.5 | 18 | | M 18x1.5 | | 30 | 94 | 72 | 27 | 0.516 |
| A 20x40* ⁵⁾ | 10 02 0020 6001/... | 20 | 40 | 53 | 40 | | 57 | 20 | | M 20x2.5 | | 34 | 105 | 80 | 30 | 0.713 |
| A 20x40FG* ⁵⁾ | 16 02 0020 6001/... | 20 | 40 | 53 | 40 | | 57 | 20 | | M 20x1.5 | | 34 | 105 | 80 | 30 | 0.713 |
| A 20x80* | 10 02 0020 6002/... | 20 | 80 | 53 | 40 | | 57 | 20 | | M 20x2.5 | | 34 | 145 | 120 | 30 | 0.963 |
| A 20x80FG* | 16 02 0020 6002/... | 20 | 80 | 53 | 40 | | 57 | 20 | | M 20x1.5 | | 34 | 145 | 120 | 30 | 0.963 |
| A 25x50* | 10 02 0025 6001/... | 25 | 50 | 67 | 50 | | 72.5 | 25 | | M 24x3 | | 42 | 132 | 100 | 36 | 1.411 |
| A 25x50FG* | 18 02 0025 6001/... | 25 | 50 | 67 | 50 | | 72.5 | 25 | | M 24x2 | | 42 | 132 | 100 | 36 | 1.411 |
| A 28x56 | 10 02 0027 6001/... | 28 | 56 | 72 | 55 | | 77.5 | 28 | | M 27x3 | | 48 | 148 | 112 | 40 | 1.915 |
| A 28x56FG | 18 02 0027 6001/... | 28 | 56 | 72 | 55 | | 77.5 | 28 | | M 27x2 | | 48 | 148 | 112 | 40 | 1.915 |
| A 30x54FG* ⁴⁾ | 18 02 3054 6001/... | 30 | 54 | 67 | 55 | | 72.5 | 30 | | M 27x2 | | 48 | 148 | 110 | 40 | 1.836 |
| A 30x60 | 10 02 0030 6001/... | 30 | 60 | 77 | 60 | | 82.5 | 30 | | M 30x3.5 | | 52 | 160 | 120 | 42 | 2.465 |
| A 30x60FG | 18 02 0030 6001/... | 30 | 60 | 77 | 60 | | 82.5 | 30 | | M 30x2 | | 52 | 160 | 120 | 42 | 2.465 |
| A 35x54FG* ⁴⁾ | 18 02 3554 6001/... | 35 | 54 | 87 | 70 | | 94 | 35 | | M 36x2 | | 60 | 188 | 144 | 54 | 3.620 |
| A 35x72* ⁴⁾ | 10 02 0035 6001/... | 35 | 72 | 87 | 70 | | 94 | 35 | | M 36x4 | | 60 | 188 | 144 | 54 | 3.632 |
| A 35x72FG* ⁴⁾ | 18 02 0035 6001/... | 35 | 72 | 87 | 70 | | 94 | 35 | | M 36x2 | | 60 | 188 | 144 | 54 | 3.632 |
| A 36x72* ⁴⁾ | 10 02 0036 6001/... | 35 | 72 | 87 | 70 | | 94 | 36 | | M 36x4 | | 60 | 188 | 144 | 54 | 3.632 |
| A 36x72FG* ⁴⁾ | 18 02 0036 6001/... | 35 | 72 | 87 | 70 | | 94 | 36 | | M 36x2 | | 60 | 188 | 144 | 54 | 3.632 |
| A 40x84* ⁴⁾ | 10 02 0040 6001/... | 40 | 84 | 100 | 85 | | 106 | 40 | | M 42x4.5 | | 70 | 232 | 168 | 63.5 | 6.700 |
| A 40x84FG* ⁴⁾ | 18 02 0040 6001/... | 40 | 84 | 100 | 85 | | 106 | 40 | | M 42x2 | | 70 | 232 | 168 | 63.5 | 6.700 |
| A 42x84* ⁴⁾ | 10 02 0042 6001/... | 42 | 84 | 100 | 85 | | 107 | 42 | M 42x4.5 | | 70 | 232 | 168 | 63.5 | 6.516 | |
| A 42x84FG* ⁴⁾ | 18 02 0042 6001/... | 42 | 84 | 100 | 85 | | 107 | 42 | M 42x2 | | 70 | 232 | 168 | 63.5 | 6.516 | |
| A 50x96* ⁴⁾ | 10 02 0050 6001/... | 50 | 96 | 115 | 96 | | 122 | 50 | M 48x5 | | 82 | 265 | 192 | 73 | 9.756 | |
| A 50x96FG* ⁴⁾ | 18 02 0050 6001/... | 50 | 96 | 115 | 96 | | 122 | 50 | M 48x2 | | 82 | 265 | 192 | 73 | 9.746 | |

- 1) code for thread:
 regular thread no code
 regular thread, left-handed LH
 fine-pitch thread FG
 fine-pitch thread, left-handed FGLH

- 2) for semifinished products, tolerance h11 or h12 according to DIN 178
 3) Bolt: head version of manufacturer's choice
 4) without washers DIN 125
 * stainless steel 1.4305 (X8CrNiS18-9) possible
 5) stainless steel 1.4404 (X2CrNiMo17-12-2) possible

Material:

1.0718 (11SMnPb30+C)
 alternative: *stainless steel 1.4305 (X8CrNiS18-9)
 (supplement to order number .../000)
⁵⁾stainless steel 1.4404 (X2CrNiMo17-12-2)
 (supplement to order number .../4404)



Surface protection:

| Identifier | Supplement to order number |
|---|----------------------------|
| bright | .../003 |
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 5 µm) | .../013 |
| electr. galvanised yellow (layer min. 5 µm) | .../023 |

Special versions upon request

mbo Osswald GmbH & Co KG

Metal processing · Linking technology

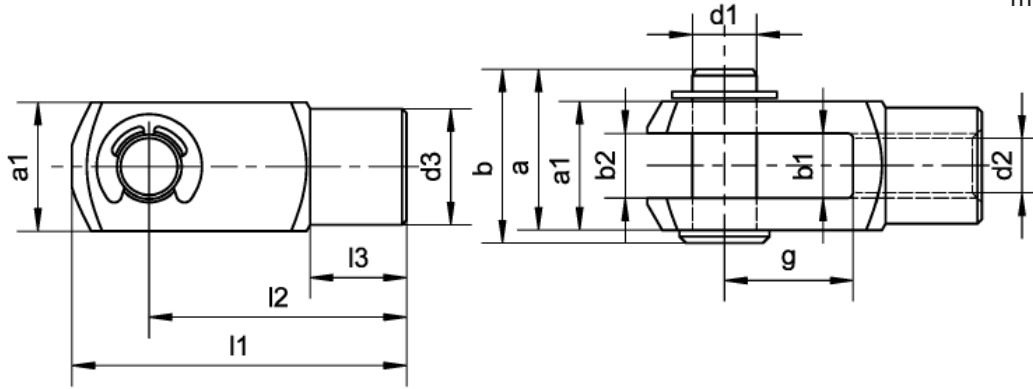
www.mbo-osswald.com · info@mbo-osswald.de
 Tel: + 49 (0) 9345-670-0 · Fax: + 49 (0) 9345-6255



General tolerances
 DIN ISO 2768-medium

Subject to technical alterations

We accept no responsibility for incorrect or incomplete details or information given



Clevis joint mbo standard ABS assembled, consisting of:

- Clevis mbo standard 02 (see mbo catalogue section 03/page 23-24 and 05/page 29-30)
- Bolt with groove mbo standard BEG/BEN (see mbo catalogue page 04_01/page 25 and 06_01/page 31)
- Locking washer DIN 6799 (see mbo catalogue page 13_03/page 55)

| Identifier | Order number | d1 h11 | g ±0.5 | a | a1 h11 | a2 ²⁾ +0.5 -0.2 | b | b1 B13 | b2 Perm. variation | d2 ¹⁾ | | d3 | l1 ±0.5 | l2 Perm. variation | l3 ±0.3 | Mass (kg) per piece | |
|-------------|---------------------|-----------|-----------|------|-----------|----------------------------------|------|-----------|--------------------------|-------------------|----------------------|-----|------------|--------------------------|------------|---------------------------|-------|
| | | | | | | | | | | Regular thread | Fine-pitch thread | | | | | | |
| ABS 4x8 | 10 02 0004 3001/... | 4 | 8 | 10.5 | 8 | | 11.5 | 4 | B13 | M 4x0.7 | | 8 | 21 | 16 | ±0.3 | 6 | 0.006 |
| ABS 4x16 | 10 02 0004 3002/... | 4 | 16 | 10.5 | 8 | | 11.5 | 4 | | M 4x0.7 | | 8 | 29 | 24 | | 6 | 0.008 |
| ABS 5x10 | 10 02 0005 3001/... | 5 | 10 | 13 | 10 | | 14.5 | 5 | | M 5x0.8 | | 9 | 26 | 20 | 7.5 | 0.012 | |
| ABS 5x20 | 10 02 0005 3002/... | 5 | 20 | 13 | 10 | | 14.5 | 5 | | M 5x0.8 | | 9 | 36 | 30 | 7.5 | 0.016 | |
| ABS 6x12 | 10 02 0006 3001/... | 6 | 12 | 15.5 | 12 | | 17 | 6 | | M 6x1 | | 10 | 31 | 24 | 9 | 0.019 | |
| ABS 6x24 | 10 02 0006 3002/... | 6 | 24 | 15.5 | 12 | | 17 | 6 | | M 6x1 | | 10 | 43 | 36 | 9 | 0.025 | |
| ABS 8x16 | 10 02 0008 3001/... | 8 | 16 | 20 | 16 | | 22 | 8 | | M 8x1.25 | | 14 | 42 | 32 | 12 | 0.046 | |
| ABS 8x16FG | 12 02 0008 3001/... | 8 | 16 | 20 | 16 | | 22 | 8 | | M 8x1.25 | M 8x1 | 14 | 42 | 32 | 12 | 0.046 | |
| ABS 8x32 | 10 02 0008 3002/... | 8 | 32 | 20 | 16 | | 22 | 8 | | M 8x1.25 | | 14 | 58 | 48 | 12 | 0.063 | |
| ABS 8x32FG | 12 02 0008 3002/... | 8 | 32 | 20 | 16 | | 22 | 8 | | M 8x1.25 | M 8x1 | 14 | 58 | 48 | 12 | 0.063 | |
| ABS 10x20 | 10 02 0010 3001/... | 10 | 20 | 25 | 20 | | 27 | 10 | | M 10x1.5 | | 18 | 52 | 40 | 15 | 0.092 | |
| ABS 10x20FG | 14 02 0010 3001/... | 10 | 20 | 25 | 20 | | 27 | 10 | | M 10x1.5 | M 10x1.25 | 18 | 52 | 40 | 15 | 0.092 | |
| ABS 10x40 | 10 02 0010 3002/... | 10 | 40 | 25 | 20 | | 27 | 10 | | M 10x1.5 | | 18 | 72 | 60 | 15 | 0.134 | |
| ABS 10x40FG | 14 02 0010 3002/... | 10 | 40 | 25 | 20 | | 27 | 10 | | M 10x1.5 | M 10x1.25 | 18 | 72 | 60 | 15 | 0.134 | |
| ABS 12x24 | 10 02 0012 3001/... | 12 | 24 | 30 | 24 | | 33 | 12 | | M 12x1.75 | | 20 | 62 | 48 | 18 | 0.152 | |
| ABS 12x24FG | 14 02 0012 3001/... | 12 | 24 | 30 | 24 | | 33 | 12 | | M 12x1.75 | M 12x1.25 | 20 | 62 | 48 | 18 | 0.152 | |
| ABS 12x48 | 10 02 0012 3002/... | 12 | 48 | 30 | 24 | | 33 | 12 | M 12x1.75 | | 20 | 86 | 72 | 18 | 0.206 | | |
| ABS 12x48FG | 14 02 0012 3002/... | 12 | 48 | 30 | 24 | | 33 | 12 | M 12x1.75 | M 12x1.25 | 20 | 86 | 72 | 18 | 0.206 | | |
| ABS 14x28 | 10 02 0014 3001/... | 14 | 28 | 33 | 27 | | 35.5 | 14 | M 14x2 | | 24 | 72 | 56 | ±0.4 | 22.5 | 0.220 | |
| ABS 14x28FG | 16 02 0014 3001/... | 14 | 28 | 33 | 27 | | 35.5 | 14 | M 14x2 | M 14x1.5 | 24 | 72 | 56 | | 22.5 | 0.220 | |
| ABS 14x56 | 10 02 0014 3002/... | 14 | 56 | 33 | 27 | | 35.5 | 14 | M 14x2 | | 24 | 101 | 85 | 22.5 | 0.300 | | |
| ABS 14x56FG | 16 02 0014 3002/... | 14 | 56 | 33 | 27 | | 35.5 | 14 | M 14x2 | M 14x1.5 | 24 | 101 | 85 | 22.5 | 0.300 | | |
| ABS 16x32 | 10 02 0016 3001/... | 16 | 32 | 38.5 | 32 | | 42 | 16 | +0.15 | M 16x2 | | 26 | 83 | 64 | 24 | 0.346 | |
| ABS 16x32FG | 16 02 0016 3001/... | 16 | 32 | 38.5 | 32 | | 42 | 16 | | M 16x2 | M 16x1.5 | 26 | 83 | 64 | 24 | 0.346 | |
| ABS 16x64 | 10 02 0016 3002/... | 16 | 64 | 38.5 | 32 | | 42 | 16 | | M 16x2 | | 26 | 115 | 96 | 24 | 0.475 | |
| ABS 16x64FG | 16 02 0016 3002/... | 16 | 64 | 38.5 | 32 | | 42 | 16 | | M 16x2 | M 16x1.5 | 26 | 115 | 96 | 24 | 0.475 | |
| ABS 20x40 | 10 02 0020 3001/... | 20 | 40 | 46 | 40 | | 50 | 20 | | M 20x2.5 | | 34 | 105 | 80 | 30 | 0.677 | |
| ABS 20x40FG | 16 02 0020 3001/... | 20 | 40 | 46 | 40 | | 50 | 20 | | M 20x2.5 | M 20x1.5 | 34 | 105 | 80 | 30 | 0.677 | |
| ABS 20x80 | 10 02 0020 3002/... | 20 | 80 | 46 | 40 | | 50 | 20 | | M 20x2.5 | | 34 | 145 | 120 | 30 | 0.927 | |
| ABS 20x80FG | 16 02 0020 3002/... | 20 | 80 | 46 | 40 | | 50 | 20 | | M 20x2.5 | M 20x1.5 | 34 | 145 | 120 | 30 | 0.927 | |
| ABS 25x50 | 10 02 0025 3001/... | 25 | 50 | 57 | 50 | | 62.5 | 25 | M 24x3 | | 42 | 132 | 100 | 36 | 1.337 | | |
| ABS 25x50FG | 18 02 0025 3001/... | 25 | 50 | 57 | 50 | | 62.5 | 25 | M 24x3 | M 24x2 | 42 | 132 | 100 | 36 | 1.337 | | |

1) code for thread:
 regular thread no code
 regular thread, left-handed LH
 fine-pitch thread FG
 fine-pitch thread, left-handed FGLH

2) for semifinished products, tolerance h11 according to DIN 178
 3) Bolt: head version of manufacturer's choice

Material:

1.0718 (11SMnPb30+C)
 alternative: stainless steel 1.4305 (X8CrNiS18-9) possible
 (supplement to order number .../000)



Surface protection:

| Identifier | Supplement to order number |
|---|----------------------------|
| bright | .../003 |
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 5 µm) | .../013 |
| electr. galvanised yellow (layer min. 5 µm) | .../023 |

Special versions upon request

11_04
12/2012





**mbo standard
ASL - AKL**

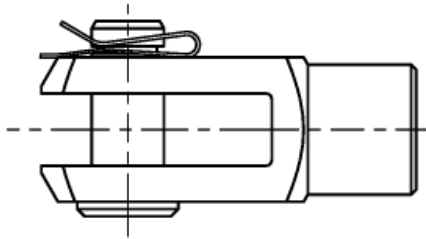
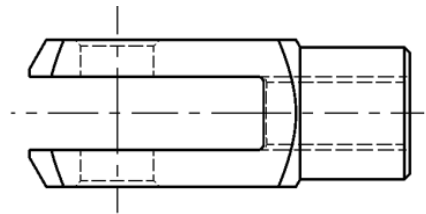


Illustration: ASL-clevis joint combination

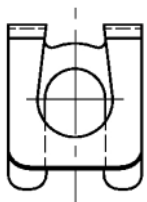
consisting of:

Clevis (G)
mbo standard 02
(see mbo catalogue page
03_01/page 23 and 03_02/page 24)



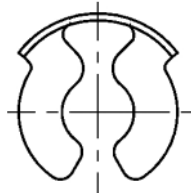
ASL

SL-retainer
mbo standard 08
(see mbo catalogue page
13_01/page 53)

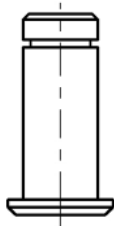


AKL

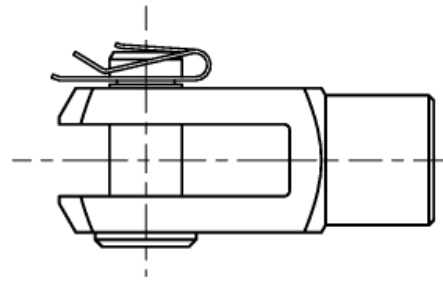
KL-retainer
mbo standard 09
(see mbo catalogue page
13_02/page 54)



Bolt with groove (BEG)
mbo standard 77
(see mbo catalogue page 04_01/page 25)

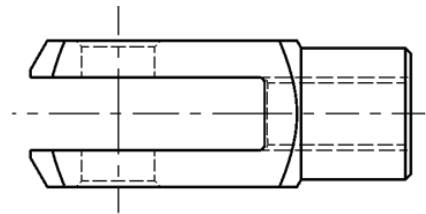


**mbo standard
AB**



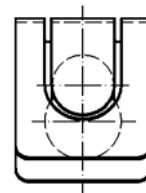
consisting of:

Clevis (G)
mbo standard 02
(see mbo catalogue page
03_01/page 23)



AB

Bayonet clip
mbo standard 06
(see mbo catalogue page
13_04/page 56)



Bolt with groove (BEG)
mbo standard 77
(see mbo catalogue page 04_01/page 25)



**You will find all parts depicted on this page in different sizes in this catalogue
Additional variations are possible**

11_05
08/2011



**mbo standard
ABS 471**

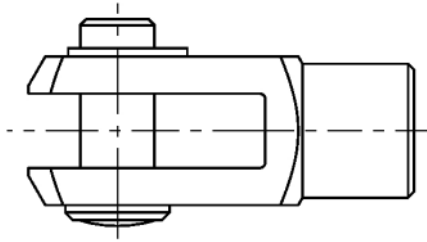
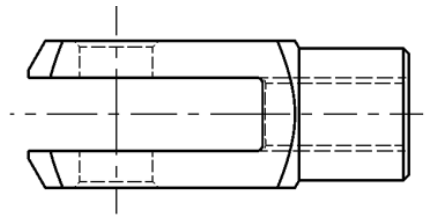
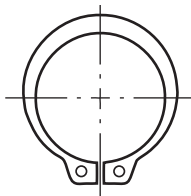


Illustration: ABS-471-clevis joint combination

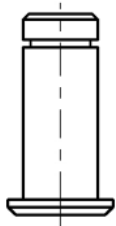
consisting of:
Clevis (G)
mbo standard 02
(see mbo catalogue page
03_01/page 23, 03_02/page 24
and 05_01/page 29)



ABS 471
Retaining ring
DIN 471
(see mbo catalogue page
13_05/page 57)



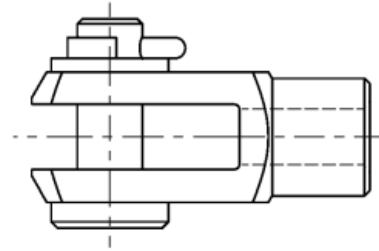
Bolt with groove (BEG)
(see mbo catalogue page
04_03/page 27 and
06_04/page 34)



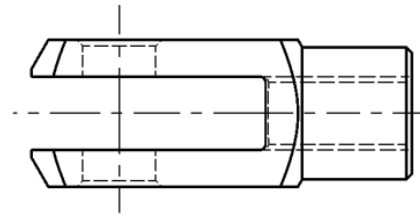
Bolt with groove (BE)
(see mbo catalogue page
04_04/page 28 and
06_05/page 35)



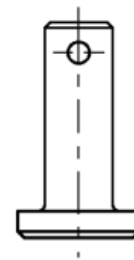
**mbo standard
AF**



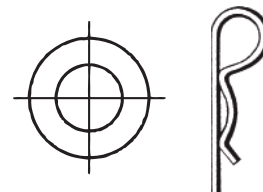
consisting of:
Clevis (G)
mbo standard 02
(see mbo catalogue page
03_01/page 23, 03_02/page 24
and 05_01/page 29)



AF
Bolts with pin hole
mbo standard BNL/BGL
(see mbo catalogue page
04_02/page 26 and 06_02/page 32)



Washer DIN 125
Spring cotter DIN 11024

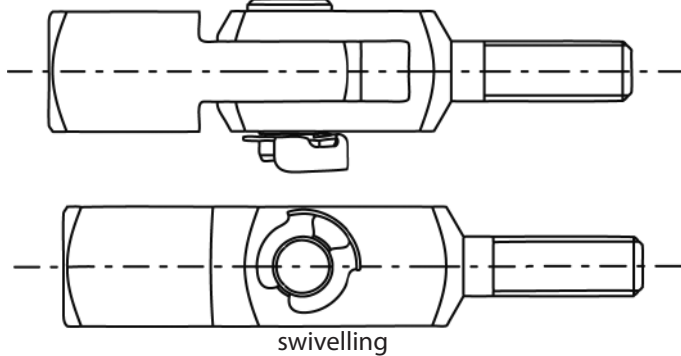


**You will find all parts depicted on this page in different sizes in this catalogue
Additional variations are possible**

11_06
08/2011



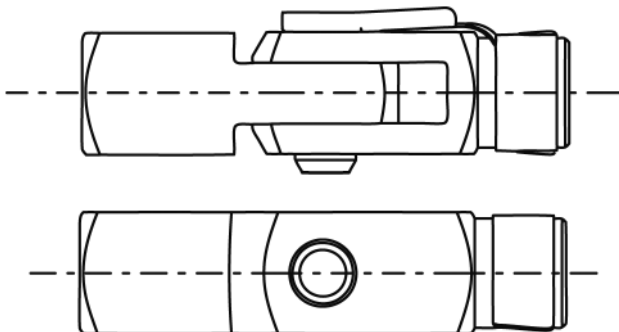
Knee joint with female and male thread



swivelling
consisting of:

AKL-clevis joint combination with male thread similar to mbo standard AKL (see mbo catalogue page 11_05/page 44 and mbo catalogue section 7/page 36) and Mating piece for clevises with female thread mbo standard 23 (see mbo catalogue section 10/page 39)

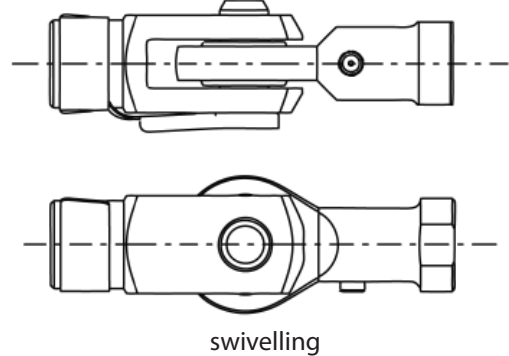
Knee joint with female thread



swivelling
consisting of:

AFKB-clevis joint combination with female thread mbo standard AFKB (see mbo catalogue page 11_01/page 40) and Mating piece for clevises with female thread mbo standard 23 (see mbo catalogue section 10/page 39)

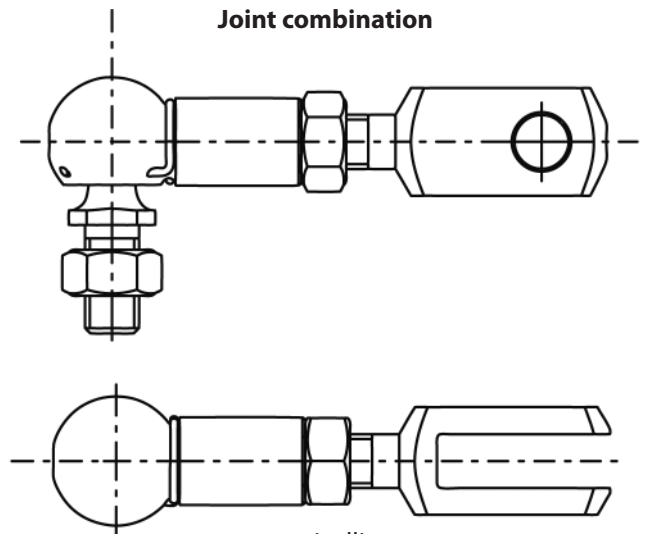
Knee joint with female thread



swivelling
consisting of:

AFKB-clevis joint combination with female thread mbo standard AFKB (see mbo catalogue page 11_01/page 40) and Rod end E series with female thread mbo standard 82 (see mbo catalogue page 17_31/page 106)

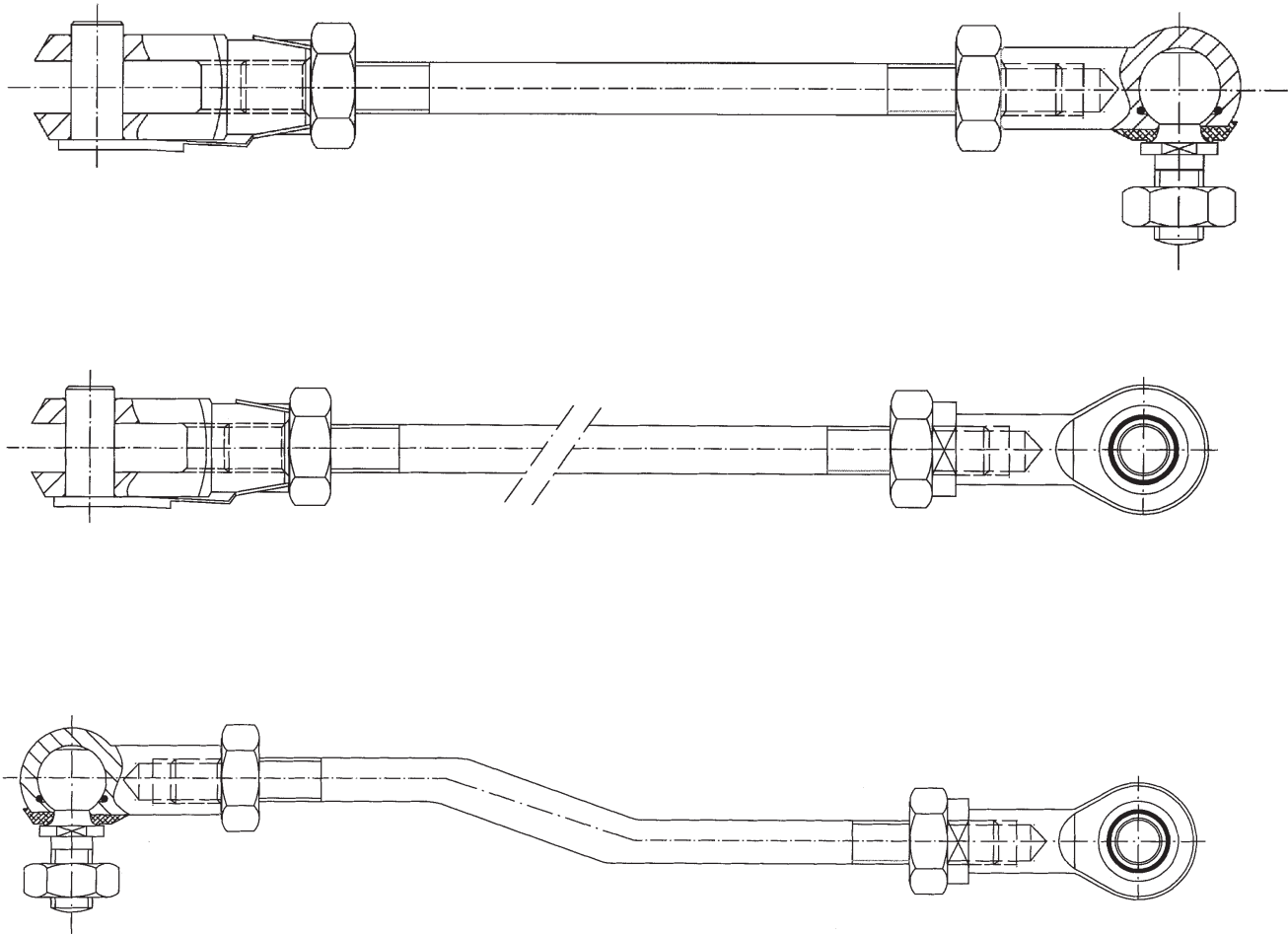
Joint combination



swivelling
consisting of:

Clevis with male thread mbo standard 42 (see mbo catalogue section 7/page 36) and Angle joint DIN 71802 mbo standard 03 (see mbo catalogue section 16/page 64-75) and Locknut as per DIN 934

11_07
08/2011



Joint rods deliverable:

M4 up to M24

- regular thread and fine-pitch thread
- regular thread / regular thread
- regular thread / left-hand thread
- bent and straight

Possible combinations of accessory parts:

- Clevises (see mbo catalogue section 3/page 23-24 and 5/page 29-30)
- Clevis joints (see mbo catalogue page 11_01/page 40 up to 11_06/page 45)
- Angle joints (see mbo catalogue section 16/page 64-75)
- Rod ends (see mbo catalogue section 17/page 76-114)
- Mating piece for clevises (see mbo catalogue section 10/page 39)
- Knuckle eyes (see mbo catalogue section 18/page 115)

Locknuts as per DIN 934

Special versions upon request



Additional variations are possible

11_08
08/2011

mbo Osswald GmbH & Co KG

Metal processing · Linking technology

www.mbo-osswald.com · info@mbo-osswald.de
Tel: + 49 (0) 9345-670-0 · Fax: + 49 (0) 9345-6255



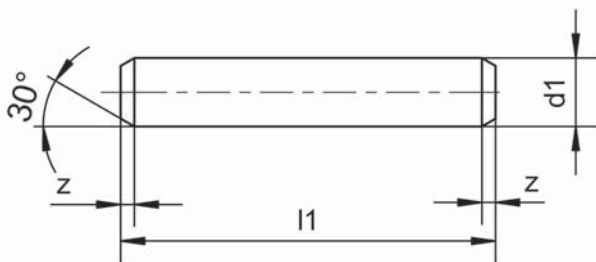
General tolerances
DIN ISO 2768-medium

Subject to technical
alterations

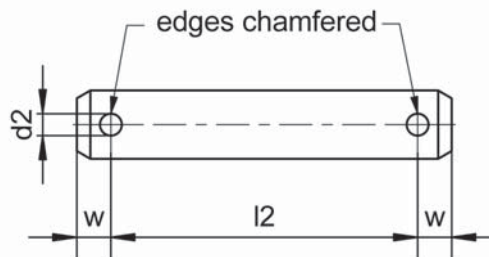
We accept no responsibility for
incorrect or incomplete details or
information given



form A without pin holes



form B with pin holes



Example for ordering: form A: Bolt without pin holes according to DIN EN 22340/ISO 2340, d=10mm, l=30mm, electroplated galvanised yellow;
Bolt ISO 2340 – A – 10 x 30 galvanised yellow
Order number: 40 10 0000 0030/023

form B: Bolt with pin holes according to DIN EN 22340/ISO 2340, d=10mm, l=30mm, lh=20mm, electroplated galvanised white;
Bolt ISO 2340 – B – 10 x 30 x 20 galvanised white
Order number: 40 10 0030 0020/013

| d h11 | 4 | 5 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | up to 60 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------|--------|----------|-----|-----|-----|----|----|----|----|----|-----|--------------|-----------|--------------|--|--|--|--|--|--|--|--|--|--|--|--|--------------|------|------|--|--|--|--|--|--|--|--|--|--|--|---|------|------|--|--|--|--|--|--|--|--|--|--|--|---|------|------|--|--|--|--|--|--|--|--|--|--|--|----|------|-------|--|--|--|--|--|--|--|--|--|--|--|----|------|------|--|--|--|--|--|--|--|--|--|--|--|----|------|------|--|--|--|--|--|--|--|--|--|--|--|----|------|------|--|--|--|--|--|--|--|--|--|--|--|----|------|------|--|--|--|--|--|--|--|--|--|--|--|----|------|------|--|--|--|--|--|--|--|--|--|--|--|----|------|------|--|--|--|--|--|--|--|--|--|--|--|----|------|------|--|--|--|--|--|--|--|--|--|--|--|----|------|------|-------|--|--|--|--|--|--|--|--|--|--|----|------|------|--|--|--|--|--|--|--|--|--|--|--|----|------|------|--|--|--|--|--|--|--|--|--|--|--|----|------|------|----|--|--|--|--|--|--|--|--|--|--|----|------|------|--|--|--|--|--|--|--|--|--|--|--|----|------|------|----------|--|--|--|--|--|--|--|--|--|--|----|------|------|--|--|--|--|--|--|--|--|--|--|--|----|------|------|--|--|--|--|--|--|--|--|--|--|--|----|-------|-------|--|--|--|--|--|--|--|--|--|--|--|----|-------|-------|--|--|--|--|--|--|--|--|--|--|--|----|-------|-------|--|--|--|--|--|--|--|--|--|--|--|----|-------|-------|--|--|--|--|--|--|--|--|--|--|--|----|-------|-------|---------|--|--|--|--|--|--|--|--|--|--|----|-------|-------|--|--|--|--|--|--|--|--|--|--|--|----|-------|-------|--|--|--|--|--|--|--|--|--|--|--|----|-------|-------|--|--|--|--|--|--|--|--|--|--|--|----|-------|-------|--|--|--|--|--|--|--|--|--|--|--|-----|-------|--------|--|--|--|--|--|--|--|--|--|--|--|-----------|--|--|--|--|--|--|--|--|--|--|--|--|--------------|
| d l H13 | 1 | 1.2 | 1.6 | 2 | 3.2 | 3.2 | 4 | 4 | 5 | 5 | 5 | 6.3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| c max. | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| le min. | 2.2 | 2.9 | 3.2 | 3.5 | 4.5 | 5.5 | 6 | 6 | 7 | 8 | 8 | 9 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th rowspan="2">Nom. size</th> <th colspan="2">l</th> <th colspan="11"></th> <th rowspan="2">upon request</th> </tr> <tr> <th>min.</th> <th>max.</th> <th colspan="11"></th> </tr> </thead> <tbody> <tr><td>6</td><td>5.75</td><td>6.25</td><td colspan="11"></td></tr> <tr><td>8</td><td>7.75</td><td>8.25</td><td colspan="11"></td></tr> <tr><td>10</td><td>9.75</td><td>10.25</td><td colspan="11"></td></tr> <tr><td>12</td><td>11.5</td><td>12.5</td><td colspan="11"></td></tr> <tr><td>14</td><td>13.5</td><td>14.5</td><td colspan="11"></td></tr> <tr><td>16</td><td>15.5</td><td>16.5</td><td colspan="11"></td></tr> <tr><td>18</td><td>17.5</td><td>18.5</td><td colspan="11"></td></tr> <tr><td>20</td><td>19.5</td><td>20.5</td><td colspan="11"></td></tr> <tr><td>22</td><td>21.5</td><td>22.5</td><td colspan="11"></td></tr> <tr><td>24</td><td>23.5</td><td>24.5</td><td colspan="11"></td></tr> <tr><td>26</td><td>25.5</td><td>26.5</td><td colspan="11">Range</td></tr> <tr><td>28</td><td>27.5</td><td>28.5</td><td colspan="11"></td></tr> <tr><td>30</td><td>29.5</td><td>30.5</td><td colspan="11"></td></tr> <tr><td>32</td><td>31.5</td><td>32.5</td><td colspan="11">of</td></tr> <tr><td>35</td><td>34.5</td><td>35.5</td><td colspan="11"></td></tr> <tr><td>40</td><td>39.5</td><td>40.5</td><td colspan="11">standard</td></tr> <tr><td>45</td><td>44.5</td><td>45.5</td><td colspan="11"></td></tr> <tr><td>50</td><td>49.5</td><td>50.5</td><td colspan="11"></td></tr> <tr><td>55</td><td>54.25</td><td>55.75</td><td colspan="11"></td></tr> <tr><td>60</td><td>59.25</td><td>60.75</td><td colspan="11"></td></tr> <tr><td>65</td><td>64.25</td><td>65.75</td><td colspan="11"></td></tr> <tr><td>70</td><td>69.25</td><td>70.75</td><td colspan="11"></td></tr> <tr><td>75</td><td>74.25</td><td>75.75</td><td colspan="11">lengths</td></tr> <tr><td>80</td><td>79.25</td><td>80.75</td><td colspan="11"></td></tr> <tr><td>85</td><td>84.25</td><td>85.75</td><td colspan="11"></td></tr> <tr><td>90</td><td>89.25</td><td>90.75</td><td colspan="11"></td></tr> <tr><td>95</td><td>94.25</td><td>95.75</td><td colspan="11"></td></tr> <tr><td>100</td><td>99.25</td><td>100.75</td><td colspan="11"></td></tr> <tr> <td>up to 200</td> <td colspan="12"></td> <td>upon request</td> </tr> </tbody> </table> | | | | | | | | | | | | | | Nom. size | l | | | | | | | | | | | | | upon request | min. | max. | | | | | | | | | | | | 6 | 5.75 | 6.25 | | | | | | | | | | | | 8 | 7.75 | 8.25 | | | | | | | | | | | | 10 | 9.75 | 10.25 | | | | | | | | | | | | 12 | 11.5 | 12.5 | | | | | | | | | | | | 14 | 13.5 | 14.5 | | | | | | | | | | | | 16 | 15.5 | 16.5 | | | | | | | | | | | | 18 | 17.5 | 18.5 | | | | | | | | | | | | 20 | 19.5 | 20.5 | | | | | | | | | | | | 22 | 21.5 | 22.5 | | | | | | | | | | | | 24 | 23.5 | 24.5 | | | | | | | | | | | | 26 | 25.5 | 26.5 | Range | | | | | | | | | | | 28 | 27.5 | 28.5 | | | | | | | | | | | | 30 | 29.5 | 30.5 | | | | | | | | | | | | 32 | 31.5 | 32.5 | of | | | | | | | | | | | 35 | 34.5 | 35.5 | | | | | | | | | | | | 40 | 39.5 | 40.5 | standard | | | | | | | | | | | 45 | 44.5 | 45.5 | | | | | | | | | | | | 50 | 49.5 | 50.5 | | | | | | | | | | | | 55 | 54.25 | 55.75 | | | | | | | | | | | | 60 | 59.25 | 60.75 | | | | | | | | | | | | 65 | 64.25 | 65.75 | | | | | | | | | | | | 70 | 69.25 | 70.75 | | | | | | | | | | | | 75 | 74.25 | 75.75 | lengths | | | | | | | | | | | 80 | 79.25 | 80.75 | | | | | | | | | | | | 85 | 84.25 | 85.75 | | | | | | | | | | | | 90 | 89.25 | 90.75 | | | | | | | | | | | | 95 | 94.25 | 95.75 | | | | | | | | | | | | 100 | 99.25 | 100.75 | | | | | | | | | | | | up to 200 | | | | | | | | | | | | | upon request |
| Nom. size | l | | | | | | | | | | | | | | upon request | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | min. | max. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | 5.75 | 6.25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | 7.75 | 8.25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | 9.75 | 10.25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | 11.5 | 12.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | 13.5 | 14.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | 15.5 | 16.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | 17.5 | 18.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | 19.5 | 20.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | 21.5 | 22.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 | 23.5 | 24.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 | 25.5 | 26.5 | Range | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 | 27.5 | 28.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | 29.5 | 30.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | 31.5 | 32.5 | of | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35 | 34.5 | 35.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 | 39.5 | 40.5 | standard | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 45 | 44.5 | 45.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 | 49.5 | 50.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 55 | 54.25 | 55.75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 60 | 59.25 | 60.75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 65 | 64.25 | 65.75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70 | 69.25 | 70.75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 75 | 74.25 | 75.75 | lengths | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80 | 79.25 | 80.75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 85 | 84.25 | 85.75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90 | 89.25 | 90.75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 95 | 94.25 | 95.75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100 | 99.25 | 100.75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| up to 200 | | | | | | | | | | | | | upon request | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Material:

1.0718 (11SMnPb30+C)
alternative: stainless steel 1.4305 (X8CrNiS18-9) (supplement to order number .../000)
stainless steel 1.4404 (X2CrNiMo17-12-2) (supplement to order number .../4404)
hardened bolts upon request



Surface protection:

| Identifier | Supplement to order number |
|---|----------------------------|
| bright | .../003 |
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 5 µm) | .../013 |
| electr. galvanised yellow (layer min. 5 µm) | .../023 |

Retaining:

form A: with retainers (mbo catalogue section 14/page 58-61)
form B: with washers and cotter pins

Dimensions also available in acc. with DIN 1433 and DIN 1443

12_01
12/2012

Special versions upon request

mbo Osswald GmbH & Co KG

Metal processing · Linking technology

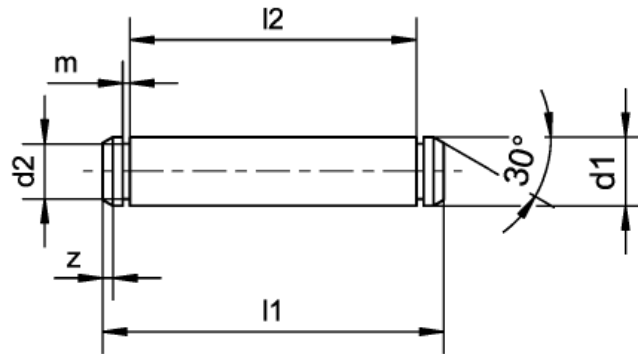
www.mbo-osswald.com · info@mbo-osswald.de
Tel: + 49 (0) 9345-670-0 · Fax: + 49 (0) 9345-6255



General tolerances
DIN ISO 2768-medium
Subject to technical alterations
We accept no responsibility for incorrect or incomplete details or information given



similar to DIN EN 22340/ISO 2340 (DIN 1433, DIN 1443) with groove



dia. d1: 4 mm - 65 mm
length l1: 10 mm - 300 mm

Material:

1.0718 (11SMnPb30+C)
alternative: stainless steel 1.4305 (X8CrNiS18-9)
 stainless steel 1.4404 (X2CrNiMo17-12-2)
hardened bolts upon request



Special versions upon request

Surface protection:

phosphatised and oiled;
optional: electroplated galvanised, passivated in white-blue
(silver/clear) or yellow

Retaining:

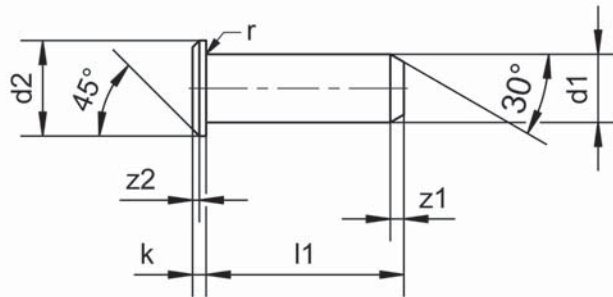
with retainers
(mbo catalogue section 13/page 53-57)



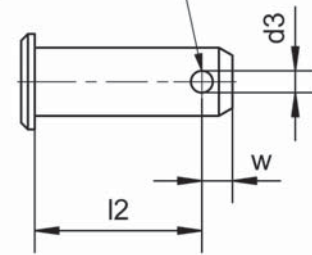
12_02
08/2011



form A without pin hole



form B with pin hole edge chamfered



Example for ordering: **form A:** Bolt without pin hole according to DIN EN 22341/ISO 2341, d=10mm, l=50mm, electroplated galvanised white;
Bolt ISO 2341 – A – 10 x 50 galvanised white, Order number: 41 10 0000 0030/013

form B: Bolt with pin hole according to DIN EN 22341/ISO 2341, d=10mm, l=30mm, lh=20mm, bright;
Bolt ISO 2341 – B – 10 x 50 x 44 bright, Order number: 41 10 0050 0044/003

| | | | | | | | | | | | | | |
|-----------|--------------|--------|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|----------|
| d h11 | 4 | 5 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | up to 50 |
| dk h14 | 6 | 8 | 10 | 14 | 18 | 20 | 22 | 25 | 28 | 30 | 33 | 36 | |
| dl H13 | 1 | 1.2 | 1.6 | 2 | 3.2 | 3.2 | 4 | 4 | 5 | 5 | 5 | 6.3 | |
| C max. | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | |
| e ≈ | 0.5 | 1 | 1 | 1 | 1 | 1.6 | 1.6 | 1.6 | 1.6 | 2 | 2 | 2 | |
| k js14 | 1 | 1.6 | 2 | 3 | 4 | 4 | 4 | 4.5 | 5 | 5 | 5.5 | 6 | |
| le min. | 2.2 | 2.9 | 3.2 | 3.5 | 4.5 | 5.5 | 6 | 6 | 7 | 8 | 8 | 9 | |
| r | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 1 | 1 | 1 | 1 | |
| l | | | | | | | | | | | | | |
| Nom. size | min. | max. | | | | | | | | | | | |
| 6 | 5.75 | 6.25 | | | | | | | | | | | |
| 8 | 7.75 | 8.25 | | | | | | | | | | | |
| 10 | 9.75 | 10.25 | | | | | | | | | | | |
| 12 | 11.5 | 12.5 | | | | | | | | | | | |
| 14 | 13.5 | 14.5 | | | | | | | | | | | |
| 16 | 15.5 | 16.5 | | | | | | | | | | | |
| 18 | 17.5 | 18.5 | | | | | | | | | | | |
| 20 | 19.5 | 20.5 | | | | | | | | | | | |
| 22 | 21.5 | 22.5 | | | | | | | | | | | |
| 24 | 23.5 | 24.5 | | | | | | | | | | | |
| 26 | 25.5 | 26.5 | | | | | | | | | | | |
| 28 | 27.5 | 28.5 | | | | | | | | | | | |
| 30 | 29.5 | 30.5 | | | | | | | | | | | |
| 32 | 31.5 | 32.5 | | | | | | | | | | | |
| 35 | 34.5 | 35.5 | | | | | | | | | | | |
| 40 | 39.5 | 40.5 | | | | | | | | | | | |
| 45 | 44.5 | 45.5 | | | | | | | | | | | |
| 50 | 49.5 | 50.5 | | | | | | | | | | | |
| 55 | 54.25 | 55.75 | | | | | | | | | | | |
| 60 | 59.25 | 60.75 | | | | | | | | | | | |
| 65 | 64.25 | 65.75 | | | | | | | | | | | |
| 70 | 69.25 | 70.75 | | | | | | | | | | | |
| 75 | 74.25 | 75.75 | | | | | | | | | | | |
| 80 | 79.25 | 80.75 | | | | | | | | | | | |
| 85 | 84.25 | 85.75 | | | | | | | | | | | |
| 90 | 89.25 | 90.75 | | | | | | | | | | | |
| 95 | 94.25 | 95.75 | | | | | | | | | | | |
| 100 | 99.25 | 100.75 | | | | | | | | | | | |
| up to 200 | upon request | | | | | | | | | | | | |

Material:

1.0718 (11SMnPb30+C)
 alternative: stainless steel 1.4305 (X8CrNiS18-9)
 (supplement to order number .../000)
 stainless steel 1.4404 (X2CrNiMo17-12-2)
 (supplement to order number .../4404)
 hardened bolts upon request



Surface protection:

| Identifier | Supplement to order number |
|---|----------------------------|
| bright | .../003 |
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 5 µm) | .../013 |
| electr. galvanised yellow (layer min. 5 µm) | .../023 |

Retaining:

form A: with retainers
 (mbo catalogue section 14/page 58-61)
 form B: with washers and cotter pins

Dimensions also available in acc. with DIN 1434, DIN 1435, DIN 1436 and DIN 1444

Special versions upon request

12_03
12/2012

mbo Osswald GmbH & Co KG

Metal processing · Linking technology

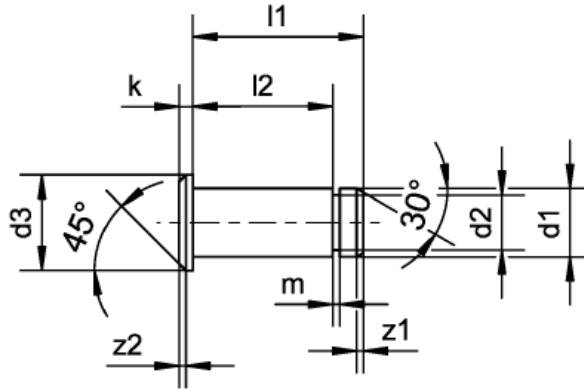
www.mbo-osswald.com · info@mbo-osswald.de
 Tel: + 49 (0) 9345-670-0 · Fax: + 49 (0) 9345-6255



General tolerances
 DIN ISO 2768-medium
 Subject to technical alterations
 We accept no responsibility for incorrect or incomplete details or information given



head version of
manufacturer's choice



dia. d1: 4 mm - 50 mm
length l1: 10 mm - 300 mm

Material:

1.0718 (11SMnPb30+C)
alternative: stainless steel 1.4305 (X8CrNiS18-9)
 stainless steel 1.4404 (X2CrNiMo17-12-2)
hardened bolts upon request



Surface protection:

phosphatised and oiled;
optional: electroplated galvanised, passivated in white-blue
(silver/clear) or yellow

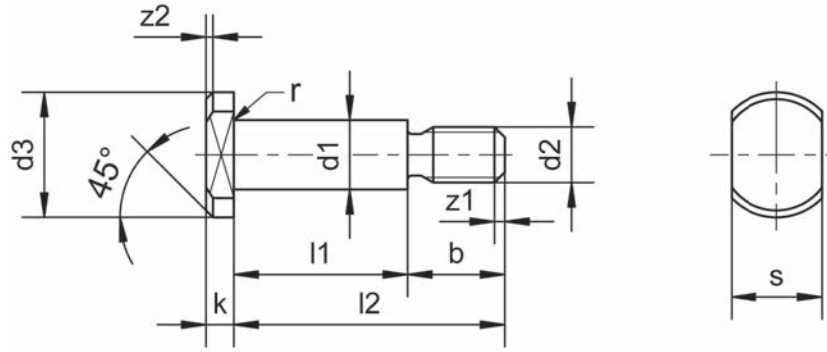
Special versions upon request

Retaining:

with retainers
(mbo catalogue section 13/page 53-57)



12_04
08/2011



Example for ordering: Bolt of diameter $d1 = 12$ mm, tolerance range h11, grip $l1 = 30$ mm and length $l2 = 50$ mm, of 11SMnPb30+C, electroplated galvanised white;
Bolt DIN 1445 - 12 h11 x 30 x 50 - St galvanised white
Order number: 45 12 0030 0050/013

| $\varnothing d1$ h11 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 27 | 30 |
|----------------------|--|-----|------|------|------|------|------|------|------|------|------|
| b min. | 11 | 14 | 17 | 20 | 20 | 20 | 25 | 25 | 29 | 29 | 36 |
| $\varnothing d2$ | M 6 | M 8 | M 10 | M 12 | M 12 | M 12 | M 16 | M 16 | M 20 | M 20 | M 24 |
| $\varnothing d3$ h14 | 14 | 18 | 20 | 22 | 25 | 28 | 30 | 33 | 36 | 40 | 44 |
| k_{js14} | 3 | 4 | 4 | 4 | 4.5 | 5 | 5 | 5.5 | 6 | 6 | 8 |
| r | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 1 | 1 | 1 | 1 | 1 | 1 |
| s | 11 | 13 | 17 | 19 | 22 | 24 | 27 | 30 | 32 | 36 | 36 |
| $z2 \approx$ | 1 | 1 | 1.6 | 1.6 | 1.6 | 1.6 | 2 | 2 | 2 | 2 | 2 |
| $l2_{js15}$ | weight (7.85 kg/dm ³) kg/1000 pcs. \approx | | | | | | | | | | |
| 16 | | | | | | | | | | | |
| (18) | | | | | | | | | | | |
| 20 | | | | | | | | | | | |
| (22) | | | | | | | | | | | |
| 25 | | | | | | | | | | | |
| (28) | | | | | | | | | | | |
| 30 | | | | | | | | | | | |
| 35 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |
| 45 | | | | | | | | | | | |
| 50 | | | | | | | | | | | |
| 55 | | | | | | | | | | | |
| 60 | | | | | | | | | | | |
| 65 | | | | | | | | | | | |
| 70 | | | | | | | | | | | |
| 75 | | | | | | | | | | | |
| 80 | | | | | | | | | | | |
| 85 | | | | | | | | | | | |
| 90 | | | | | | | | | | | |
| (95) | | | | | | | | | | | |
| 100 | | | | | | | | | | | |

Material:

1.0718 (11SMnPb30+C)

alternative: stainless steel 1.4305 (X8CrNiS18-9)

(supplement to order number .../000)

stainless steel 1.4404 (X2CrNiMo17-12-2)

(supplement to order number .../4404)



Surface protection:

| Identifier | Supplement to order number |
|---|----------------------------|
| bright | .../003 |
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 5 µm) | .../013 |
| electr. galvanised yellow (layer min. 5 µm) | .../023 |

Special versions upon request

12_05
12/2012

mbo Osswald GmbH & Co KG

Metal processing · Linking technology

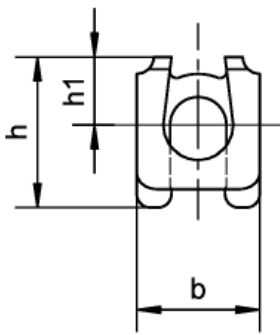
www.mbo-osswald.com · info@mbo-osswald.de
Tel: + 49 (0) 9345-670-0 · Fax: + 49 (0) 9345-6255



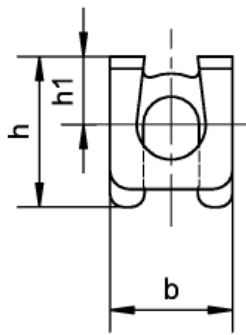
General tolerances
DIN ISO 2768-medium

Subject to technical alterations

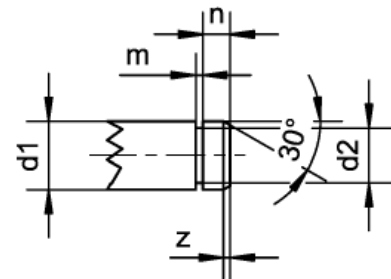
We accept no responsibility for incorrect or incomplete details or information given



SL-retainer with relief²⁾
(mbo standard 88)



SL-retainer without relief



Example for ordering: SL-retainer for bolt diameter $d_1 = 10$ mm, electroplated galvanised white;
SL-retainer 10 mbo 08 galvanised white
Order number: 10 08 0000 0010/014

| Identifier | Order number | Nom. size d_1 | Retainer | | | | | Max. perm. thrust approx. $N^{1)}$ | Mass (kg) per 100 pieces | Bolt | | | | |
|------------|----------------------|-----------------|----------|------|-------|---------------|------|------------------------------------|--------------------------|-------------|--------------|------------|--------|------|
| | | | b | h | h_1 | $a_{\pm 0.2}$ | s | | | d_1_{h11} | $d_2_{-0.2}$ | $m_{+0.1}$ | $n^3)$ | z |
| 4 mbo 08 | 10 08 0000 0004 /... | 4 | 7 | 8.6 | 4.1 | 1.9 | 0.3 | 700 | 0.019 | 4 | 3.2_{h11} | 0.64 | 2 | 0.5 |
| 5 mbo 08 | 10 08 0000 0005 /... | 5 | 9 | 10.9 | 5 | 2.2 | 0.4 | 900 | 0.034 | 5 | 4 | 0.74 | 2.5 | 0.5 |
| 6 mbo 08 | 10 08 0000 0006 /... | 6 | 11 | 13.9 | 6.2 | 3.1 | 0.4 | 1050 | 0.063 | 6 | 5 | 0.74 | 3 | 1 |
| 8 mbo 08 | 10 08 0000 0008 /... | 8 | 14 | 18 | 8.6 | 3.5 | 0.45 | 2500 | 0.109 | 8 | 6 | 0.94 | 3.5 | 0.5 |
| 10 mbo 08 | 10 08 0000 0010 /... | 10 | 18 | 22 | 10 | 3.6 | 0.5 | 4500 | 0.211 | 10 | 8 | 1.05 | 4.5 | 1 |
| 12 mbo 08 | 10 08 0000 0012 /... | 12 | 22 | 25.9 | 11.8 | 4.8 | 0.5 | 6700 | 0.280 | 12 | 9 | 1.15 | 5.5 | 1 |
| 14 mbo 08 | 10 08 0000 0014 /... | 14 | 25.1 | 30.2 | 13.5 | 4.8 | 0.6 | 7900 | 0.474 | 14 | 10_{h11} | 1.25 | 5.5 | 1.25 |
| 16 mbo 08 | 10 08 0000 0016 /... | 16 | 28 | 34 | 16.2 | 4.8 | 0.6 | 9500 | 0.563 | 16 | 12_{h11} | 1.35 | 6 | 1.5 |

1) for shafts of 500 N/mm² tensile strength

2) only for size 8 mbo 08

3) dimensional variations according to DIN 2768, medium

Material:

Spring band steel, hardened and annealed to 1450 up to 1600 N/mm² tensile strength

Surface protection:

| Identifier | Supplement to order number |
|---|----------------------------|
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 8 µm) | .../014 |
| electr. galvanised yellow (layer min. 8 µm) | .../024 |

Assembly:

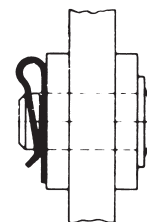
possible with or without tools; removable

Assembly tools:

see mbo catalogue page 15_01/page 62

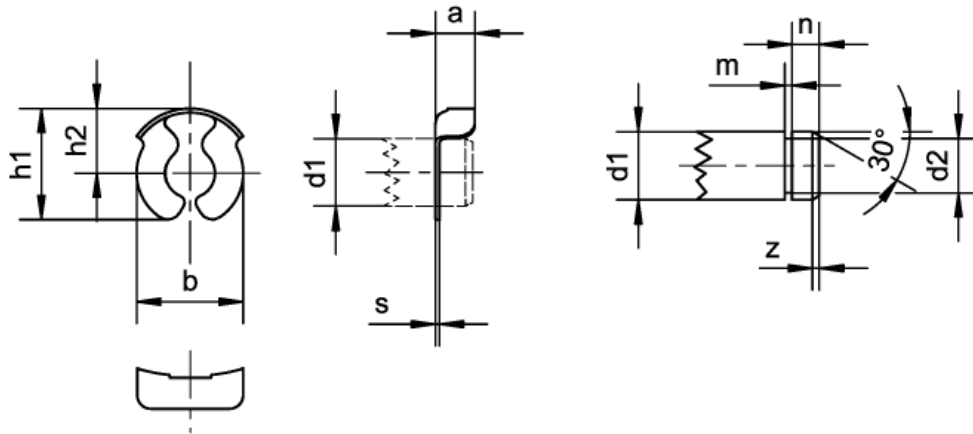
Special versions upon request

Example of application:



13_01
08/2011





Example for ordering: KL-retainer for bolt diameter $d_1 = 12$ mm, phosphatised oiled;
 KL-retainer 12 mbo 09 phosphatised oiled
 Order number: 10 09 0000 0012/002

| Identifier | Order number | Nom. size d_1 | Retainer | | | | | Max. perm. thrust approx. $N^{1)}$ static | Mass (kg) per 100 pieces | Bolt | | | | |
|-------------------------|---------------------|---------------------|-------------|---------------|---------------|-------------|-----|---|--------------------------|---------------------|----------------|------------|-------------|------|
| | | | $b \approx$ | $h_1 \approx$ | $h_2 \approx$ | $a \approx$ | s | | | d_1 h_{11} | d_2 h_{11} | $m_{+0.1}$ | $n^{2) *)}$ | z |
| 3 mbo 09 | 10 09 0000 0003/... | 3 | 4.4 | 4.8 | 3 | 1.9 | 0.4 | 730 | 0.005 | 3 | 2.3 | 0.64 | 1.5 | 0.5 |
| 4 mbo 09 | 10 09 0000 0004/... | 4 | 6.6 | 7.2 | 4.3 | 2.8 | 0.4 | 1100 | 0.011 | 4 | 3.2 | 0.64 | 2 | 0.5 |
| 5 mbo 09 | 10 09 0000 0005/... | 5 | 7.5 | 8.4 | 5.2 | 2.8 | 0.5 | 2100 | 0.020 | 5 | 4 -0.2 | 0.74 | 2.5 | 0.5 |
| 6 mbo 09 | 10 09 0000 0006/... | 6 | 10.6 | 11.25 | 6.8 | 3.5 | 0.5 | 3500 | 0.033 | 6 | 5 -0.2 | 0.74 | 3 | 1 |
| 8 mbo 09 | 10 09 0000 0008/... | 8 | 11.5 | 11.9 | 7.4 | 4.5 | 0.5 | 4000 | 0.041 | 8 | 6 -0.2 | 0.94 | 3.5 | 0.5 |
| 10 mbo 09 | 10 09 0000 0010/... | 10 | 15.5 | 16.3 | 9.5 | 5.9 | 0.6 | 6600 | 0.090 | 10 | 8 -0.2 | 1.05 | 4.5 | 1 |
| 12 mbo 09 | 10 09 0000 0012/... | 12 | 16.8 | 18 | 10.5 | 6.2 | 0.6 | 7500 | 0.110 | 12 | 9 -0.2 | 1.15 | 5.5 | 1 |
| 14 mbo 09 | 10 09 0000 0014/... | 14 | 19.2 | 20 | 12.2 | 6.8 | 0.7 | 8900 | 0.158 | 14 | 10 | 1.25 | 5.5 | 1.25 |
| 16 mbo 09 ³⁾ | 10 09 0000 0016/... | 16-18 ³⁾ | 22.7 | 24 | 14.3 | 7.6 | 0.8 | 9800 | 0.228 | 16-18 ³⁾ | 12-13 | 1.35 | 5.5-6 | 1.5 |
| 24 mbo 09 ⁴⁾ | 10 09 0000 0024/... | 24 ⁴⁾ | 34 | 34 | 19 | 9.8 | 1 | 10500 | 0.617 | 20-25 ⁴⁾ | 16-18 | 1.8 | 5.5-6.5 | 1.5 |

^{*)} dimensional variations according to DIN 2768, medium

¹⁾ for shafts of 500 N/mm² tensile strength

²⁾ corresponds to standard version mbo standard 07, however, extendible at will

³⁾ size 16 may be used for shafts with diameter 16 or 18

⁴⁾ size 24 may be used for shafts with diameter 20 or 25

Material:

spring band steel, hardened and annealed to 1450 up to 1600 N/mm² tensile strength

Surface protection:

| Identifier | Supplement to order number |
|---|----------------------------|
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 8 µm) | .../014 |
| electr. galvanised yellow (layer min. 8 µm) | .../024 |

Assembly:

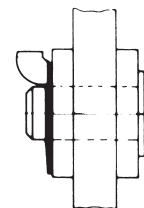
possible with or without tools, removable

Assembly tools:

see mbo catalogue page 15_01/page 62

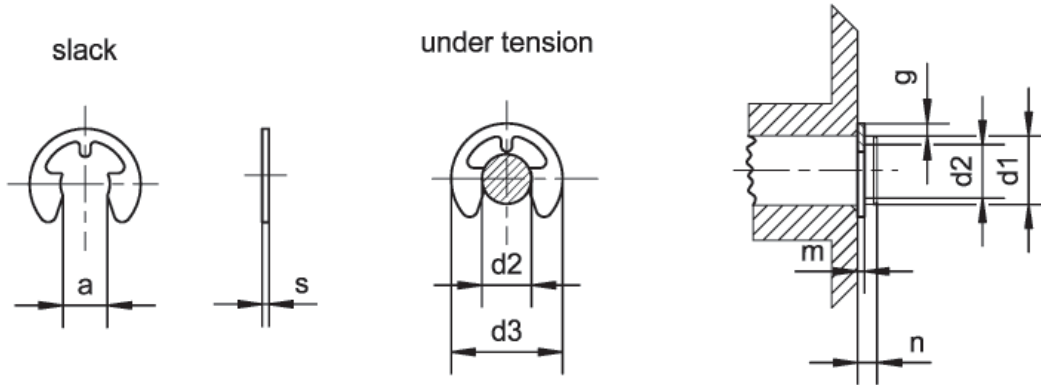
Special versions upon request

Example of application:



13_02
08/2011





Example for ordering: Locking washer for groove diameter (nom. size) d2 = 4 mm, mechanically galvanised silver;
Locking washer DIN 6799-4 galvanised silver
Order number: 10 00 6799 0040/206

| Groove dia. d2 Nom. size | Order number | Shaft dia. d1 | | Locking washer | | | Groove | | | Supplementary data | | | | | | | |
|--------------------------------|---------------------|------------------|----|----------------|---------------------|-----------------------------|-------------|-------------|---------|--------------------|----------------|----------------|----|-----------------|------------------|--------------------|-------|
| | | from | to | s | a | Weight (kg) per 1000 pcs. ≈ | d2 | m | n | d3 | F _N | F _S | g | F _{Sg} | n _{abl} | | |
| | | | | perm. diff. | perm. diff. (±IT10) | | perm. diff. | perm. diff. | min. | max. | kN | with d1' | kN | kN | kN | min. ⁻¹ | |
| 3.2 | 10 00 6799 0032/... | 4 | 5 | 0.6 | 2.7 | ±0.04 | 0.088 | 3.2 | 0.64 | 1 | 7.3 | 0.22 | 4 | 0.65 | 0.9 | 0.32 | 35000 |
| 4 | 10 00 6799 0040/... | 5 | 7 | 0.7 | 3.34 | | 0.158 | 4 | 0 | 1.2 | 9.3 | 0.25 | 5 | 0.95 | 1 | 0.47 | 32000 |
| 5 | 10 00 6799 0050/... | 6 | 8 | 0.7 | 4.11 | ±0.02 | 0.236 | 5 | -0.075 | 1.2 | 11.3 | 0.9 | 7 | 1.15 | 1 | 0.6 | 28000 |
| 6 | 10 00 6799 0060/... | 7 | 9 | 0.7 | 5.26 | ±0.048 | 0.255 | 6 | 0.74 | 1.2 | 12.3 | 1.1 | 8 | 1.35 | 1.1 | 0.7 | 25000 |
| 7 | 10 00 6799 0070/... | 8 | 11 | 0.9 | 5.84 | | 0.474 | 7 | 0.94 | 1.5 | 14.3 | 1.25 | 9 | 1.8 | 1.3 | 1 | 22000 |
| 8 | 10 00 6799 0080/... | 9 | 12 | 1 | 6.52 | | 0.66 | 8 | 1.05 | 1.8 | 16.3 | 1.42 | 10 | 2.5 | 1.5 | 1.25 | 20000 |
| 9 | 10 00 6799 0090/... | 10 | 14 | 1.1 | 7.63 | ±0.058 | 1.09 | 9 | -0.09 | 2 | 18.8 | 1.6 | 11 | 3 | 1.6 | 1.5 | 17000 |
| 10 | 10 00 6799 0100/... | 11 | 15 | 1.2 | 8.32 | ±0.03 | 1.25 | 10 | 1.25 | 2 | 20.4 | 1.7 | 12 | 3.5 | 1.8 | 1.75 | 15000 |
| 12 | 10 00 6799 0120/... | 13 | 18 | 1.3 | 10.45 | | 1.63 | 12 | 0/-0.11 | 2.5 | 23.4 | 3.1 | 15 | 4.7 | 1.9 | 2.3 | 13000 |
| 19* | 10 00 6799 0190/... | 20 | 31 | 1.75 | 15.92 | ±0.07 | 6.42 | 19 | 0/-0.13 | 3.5 | 37.6 | 10 | 25 | 11 | 2.5 | 3.6 | 7600 |

*) size 19 only in stainless steel

Additional sizes upon request

Material:

spring steel C67S up to C75S according to DIN EN 101322-4 (of manufacturer's choice); hardened and annealed to 460 up to 580 HV (equivalent to 46 to 54 HRC)

alternative: stainless steel

(supplement to order number .../000)



Surface protection:

| Identifier | Supplement to order number |
|--|----------------------------|
| phosphatised oiled | .../002 |
| burnished | .../005 |
| mech. galvanised silver (layer min. 11 µm) | .../206 |
| mech. galvanised yellow (layer min. 8 µm) | .../100 |

Note:

The values in the table for thickness "s" are valid for washers in the phosphatised, blackened or polished version.

DIN 6799 load capacity of groove F_N:

The F_N values refer to the shaft diameter d1'. If the shaft diameter d1' is different from d1 the load capacity of groove F_N' is determined by the formula:

$$F_{N'} = F_N \cdot \frac{d1' - d2}{d1 - d2}$$

Assembly:

possible with or without tools, removable

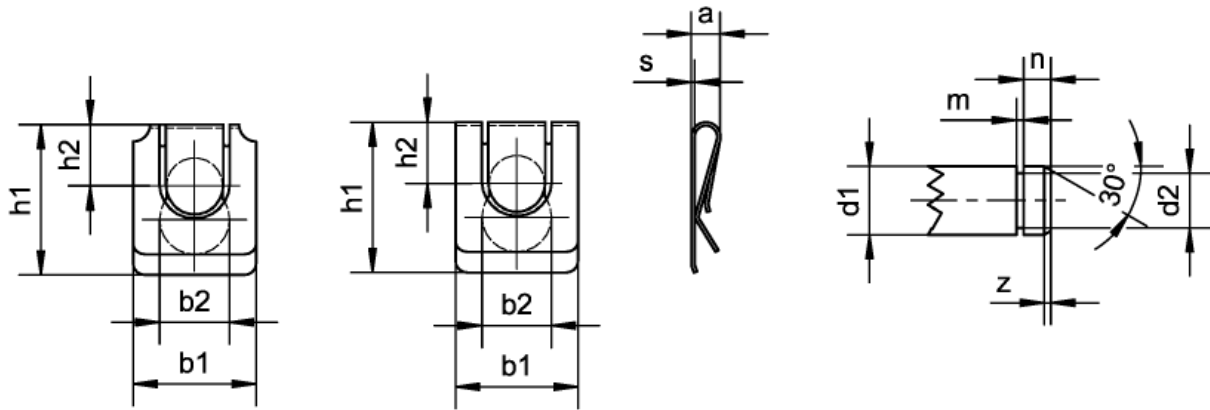
Assembly tools:

see mbo catalogue page 15_01/page 62

Special versions upon request

13_03
08/2011





Bayonet clips **with relief**³⁾
(mbo standard 66)

Bayonet clips **without relief**

Example for ordering: Bayonet clip for bolt diameter $d1 = 10$ mm, electroplated galvanised white;
Bayonet clip 10 mbo 06 galvanised white
Order number: 10 06 0000 0010/014

| Identifier | Order number | Nom. size $d1$ | Retainer | | | | | | Max. perm. thrust approx. $N^1)$ | Mass (kg) per 100 pieces | Bolt | | | | |
|------------|---------------------|----------------|----------------|-------------|----------------|----------------|---------------|------|----------------------------------|--------------------------|---------------|--------------|------------|--------|------|
| | | | $b1$ ± 0.2 | $b2$ $+0.3$ | $h1$ ± 0.5 | $h2$ ± 0.5 | a ± 0.5 | s | | | $d1$ h_{11} | $d2$ -0.2 | m $+0.1$ | $n^2)$ | z |
| 4 mbo 06 | 10 06 0000 0004/... | 4 | 7 | 4.2 | 9 | 3.5 | 2.2 | 0.35 | 1100 | 0.02 | 4 | 3.2 h_{11} | 0.64 | 2 | 0.5 |
| 5 mbo 06 | 10 06 0000 0005/... | 5 | 9 | 5.2 | 11 | 4.5 | 2.8 | 0.35 | 1600 | 0.04 | 5 | 4 | 0.74 | 2.5 | 0.5 |
| 6 mbo 06 | 10 06 0000 0006/... | 6 | 11 | 6.2 | 13.3 | 5.5 | 3.2 | 0.4 | 3200 | 0.07 | 6 | 5 | 0.74 | 3 | 1 |
| 8 mbo 06 | 10 06 0000 0008/... | 8 | 14 | 8.2 | 18 | 7 | 4.2 | 0.6 | 5500 | 0.17 | 8 | 6 | 0.94 | 3.5 | 0.5 |
| 10 mbo 06 | 10 06 0000 0010/... | 10 | 18 | 10.2 | 22 | 9 | 4.3 | 0.5 | 9700 | 0.24 | 10 | 8 | 1.05 | 4.5 | 1 |
| 12 mbo 06 | 10 06 0000 0012/... | 12 | 22 | 12.2 | 26 | 10 | 5.5 | 0.6 | 9900 | 0.41 | 12 | 9 | 1.15 | 5.5 | 1 |
| 14 mbo 06 | 10 06 0000 0014/... | 14 | 25 | 14.2 | 30 | 12 | 6.5 | 0.7 | 11300 | 0.66 | 14 | 10 h_{11} | 1.25 | 5.5 | 1.25 |
| 16 mbo 06 | 10 06 0000 0016/... | 16 | 28 | 16.2 | 37 | 16 | 7 | 0.8 | 13800 | 0.98 | 16 | 12 h_{11} | 1.35 | 6 | 1.5 |

1) for shafts of 500 N/mm² tensile strength

2) dimensional variations according to DIN 2768, medium

3) only for size 6 mbo 06

Material:

spring band steel, hardened and annealed to 1450 up to 1600 N/mm² tensile strength

Assembly tools:

see mbo catalogue page 15_02/page 63

Surface protection:

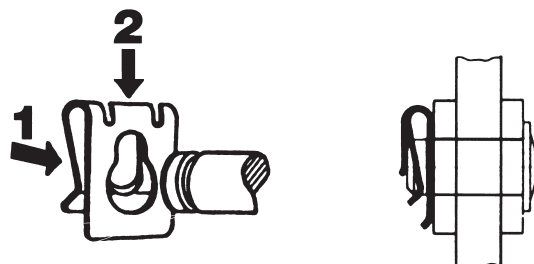
| Identifier | Supplement to order number |
|--|----------------------------|
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 8 μ m) | .../014 |
| electr. galvanised yellow (layer min. 8 μ m) | .../024 |

Assembly:

possible with or without tools, removable

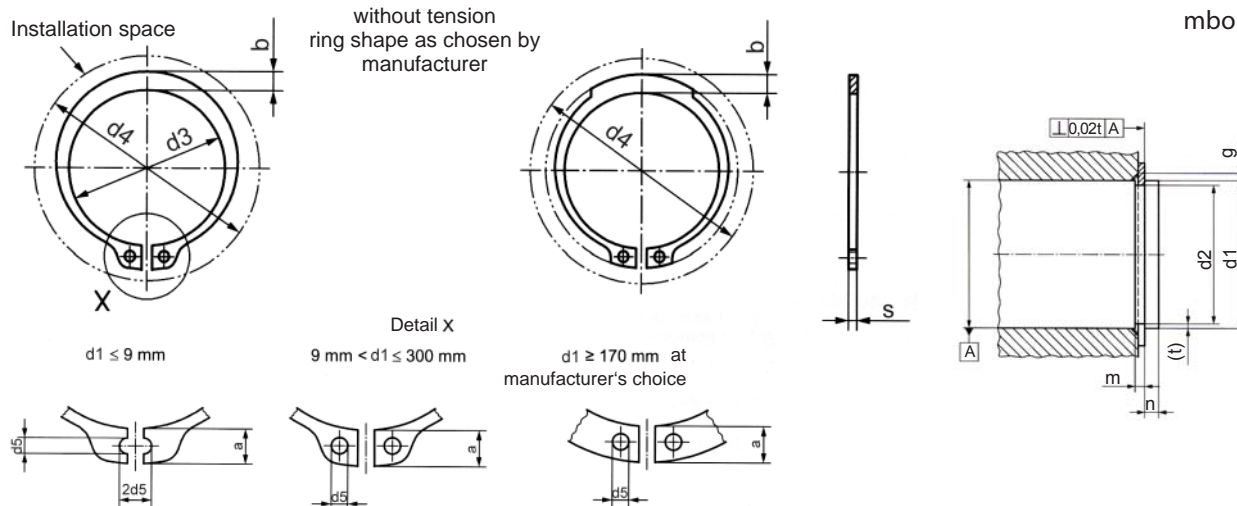
Special versions upon request

Example of application:



13_04
08/2011





Example for ordering: Retaining ring for bolt diameter (nom. size) $d_1 = 8$ mm, phosphatised oiled;
Retaining ring DIN 471-8 phosphatised oiled
Order number: 10 00 0471 0080/002

| Shaft Ø d_1 Nom. size | Order number | Ring | | Groove | | | Supplementary datas ²⁾ | | | | | | | | | | Nom. size of pliers according to DIN 5254 | | |
|-------------------------------------|---------------------|---------------------|-------------------------|-----------|------------|---------------|---|-------------------------|----------|------|-----------|-------|-------------|-------------|------|----------------|---|---------------------------------|--------|
| | | s perm. diff. | d_3 perm. diff. | a max. | b^1 ≈ | d_5 min. | Weight (kg) per 1000 pcs. ≈ | d_2 perm. diff. | m H13 | t | n min. | d_4 | F_N kN | F_R kN | g | F_{Rg} kN | | n_{abl} min. ⁻¹ | |
| 4 | 10 00 0471 0040/... | 0.4 | 3.7 | 2.2 | 0.9 | 1 | 0.022 | 3.8 | 0 | 0.5 | 0.1 | 0.3 | 8.6 | 0.2 | 0.5 | 0.3 | 211000 | 3 | |
| 5 | 10 00 0471 0050/... | 0.6 | 4.7 | 2.5 | 1.1 | 1 | 0.066 | 4.8 | 0 | 0.7 | 0.1 | 0.3 | 10.3 | 0.26 | 1 | 0.5 | 0.8 | | 154000 |
| 6 | 10 00 0471 0060/... | 0.7 | 5.6 | 2.7 | 1.3 | 1.2 | 0.084 | 5.7 | -0.05 | 0.8 | 0.15 | 0.5 | 11.7 | 0.46 | 1.45 | 0.5 | 0.9 | | 114000 |
| 8 | 10 00 0471 0080/... | 0.8 | 7.4 | 3.2 | 1.5 | 1.2 | 0.158 | 7.6 | 0/-0.06 | 0.9 | 0.2 | 0.6 | 14.7 | 0.81 | 3 | 0.5 | 2 | | 96000 |
| 10 | 10 00 0471 0100/... | 1 | 9.3 | 3.3 | 1.8 | 1.5 | 0.34 | 9.6 | 0 | 1.1 | 0.2 | 0.6 | 17 | 1.01 | 4 | 1 | 2.4 | 84000 | 3; 10 |
| 12 | 10 00 0471 0120/... | 1 | 11 | 3.3 | 1.8 | 1.7 | 0.5 | 11.5 | -0.11 | 1.1 | 0.25 | 0.8 | 19 | 1.53 | 5 | 1 | 2.4 | 75000 | |
| 14 | 10 00 0471 0140/... | 1 | 12.9 | 3.5 | 2.1 | 1.7 | 0.64 | 13.4 | 0 | 1.1 | 0.3 | 0.9 | 21.4 | 2.15 | 6.35 | 1 | 2.4 | 58000 | 10 |
| 16 | 10 00 0471 0160/... | 1 | 14.7 | 3.7 | 2.2 | 1.7 | 0.7 | 15.2 | -0.21 | 1.1 | 0.4 | 1.2 | 23.8 | 3.26 | 7.4 | 1 | 2.4 | 45000 | |
| 20 | 10 00 0471 0200/... | 1.2 | 18.5 | 4 | 2.6 | 2 | 1.3 | 19 | 0/-0.13 | 1.3 | 0.5 | 1.5 | 28.4 | 5.06 | 17.1 | 1.5 | 3.85 | 32000 | 10; 19 |
| 25 | 10 00 0471 0250/... | 1.2 | 23.2 | 4.4 | 3 | 2 | 1.9 | 23.9 | 0 | 1.3 | 0.55 | 1.7 | 34.2 | 7.05 | 16.2 | 1.5 | 3.7 | 25000 | |
| 30 | 10 00 0471 0300/... | 1.5 | 27.9 | 5 | 3.5 | 2 | 3.31 | 28.6 | -0.21 | 1.6 | 0.7 | 2.1 | 40.5 | 10.73 | 32.1 | 1.5 | 7.65 | 18900 | 19 |
| 35 | 10 00 0471 0350/... | 1.5 | 32.2 | 5.6 | 3.9 | 2.5 | 4 | 33 | 0 | 1.6 | 1 | 3 | 46.8 | 17.8 | 30.8 | 2 | 5.55 | 15500 | |
| 40 | 10 00 0471 0400/... | 1.75 | 36.5 | 6 | 4.4 | 2.5 | 6.03 | 37.5 | -0.25 | 1.85 | 1.25 | 3.8 | 52.6 | 25.3 | 51 | 2 | 9.5 | 14300 | 19; 40 |
| 42 | 10 00 0471 0420/... | 1.75 | 38.5 | 6.5 | 4.5 | 2.5 | 6.5 | 39.5 | 0 | 1.85 | 1.25 | 3.8 | 55.7 | 26.7 | 50 | 2 | 9.45 | 13000 | |
| 50 | 10 00 0471 0500/... | 2 | 45.8 | 6.9 | 5.1 | 2.5 | 10.2 | 47 | -0.25 | 2.15 | 1.5 | 4.5 | 64.5 | 38 | 73.3 | 2 | 14.4 | 10500 | 40 |

1) dimension b must not exceed dimension a max.
2) the supplementary datas apply only to spring-steel retaining rings according to DIN EN 101322-4

Material:

spring steel C67S up to C75S according to DIN EN 101322-4 (of manufacturer's choice); hardened and annealed to 435 up to 580 HV (equivalent 44 up to 54 HRC)
alternative: stainless steel
(supplement to order number .../000)



DIN 471 load capacity:

The load capacities specified in the table (F_N , F_R , F_{Rg}) do not include protection against creeping in the event of static stress and against fatigue failure in the event of pulsating stress. At least double protection is provided against failure in the event of static stress.

Surface protection:

| Identifier | Supplement to order number |
|---------------------------|----------------------------|
| phosphatised oiled | .../002 |
| electr. galvanised white | .../014 |
| electr. galvanised yellow | .../024 |

Assembly:

possible with tools; removable

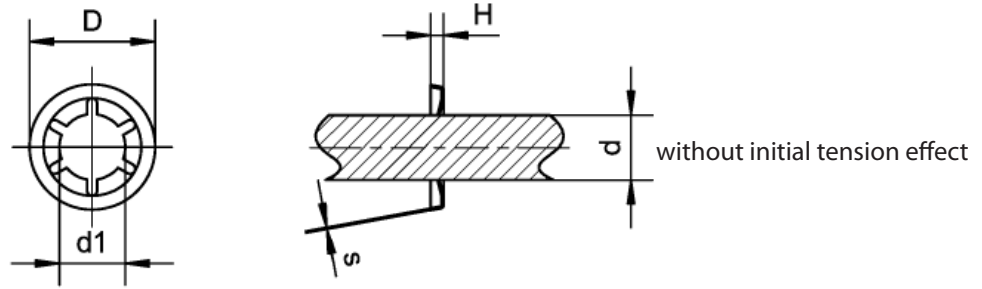
Assembly tools: upon request

Note:

The values in the table for thickness "s" are valid for washers in the phosphatised, blackened or polished version. DIN 471 retaining rings are not suitable for securing bolts as per mbo standard 07 and mbo standard 77. Recommendation: Bolts see mbo catalogue pages 04_03/page 27 and 04_04/page 28 and also 06_04/page 34 and 06_05/page 35

13_05
08/2011





Example for ordering: Spring washer without cap for shaft diameter d = 10 mm, stainless steel;
Spring washer without cap 10 mbo 28 stainless steel
Order number: 10 28 0100 0184/000

| Shaft Ø d | Order number | Internal Ø d1 | External Ø D ±0.3 | Height H ±0.2 | Material thickness S ±0.03 | Number of slots | Trigger force* approx. N | Surface | | |
|-----------------|---------------------|------------------|-------------------------|---------------------|----------------------------------|--------------------|--------------------------------|----------------------------------|-----------|--------------------|
| | | | | | | | | Mechanically galvanised white | Varnished | Stainless steel |
| 1.6 | 10 28 0016 0097/... | 1.23 - 1.46 | 9.7 | 1.3 | 0.2 | 4 | 200 | ... / 205** | ... / 006 | ... / 000** |
| 2 | 10 28 0020 0097/... | 1.61 - 1.84 | 9.7 | 1.3 | 0.2 | 4 | 200 | ... / 205 | ... / 006 | ... / 000 |
| 2.4 | 10 28 0024 0097/... | 2.02 - 2.25 | 9.7 | 1.3 | 0.2 | 4 | 200 | ... / 205 | ... / 006 | ... / 000** |
| 3 | 10 28 0030 0097/... | 2.58 - 2.81 | 9.7 | 1.3 | 0.2 | 4 | 200 | ... / 205 | ... / 006 | ... / 000 |
| 3.2 | 10 28 0032 0097/... | 2.78 - 3.01 | 9.7 | 1.3 | 0.2 | 4 | 200 | ... / 205 | ... / 006 | ... / 000** |
| 4 | 10 28 0040 0115/... | 3.57 - 3.80 | 11.5 | 1.3 | 0.2 | 5 | 400 | ... / 205 | ... / 006 | ... / 000 |
| 4.8 | 10 28 0048 0115/... | 4.31 - 4.53 | 11.5 | 1.3 | 0.2 | 6 | 400 | ... / 205 | ... / 006 | ... / 000** |
| 5 | 10 28 0050 0115/... | 4.51 - 4.74 | 11.5 | 1.3 | 0.2 | 6 | 400 | ... / 205 | ... / 006 | ... / 000 |
| 6 | 10 28 0060 0153/... | 5.45 - 5.70 | 15.3 | 1.3 | 0.25 | 6 | 800 | ... / 205 | ... / 006 | ... / 000 |
| 6.35 | 10 28 0635 0153/... | 5.83 - 6.08 | 15.3 | 1.3 | 0.25 | 6 | 800 | ... / 205 | ... / 006 | ... / 000** |
| 7 | 10 28 0070 0153/... | 6.46 - 6.72 | 15.3 | 1.3 | 0.25 | 6 | 800 | ... / 205 | ... / 006 | ... / 000 |
| 8 | 10 28 0080 0153/... | 7.40 - 7.66 | 15.3 | 1.3 | 0.25 | 6 | 800 | ... / 205 | ... / 006 | ... / 000 |
| 9 | 10 28 0090 0184/... | 8.50 - 8.75 | 18.4 | 1.9 | 0.3 | 6 | 1000 | ... / 205 | ... / 006 | ... / 000 |
| 9.5 | 10 28 0095 0184/... | 9.00 - 9.26 | 18.4 | 1.9 | 0.3 | 6 | 1000 | ... / 205** | ... / 006 | ... / 000 |
| 10 | 10 28 0100 0184/... | 9.49 - 9.74 | 18.4 | 1.9 | 0.3 | 6 | 1000 | ... / 205 | ... / 006 | ... / 000 |
| 11 | 10 28 0110 0184/... | 10.50 - 10.76 | 18.4 | 1.9 | 0.3 | 6 | 1000 | ... / 205 | ... / 006 | ... / 000 |
| 12 | 10 28 0120 0250/... | 11.37 - 11.62 | 25 | 2.3 | 0.4 | 6 | 2500 | ... / 205 | ... / 006 | ... / 000 |
| 12.7 | 10 28 0127 0250/... | 12.10 - 12.36 | 25 | 2.3 | 0.4 | 6 | 2500 | ... / 205** | ... / 006 | ... / 000** |
| 13 | 10 28 0130 0250/... | 12.38 - 12.64 | 25 | 2.3 | 0.4 | 6 | 2500 | ... / 205 | ... / 006 | ... / 000** |
| 14 | 10 28 0140 0282/... | 13.40 - 13.66 | 28.2 | 2.3 | 0.4 | 6 | 2500 | ... / 205 | ... / 006 | ... / 000 |
| 15 | 10 28 0150 0282/... | 14.43 - 14.68 | 28.2 | 2.3 | 0.4 | 6 | 2500 | ... / 205 | ... / 006 | ... / 000** |
| 16 | 10 28 0160 0282/... | 15.28 - 15.53 | 28.2 | 2.3 | 0.4 | 6 | 2500 | ... / 205 | ... / 006 | ... / 000 |
| 17 | 10 28 0170 0282/... | 16.42 - 16.68 | 28.2 | 2.3 | 0.4 | 6 | 2500 | ... / 205** | ... / 006 | ... / 000** |
| 18 | 10 28 0180 0366/... | 17.34 - 17.62 | 36.6 | 3 | 0.4 | 9 | 3500 | ... / 205 | ... / 006 | ... / 000** |
| 19 | 10 28 0190 0366/... | 18.40 - 18.69 | 36.6 | 3 | 0.4 | 9 | 3500 | ... / 205 | ... / 006 | ... / 000** |
| 20 | 10 28 0200 0366/... | 19.30 - 19.63 | 36.6 | 3 | 0.4 | 9 | 3500 | ... / 205 | ... / 006 | ... / 000 |
| 21 | 10 28 0210 0366/... | 20.33 - 20.61 | 36.6 | 3 | 0.4 | 9 | 3500 | ... / 205** | ... / 006 | ... / 000** |
| 22 | 10 28 0220 0366/... | 21.37 - 21.65 | 36.6 | 3 | 0.4 | 9 | 3500 | ... / 205** | ... / 006 | ... / 000** |
| 23 | 10 28 0230 0382/... | 22.34 - 22.62 | 38.1 | 2.9 | 0.45 | 9 | 3500 | ... / 205** | ... / 006 | ... / 000** |
| 24 | 10 28 0240 0382/... | 23.33 - 23.66 | 38.1 | 3.2 | 0.5 | 9 | 3850 | ... / 205 | ... / 006 | - |
| 25 | 10 28 0250 0414/... | 24.30 - 24.63 | 41.3 | 3.2 | 0.5 | 9 | 3850 | ... / 205 | ... / 006 | - |

* the trigger values are valid for steel versions (not stainless steel) using a standard polished steel bolt St 37 (tolerance field h11)

** special sizes manufactured in respective quantities to order; number of clamps of manufacturer's choice

Material:

spring steel

alternative: stainless steel



Surface protection:

mechanically galvanised white or brownish / bluish
varnished

Assembly tools:

see mbo catalogue page 15_02/page 63

14_01
08/2011

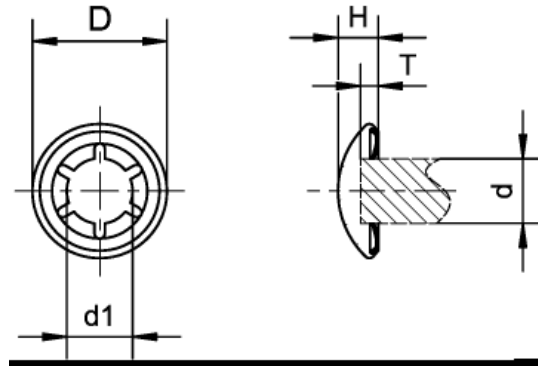
mbo Osswald GmbH & Co KG

Metal processing · Linking technology

www.mbo-osswald.com · info@mbo-osswald.de
Tel: + 49 (0) 9345-670-0 · Fax: + 49 (0) 9345-6255



Subject to technical
alterations
We accept no responsibility for
incorrect or incomplete details or
information given



with standard cap
made of stainless steel
without initial tension effect

Example for ordering: Spring washer with cap for shaft diameter $d = 10$ mm, stainless steel;
Spring washer with cap 10 mbo 29 stainless steel
Order number: 10 29 0100 0197/000

| Shaft \varnothing d | Order number | Internal \varnothing d1 | External \varnothing D ± 0.3 | Height H ± 0.2 | Push-on depth T max. | Number of slots | Trigger force* approx. N | Surface | | |
|-----------------------------|---------------------|------------------------------|--|--------------------------|----------------------------|--------------------|--------------------------------|-----------------------------|-------------|--------------------|
| | | | | | | | | Mechanically galv. white | Varnished | Stainless steel |
| 1.6 | 10 29 0016 0106/... | 1.23 - 1.46 | 10.6 | 3 | 2.5 | 4 | 200 | ... / 205** | ... / 006** | ... / 000** |
| 2 | 10 29 0020 0106/... | 1.61 - 1.84 | 10.6 | 3 | 2.5 | 4 | 200 | ... / 205** | ... / 006 | ... / 000** |
| 2.4 | 10 29 0024 0106/... | 2.02 - 2.25 | 10.6 | 3 | 2.5 | 4 | 200 | ... / 205 | ... / 006** | ... / 000** |
| 3 | 10 29 0030 0106/... | 2.58 - 2.81 | 10.6 | 3 | 2.5 | 4 | 200 | ... / 205 | ... / 006 | ... / 000 |
| 3.2 | 10 29 0032 0106/... | 2.78 - 3.01 | 10.6 | 3 | 2.5 | 4 | 200 | ... / 205 | ... / 006 | ... / 000** |
| 4 | 10 29 0040 0124/... | 3.57 - 3.80 | 12.4 | 3.8 | 3 | 5 | 400 | ... / 205 | ... / 006 | ... / 000 |
| 4.8 | 10 29 0048 0124/... | 4.31 - 4.53 | 12.4 | 3.8 | 3 | 6 | 400 | ... / 205 | ... / 006 | ... / 000** |
| 5 | 10 29 0050 0124/... | 4.51 - 4.74 | 12.4 | 3.8 | 3 | 6 | 400 | ... / 205 | ... / 006 | ... / 000 |
| 6 | 10 29 0060 0162/... | 5.45 - 5.70 | 16.2 | 5 | 4 | 6 | 800 | ... / 205 | ... / 006 | ... / 000 |
| 6.35 | 10 29 0635 0162/... | 5.83 - 6.08 | 16.2 | 5 | 4 | 6 | 800 | ... / 205** | ... / 006** | ... / 000** |
| 7 | 10 29 0070 0162/... | 6.46 - 6.72 | 16.2 | 5 | 4 | 6 | 800 | ... / 205 | ... / 006 | ... / 000 |
| 8 | 10 29 0080 0162/... | 7.40 - 7.66 | 16.2 | 5 | 4 | 6 | 800 | ... / 205 | ... / 006 | ... / 000 |
| 9 | 10 29 0090 0197/... | 8.50 - 8.75 | 19.7 | 5.9 | 4.5 | 6 | 1000 | ... / 205 | ... / 006 | ... / 000 |
| 9.5 | 10 29 0095 0197/... | 9.00 - 9.26 | 19.7 | 5.9 | 4.5 | 6 | 1000 | ... / 205** | ... / 006** | ... / 000** |
| 10 | 10 29 0100 0197/... | 9.49 - 9.74 | 19.7 | 5.9 | 4.5 | 6 | 1000 | ... / 205 | ... / 006 | ... / 000 |
| 11 | 10 29 0110 0197/... | 10.50 - 10.76 | 19.7 | 5.9 | 4.5 | 6 | 1000 | ... / 205 | ... / 006 | ... / 000 |
| 12 | 10 29 0120 0260/... | 11.37 - 11.62 | 26 | 7.5 | 6 | 6 | 2500 | ... / 205 | ... / 006 | ... / 000 |
| 12.7 | 10 29 0127 0260/... | 12.10 - 12.36 | 26 | 7.5 | 6 | 6 | 2500 | ... / 205** | ... / 006** | ... / 000** |
| 13 | 10 29 0130 0260/... | 12.38 - 12.64 | 26 | 7.5 | 6 | 6 | 2500 | ... / 205** | ... / 006** | ... / 000** |
| 14 | 10 29 0140 0294/... | 13.40 - 13.66 | 29.4 | 9 | 7 | 6 | 2500 | ... / 205 | ... / 006 | ... / 000** |
| 15 | 10 29 0150 0294/... | 14.43 - 14.68 | 29.4 | 9 | 7 | 6 | 2500 | ... / 205 | ... / 006 | ... / 000** |
| 16 | 10 29 0160 0294/... | 15.28 - 15.53 | 29.4 | 9 | 7 | 6 | 2500 | ... / 205 | ... / 006 | ... / 000** |
| 17 | 10 29 0170 0294/... | 16.42 - 16.68 | 29.4 | 9 | 7 | 6 | 2500 | ... / 205** | ... / 006 | ... / 000** |
| 18 | 10 29 0180 0382/... | 17.34 - 17.62 | 38.2 | 11.7 | 8.7 | 9 | 3500 | ... / 205 | ... / 006 | ... / 000** |
| 19 | 10 29 0190 0382/... | 18.40 - 18.69 | 38.2 | 11.7 | 8.7 | 9 | 3500 | ... / 205** | ... / 006** | ... / 000** |
| 20 | 10 29 0200 0382/... | 19.30 - 19.63 | 38.2 | 11.7 | 8.7 | 9 | 3500 | ... / 205 | ... / 006 | ... / 000** |
| 21 | 10 29 0210 0382/... | 20.33 - 20.61 | 38.2 | 11.7 | 8.7 | 9 | 3500 | ... / 205** | ... / 006** | ... / 000** |
| 22 | 10 29 0220 0382/... | 21.37 - 21.65 | 38.2 | 11.7 | 8.7 | 9 | 3500 | ... / 205** | ... / 006** | ... / 000** |
| 23 | 10 29 0230 0398/... | 22.34 - 22.62 | 39.8 | 13 | 9.5 | 9 | 3500 | ... / 205** | ... / 006** | ... / 000** |
| 24 | 10 29 0240 0430/... | 23.33 - 23.66 | 43 | 12.5 | 9.5 | 9 | 3850 | ... / 205** | ... / 006** | - |
| 25 | 10 29 0250 0430/... | 24.30 - 24.63 | 43 | 12.5 | 9.5 | 9 | 3850 | ... / 205** | ... / 006 | - |

* the trigger values are valid for steel versions (not stainless steel) using a standard polished steel bolt St 37 (tolerance field h11)

** special sizes manufactured in respective quantities to order; number of clamps of manufacturer's choice

Material:

Spring washer: spring steel

alternative: stainless steel

Cap: generally stainless steel



Surface protection:

Spring washer: mechanically galvanised white or brownish / bluish varnished

Assembly tools:

see mbo catalogue page 15_02/page 63

14_02
08/2011

Special versions upon request

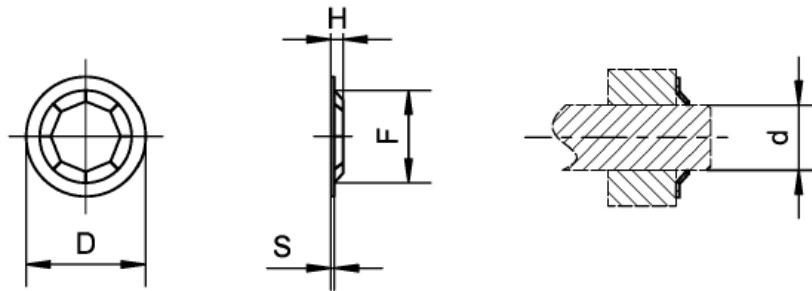
mbo Osswald GmbH & Co KG

Metal processing · Linking technology

www.mbo-osswald.com · info@mbo-osswald.de
Tel: + 49 (0) 9345-670-0 · Fax: + 49 (0) 9345-6255



Subject to technical alterations
We accept no responsibility for incorrect or incomplete details or information given



Example for ordering: Spring washer without cap for shaft diameter $d = 8$ mm;
Spring washer without cap 8 mbo 63
Order number: 00 26 0151 0002

| Shaft \varnothing d *) | Order number | H | F | D | Material thickness S | Impact force N | Clamping force N | Min. retaining force N |
|----------------------------------|-----------------|-----|------|------|----------------------------|-------------------|------------------------|------------------------------|
| 6 | 00 26 0151 0001 | 1.6 | 9.4 | 13.5 | 0.5 | 111 | – | 1780 |
| 8 | 00 26 0151 0002 | 1.7 | 11.6 | 15.9 | 0.5 | 256 | – | 3969 |

*) shaft tolerance: +0.05/-0.07 mm

Version:
hardened and annealed to

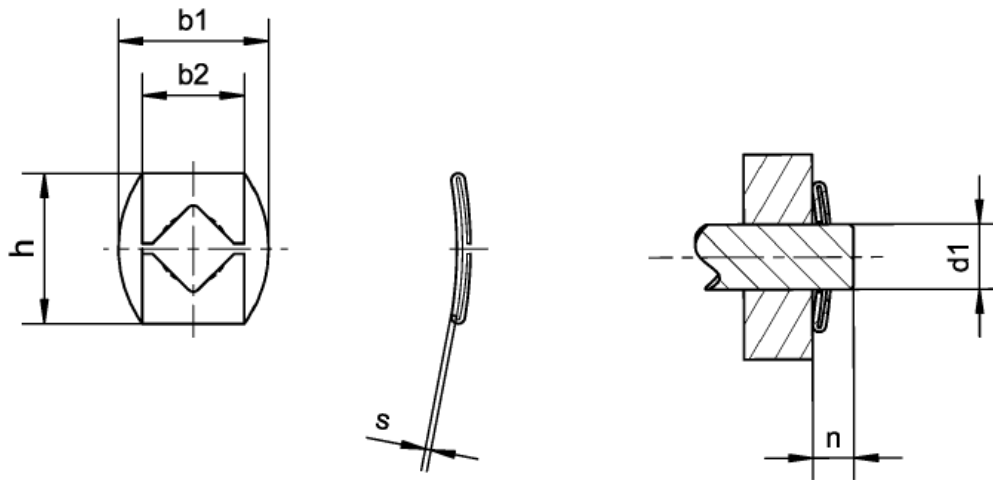
Material:
spring band steel

Special versions upon request

Surface protection:
phosphatised oiled or mechanically galvanised,
other surfaces upon request

The hardness of surface should not exceed 208 HV.
Nickel, chromium and other hard surfaces are to be avoided
when used in connection with steel.

14_03
08/2011



Example for ordering: Duo clip for bolt diameter $d_1 = 8$ mm, electroplated galvanised white;
Duo clip 8 mbo 10 galvanised white
Order number: 10 10 0000 0008/013

| Identifier ^{*)} | Order number | Nom. size d_1 h_9 | b_1 ≈ | b_2 ≈ | h ≈ | s | Minimum dimension n | Max. perm. thrust approx. N ¹⁾ static | Mass (kg) per 100 pieces |
|--------------------------|---------------------|-----------------------------|------------|------------|----------|------|-----------------------------|---|--------------------------------|
| 3 mbo 10 | 10 10 0000 0003/... | 3 | 7 | 4.5 | 8 | 0.25 | 2.5 | 300 | 0.014 |
| 4 mbo 10 | 10 10 0000 0004/... | 4 | 9.3 | 6.1 | 10 | 0.3 | 3 | 500 | 0.028 |
| 5 mbo 10 | 10 10 0000 0005/... | 5 | 11 | 7.6 | 11 | 0.3 | 3.5 | 800 | 0.034 |
| 6 mbo 10 | 10 10 0000 0006/... | 6 | 13 | 9.2 | 13 | 0.3 | 4 | 900 | 0.052 |
| 8 mbo 10 | 10 10 0000 0008/... | 8 | 17 | 12 | 17 | 0.35 | 5 | 1050 | 0.102 |
| 10 mbo 10 | 10 10 0000 0010/... | 10 | 22 | 15 | 22 | 0.4 | 6 | 1400 | 0.193 |

^{*)} special sizes manufactured in respective quantities to order

¹⁾ for non-hardened, non-chromium-plated shafts of regular strength and for galvanised parts with a layer of max. 5 µm

Material:

spring band steel, hardened and annealed to 1450 up to 1600 N/mm² tensile strength

Assembly tools:

see mbo catalogue page 15_02/page 63

Surface protection:

| Identifier | Supplement to order number |
|---|-------------------------------|
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 5 µm) | .../013 |
| electr. galvanised white (layer min. 8 µm) | .../014 |
| electr. galvanised yellow (layer min. 5 µm) | .../023 |

Special versions upon request

14_04
08/2011





SL-retainers mbo standard 08

- assembly of the SL-retainer is possible with and without tool
- an assembly tool is used for quicker assembly, situations of difficult access, and assembly facilitation for applying the required force
- the SL-retainer is inserted into the tool, while the retainer is positioned within the hooks i.e. closed clip side pointing down and the open clip side pointing up
- the retainer is mounted to the shaft from the side
- both assembly and disassembly are possible



KL-retainers mbo standard 09

- assembly of the KL-retainer is possible with and without tool
- an assembly tool is used for quicker assembly, situations of difficult access, and assembly facilitation for applying the required force
- the KL-retainer is placed in the opening in the front area of the assembly tool and fitted onto the shaft from the side
- both assembly and disassembly are possible



Locking washers according to DIN 6799

- assembly of the locking washer according to DIN 6799 is possible with and without tool
- an assembly tool is used for quicker assembly, situations of difficult access, and assembly facilitation for applying the required force
- the retainer is accommodated by the assembly tool
- assembly is carried out from the side
- both assembly and disassembly are possible



Retaining rings according to DIN 471

Circlip pliers upon request

15_01
08/2011



Bayonet clips mbo standard 06

- assembly of the bayonet clips is possible with and without tool
- an assembly tool is used for quicker assembly, situations of difficult access, and assembly facilitation for applying the required force
- the assembly tool is equipped with 3 fit-in and glued-on magnets in the front area, accommodating the bayonet clip
- assembly is similar to manual assembly, the clip is put onto the shaft in axial direction and pressed downwards perpendicularly
- both assembly and disassembly are possible



Spring washers without cap mbo standard 28

- assembly of the spring washer mbo standard 28 is possible with and without tool
- an assembly tool is used for quicker assembly, situations of difficult access, and assembly facilitation for applying the required force
- the assembly tool has a magnet holding the spring washer. Tip: put the spring washer onto the magnet, with the edge facing upward
- assembly is carried out in the axial direction to the shaft
- during disassembly the end of the retainer will be damaged to the end and the same retainer can no longer be used



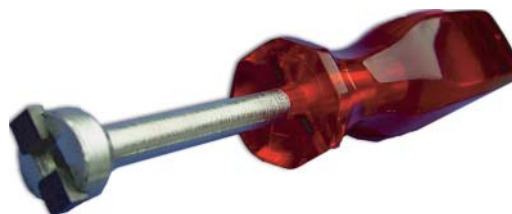
Spring washers with cap mbo standard 29

- assembly of the spring washer mbo standard 29 is possible with and without tool
- an assembly tool is used for quicker assembly, situations of difficult access, and assembly facilitation for applying the required force
- the assembly tool has a magnet holding the spring washer. Tip: put the spring washer with cap into the recess
- assembly is carried out in the axial direction to the shaft
- during disassembly the retainer will be damaged to the end that the same retainer can no longer be used



Duo clips mbo standard 10

- assembly of the duo clips is possible with and without tool
- an assembly tool is used for quicker assembly, situations of difficult access, and assembly facilitation for applying the required force
- the duo clip is accommodated by a magnet in the front area of the tool
- assembly is carried out in the axial direction to the shaft
- disassembly only possible with a screwdriver and afterwards the same retainer can no longer be used



15_02
08/2011



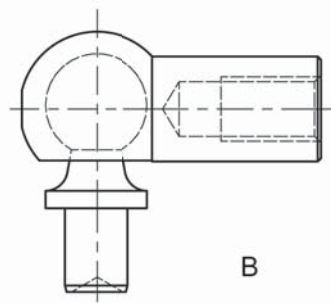
without circlip

with circlip

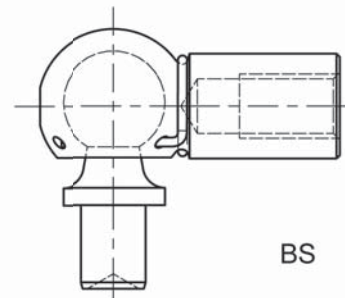
mbo standard 03

Form

B and BS
rivet stud

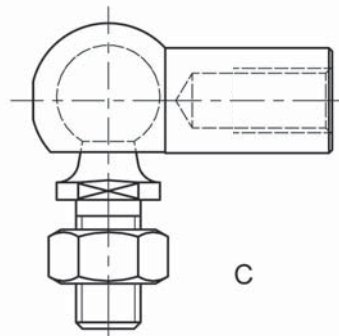


B

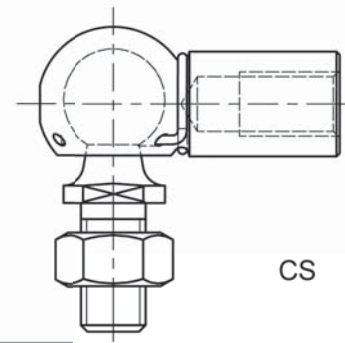


BS

C and CS
ball stud with
spanner surface



C



CS

Joint components:

| Quantity form | | | | Designation | Identifier for ball diameter d1 | | | | | |
|---------------|----|---|----|---|---------------------------------|----------------------|------------------------|-----------------------|-----------------------|----------------------------|
| B | BS | C | CS | | 6 | 8 | 10 | 13 | 16 | 19 |
| - | - | - | - | Ball studs according to DIN 71803 | - | A 8 | A 10 | A 13 | A 16 | A 19 |
| 1 | 1 | - | - | | B 6 x 3,5 | B 8 x 4 B 8 x 7,5 | B 10 x 4,5 B 10 x 8 | B 13 x 5 B 13 x 10 | B 16 x 6 B 16 x 13 | B 19 x 12 B 19 x 18 |
| - | - | 1 | 1 | | C 6 ²⁾ | C 8 | C 10 | C 13 | C 16 | C 19 |
| 1 | - | 1 | - | Ball socket according to DIN 71805 | A 6 | A 8 | A 10 | A 13 | A 16 | A 19 ¹⁾ |
| - | 1 | - | 1 | | - | B 8 | B 10 | B 13 | B 16 | B 19 ¹⁾ |
| - | 1 | - | 1 | Circlip according to DIN 71805 | - | S 8 | S 10 | S 13 | S 16 | S 19 |
| - | - | 1 | 1 | Hexagonal nut DIN 934 min. tensile strength class 6 is supplied loose | M 4 | M 5 | M 6 | M 8 | M10 M12* | M 14x1,5 M 14* M 16* |

* similar to DIN 71802

1) the manufacturer reserves the right to supply the ball socket with or without spanner surface

2) similar to DIN 71803

Special versions upon request

16_01
07/2012

mbo Osswald GmbH & Co KG

Metal processing · Linking technology

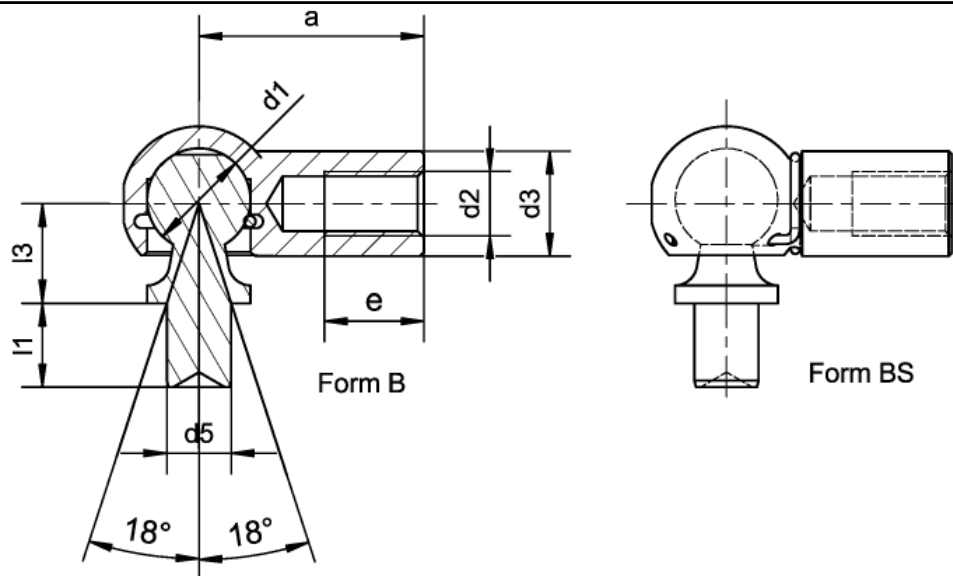
www.mbo-osswald.com · info@mbo-osswald.de
Tel: + 49 (0) 9345-670-0 · Fax: + 49 (0) 9345-6255



General tolerances
DIN ISO 2768-medium

Subject to technical alterations

We accept no responsibility for incorrect or incomplete details or information given



Angle joint with rivet stud according to DIN 71802 form B

| Identifier | Order number | d1 H9/h9 | d2 | d3 | d5 h11 | l1 ±0.2 | l3 ±0.3 | a ±0.3 | e Min. | Mass (kg) per piece |
|------------|---------------------|-------------|------|----|-----------|------------|------------|-----------|-----------|---------------------------|
| B 6 x 3.5 | 10 03 1033 1006/... | 6 | M 4 | 7 | 4 | 3.5 | 8.5 | 22 | 10.2 | 0.010 |
| B 8 x 4 | 10 03 1033 1008/... | 8 | M 5 | 8 | 5 | 4 | 9 | 22 | 10.2 | 0.013 |
| B 8 x 7.5 | 10 03 1033 2008/... | 8 | M 5 | 8 | 5 | 7.5 | 9 | 22 | 10.2 | 0.013 |
| B 10 x 4.5 | 10 03 1033 1010/... | 10 | M 6 | 10 | 6 | 4.5 | 11 | 25 | 11.5 | 0.021 |
| B 10 x 8 | 10 03 1033 2010/... | 10 | M 6 | 10 | 6 | 8 | 11 | 25 | 11.5 | 0.022 |
| B 13 x 5 | 10 03 1033 1013/... | 13 | M 8 | 13 | 8 | 5 | 13 | 30 | 14 | 0.043 |
| B 13 x 10 | 10 03 1033 2013/... | 13 | M 8 | 13 | 8 | 10 | 13 | 30 | 14 | 0.045 |
| B 16 x 6 | 10 03 1033 1016/... | 16 | M 10 | 16 | 10 | 6 | 16 | 35 | 15.5 | 0.082 |
| B 16 x 13 | 10 03 1033 2016/... | 16 | M 10 | 16 | 10 | 13 | 16 | 35 | 15.5 | 0.087 |
| B 19 x 12 | 10 03 1033 1019/... | 19 | M 14 | 22 | 14 | 12 | 20 | 45 | 21.5 | 0.181 |
| B 19 x 18 | 10 03 1033 2019/... | 19 | M 14 | 22 | 14 | 18 | 20 | 45 | 21.5 | 0.189 |

Angle joint with rivet stud according to DIN 71802 form BS

| Identifier | Order number | d1 H9/h9 | d2 | d3 | d5 h11 | l1 ±0.2 | l3 ±0.3 | a ±0.3 | e Min. | Mass (kg) per piece |
|-------------|---------------------|-------------|------|----|-----------|------------|------------|-----------|-----------|---------------------------|
| BS 8 x 4 | 10 03 1333 1008/... | 8 | M 5 | 8 | 5 | 4 | 9 | 22 | 10.2 | 0.013 |
| BS 8 x 7.5 | 10 03 1333 2008/... | 8 | M 5 | 8 | 5 | 7.5 | 9 | 22 | 10.2 | 0.013 |
| BS 10 x 4.5 | 10 03 1333 1010/... | 10 | M 6 | 10 | 6 | 4.5 | 11 | 25 | 11.5 | 0.021 |
| BS 10 x 8 | 10 03 1333 2010/... | 10 | M 6 | 10 | 6 | 8 | 11 | 25 | 11.5 | 0.022 |
| BS 13 x 5 | 10 03 1333 1013/... | 13 | M 8 | 13 | 8 | 5 | 13 | 30 | 14 | 0.043 |
| BS 13 x 10 | 10 03 1333 2013/... | 13 | M 8 | 13 | 8 | 10 | 13 | 30 | 14 | 0.045 |
| BS 16 x 6 | 10 03 1333 1016/... | 16 | M 10 | 16 | 10 | 6 | 16 | 35 | 15.5 | 0.082 |
| BS 16 x 13 | 10 03 1333 2016/... | 16 | M 10 | 16 | 10 | 13 | 16 | 35 | 15.5 | 0.087 |
| BS 19 x 12 | 10 03 1333 1019/... | 19 | M 14 | 22 | 14 | 12 | 20 | 45 | 21.5 | 0.181 |
| BS 19 x 18 | 10 03 1333 2019/... | 19 | M 14 | 22 | 14 | 18 | 20 | 45 | 21.5 | 0.189 |

Material:

Ball stud: steel, minimum tensile strength $R_m = 600 \text{ N/mm}^2$
 Ball socket: steel, min. tensile strength $R_m = 500 \text{ N/mm}^2$
 alternative: stainless steel 1.4305 (X8CrNiS18-9)
 (supplement to order number .../000)
 stainless steel 1.4404 (X2CrNiMo17-12-2)
 (supplement to order number .../4404)



Snap ring and circlip: stainless steel

Surface protection:

| Identifier | Supplement to order number |
|---|----------------------------|
| bright | .../003 |
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 5 µm) | .../013 |
| electr. galvanised yellow (layer min. 5 µm) | .../023 |

Special versions upon request



16_02
12/2012

mbo Osswald GmbH & Co KG

Metal processing · Linking technology

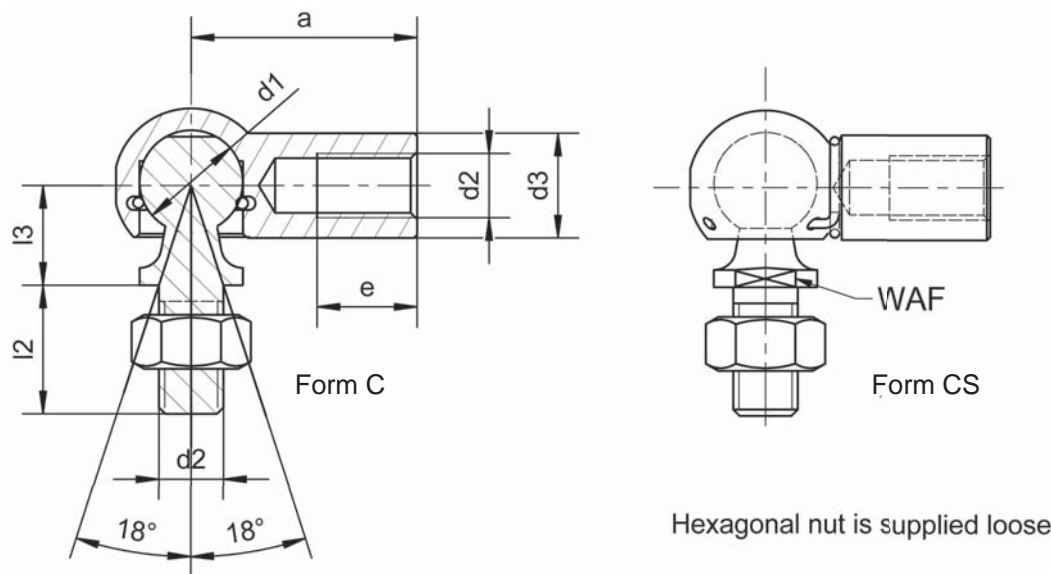
www.mbo-osswald.com · info@mbo-osswald.de
 Tel: + 49 (0) 9345-670-0 · Fax: + 49 (0) 9345-6255



General tolerances
DIN ISO 2768-medium

Subject to technical alterations

We accept no responsibility for incorrect or incomplete details or information given



Angle joint with threaded stud according to DIN 71802 form C

| Identifier | Order number | d1 H9/h9 | d2 | d3 | l2 ±0.3 | l3 ±0.3 | a ±0.3 | e min. | WAF | Mass (kg) per piece |
|---------------|---------------------|-------------|----------|----|------------|------------|-----------|-----------|-----|---------------------------|
| C 6 M 4 | 10 03 4006 8001/... | 6 | M 4 | 7 | 8.5 | 8.5 | 22 | 10.2 | 5 | 0.010 |
| C 8 M 5 | 10 03 4008 8001/... | 8 | M 5 | 8 | 10.2 | 9 | 22 | 10.2 | 7 | 0.015 |
| C 10 M 6 | 10 03 4010 8001/... | 10 | M 6 | 10 | 12.5 | 11 | 25 | 11.5 | 8 | 0.025 |
| C 13 M 8 | 10 03 4013 8001/... | 13 | M 8 | 13 | 16.5 | 13 | 30 | 14 | 11 | 0.053 |
| C 16 M 10 | 10 03 4016 8001/... | 16 | M 10 | 16 | 20 | 16 | 35 | 15.5 | 13 | 0.104 |
| C 16 M 12 | 10 03 4016 8121/... | 16 | M 12 | 16 | 20 | 16 | 35 | 15.5 | 13 | 0.104 |
| C 19 M 14 | 10 03 4019 8001/... | 19 | M 14 | 22 | 28 | 20 | 45 | 21.5 | 16 | 0.221 |
| C 19 M 14x1.5 | 16 03 4019 8001/... | 19 | M 14x1.5 | 22 | 28 | 20 | 45 | 21.5 | 16 | 0.221 |
| C 19 M 16 | 10 03 4019 8161/... | 19 | M 16 | 22 | 28 | 20 | 45 | 21.5 | 16 | 0.221 |

Angle joint with threaded stud according to DIN 71802 form CS

| Identifier | Order number | d1 H9/h9 | d2 | d3 | l2 ±0.3 | l3 ±0.3 | a ±0.3 | e min. | WAF | Mass (kg) per piece |
|----------------|---------------------|-------------|----------|----|------------|------------|-----------|-----------|-----|---------------------------|
| CS 8 M 5 | 10 03 4408 8002/... | 8 | M 5 | 8 | 10.2 | 9 | 22 | 10.2 | 7 | 0.015 |
| CS 10 M 6 | 10 03 4410 8002/... | 10 | M 6 | 10 | 12.5 | 11 | 25 | 11.5 | 8 | 0.025 |
| CS 13 M 8 | 10 03 4413 8002/... | 13 | M 8 | 13 | 16.5 | 13 | 30 | 14 | 11 | 0.053 |
| CS 16 M 10 | 10 03 4416 8002/... | 16 | M 10 | 16 | 20 | 16 | 35 | 15.5 | 13 | 0.104 |
| CS 16 M 12 | 10 03 4416 8122/... | 16 | M 12 | 16 | 20 | 16 | 35 | 15.5 | 13 | 0.104 |
| CS 19 M 14 | 10 03 4419 8002/... | 19 | M 14 | 22 | 28 | 20 | 45 | 21.5 | 16 | 0.221 |
| CS 19 M 14x1.5 | 16 03 4419 8002/... | 19 | M 14x1.5 | 22 | 28 | 20 | 45 | 21.5 | 16 | 0.221 |
| CS 19 M 16 | 10 03 4419 8162/... | 19 | M 16 | 22 | 28 | 20 | 45 | 21.5 | 16 | 0.221 |

Material:

Ball stud: steel, minimum tensile strength $R_m = 600 \text{ N/mm}^2$
 Ball socket: steel, min. tensile strength $R_m = 500 \text{ N/mm}^2$
 alternative: stainless steel 1.4305 (X8CrNiS18-9)
 (supplement to order number .../000)
 stainless steel 1.4404 (X2CrNiMo17-12-2)
 (supplement to order number .../4404)

Snap ring and circlip: stainless steel



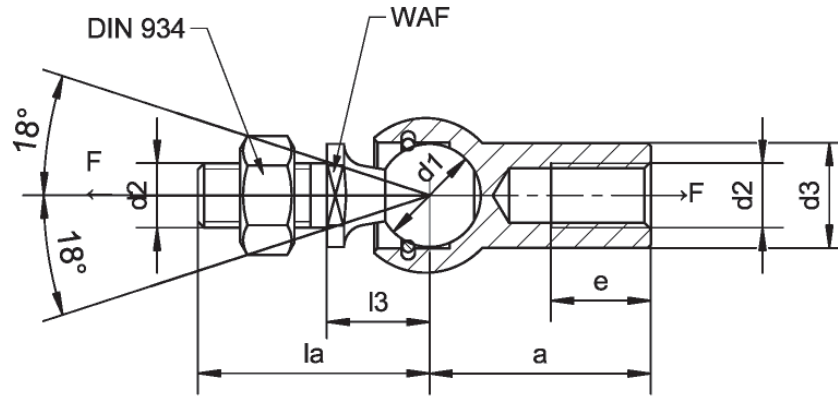
Surface protection:

| Identifier | Supplement to order number |
|---|----------------------------|
| bright | .../003 |
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 5 µm) | .../013 |
| electr. galvanised yellow (layer min. 5 µm) | .../023 |

Special versions upon request

16_03
12/2012





Hexagonal nut is supplied loose

| Size | Order number | d1 H9/h9 | d2 | d3 | a | la | l3 | e | Extraction force according to DIN 71805 F in N min. | WAF | Mass (kg) per piece |
|------|---------------------|-------------|----------|----|----|------|----|------|---|-----|---------------------------|
| 8 | 10 34 4408 8002/... | 8 | M 5 | 8 | 22 | 19.2 | 9 | 10.2 | 30 | 7 | 0.015 |
| 10 | 10 34 4410 8002/... | 10 | M 6 | 10 | 25 | 23.5 | 11 | 11.5 | 40 | 8 | 0.025 |
| 13 | 10 34 4413 8002/... | 13 | M 8 | 13 | 30 | 29.5 | 13 | 14 | 60 | 11 | 0.053 |
| 16 | 10 34 4416 8002/... | 16 | M 10 | 16 | 35 | 36 | 16 | 15.5 | 80 | 13 | 0.104 |
| 16 | 10 34 4416 8122/... | 16 | M 12 | 16 | 35 | 36 | 16 | 15.5 | 80 | 13 | 0.104 |
| 19 | 10 34 4419 8002/... | 19 | M 14 | 22 | 45 | 48 | 20 | 21.5 | 100 | 16 | 0.221 |
| 19 | 16 34 4419 8002/... | 19 | M 14x1.5 | 22 | 45 | 48 | 20 | 21.5 | 100 | 16 | 0.221 |
| 19 | 10 34 4419 8162/... | 19 | M 16 | 22 | 45 | 48 | 20 | 21.5 | 100 | 16 | 0.221 |

Material:

Ball stud: steel, minimum tensile strength $R_m = 600 \text{ N/mm}^2$

Ball socket: steel, min. tensile strength $R_m = 500 \text{ N/mm}^2$

alternative: stainless steel 1.4305 (X8CrNiS18-9)

(supplement to order number .../000)

stainless steel 1.4404 (X2CrNiMo17-12-2)

(supplement to order number .../4404)



Snap ring: stainless steel

Surface protection:

| Identifier | Supplement to order number |
|---|----------------------------|
| bright | .../003 |
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 5 µm) | .../013 |
| electr. galvanised yellow (layer min. 5 µm) | .../023 |

Left-hand thread in the ball socket possible

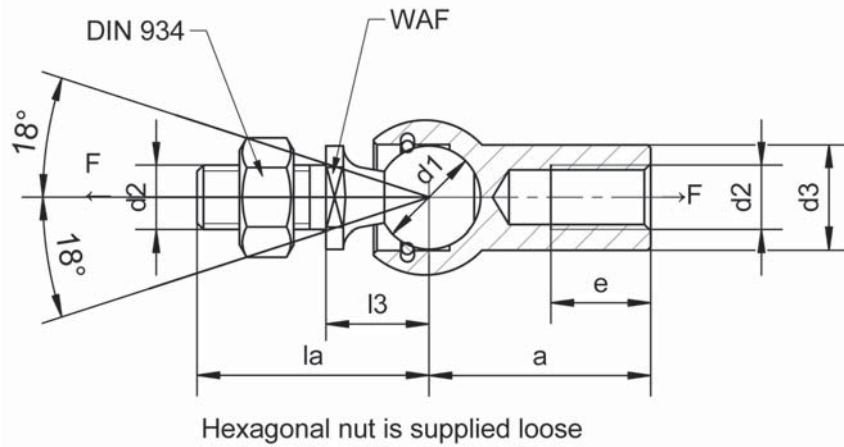
Axial joints not removable (see mbo catalogue page 16_05/page 68)

Special versions upon request



16_04
12/2012





| Size | Order number | d1 H9/h9 | d2 | d3 | a | la | l3 | e | WAF | Mass (kg) per piece |
|------|---------------------|-------------|----------|----|----|------|----|------|-----|---------------------------|
| 8 | 10 41 4408 8002/... | 8 | M 5 | 8 | 22 | 19.2 | 9 | 10.2 | 7 | 0.015 |
| 10 | 10 41 4410 8002/... | 10 | M 6 | 10 | 25 | 23.5 | 11 | 11.5 | 8 | 0.025 |
| 13 | 10 41 4413 8002/... | 13 | M 8 | 13 | 30 | 29.5 | 13 | 14 | 11 | 0.053 |
| 16 | 10 41 4416 8002/... | 16 | M 10 | 16 | 35 | 36 | 16 | 15.5 | 13 | 0.104 |
| 16 | 10 41 4416 8122/... | 16 | M 12 | 16 | 35 | 36 | 16 | 15.5 | 13 | 0.104 |
| 19 | 10 41 4419 8002/... | 19 | M 14 | 22 | 45 | 48 | 20 | 21.5 | 16 | 0.221 |
| 19 | 16 41 4419 8002/... | 19 | M 14x1.5 | 22 | 45 | 48 | 20 | 21.5 | 16 | 0.221 |
| 19 | 10 41 4419 8162/... | 19 | M 16 | 22 | 45 | 48 | 20 | 21.5 | 16 | 0.221 |

Material:

Ball stud: steel, minimum tensile strength $R_m = 600 \text{ N/mm}^2$

Ball socket: steel, min. tensile strength $R_m = 500 \text{ N/mm}^2$

alternative: stainless steel 1.4305 (X8CrNiS18-9)

(supplement to order number .../000)

stainless steel 1.4404 (X2CrNiMo17-12-2)

(supplement to order number .../4404)



Snap ring: stainless steel

Surface protection:

| Identifier | Supplement to order number |
|---|----------------------------|
| bright | .../003 |
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 5 µm) | .../013 |
| electr. galvanised yellow (layer min. 5 µm) | .../023 |

Special versions upon request



Extraction forces upon request

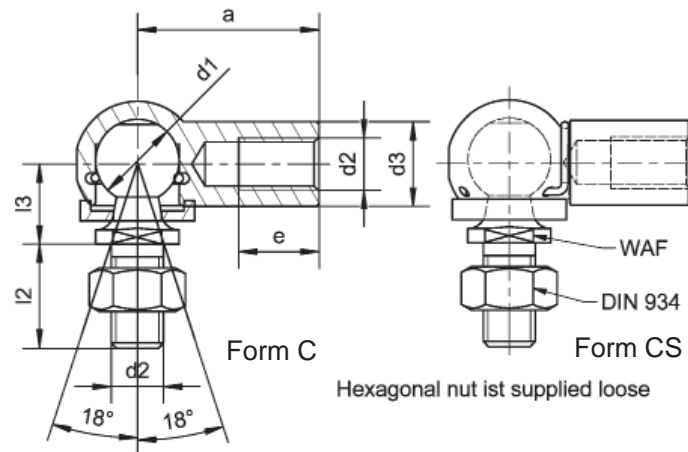
Left-hand thread in the ball socket possible

16_05
12/2012





Protection against dust, dirt,
water splashes, vapours



Angle joint with sealing cap according to DIN 71802 form C

| Identifier | Order number | d1 H9/h9 | d2 | d3 | l2 ±0.3 | l3 ±0.3 | a ±0.3 | e min. | WAF | Mass (kg) per piece |
|---------------|---------------------|-------------|----------|----|------------|------------|-----------|-----------|-----|---------------------------|
| C 8 M 5 | 10 33 4008 8001/... | 8 | M 5 | 8 | 10.2 | 9 | 22 | 10.2 | 7 | 0.015 |
| C 10 M 6 | 10 33 4010 8001/... | 10 | M 6 | 10 | 12.5 | 11 | 25 | 11.5 | 8 | 0.025 |
| C 13 M 8 | 10 33 4013 8001/... | 13 | M 8 | 13 | 16.5 | 13 | 30 | 14 | 11 | 0.053 |
| C 16 M 10 | 10 33 4016 8001/... | 16 | M 10 | 16 | 20 | 16 | 35 | 15.5 | 13 | 0.104 |
| C 16 M 12 | 10 33 4016 8121/... | 16 | M 12 | 16 | 20 | 16 | 35 | 15.5 | 13 | 0.104 |
| C 19 M 14 | 10 33 4019 8001/... | 19 | M 14 | 22 | 28 | 20 | 45 | 21.5 | 16 | 0.221 |
| C 19 M 14x1.5 | 16 33 4019 8001/... | 19 | M 14x1.5 | 22 | 28 | 20 | 45 | 21.5 | 16 | 0.221 |
| C 19 M 16 | 10 33 4019 8161/... | 19 | M 16 | 22 | 28 | 20 | 45 | 21.5 | 16 | 0.221 |

Angle joint with sealing cap according to DIN 71802 form CS

| Identifier | Order number | d1 H9/h9 | d2 | d3 | l2 ±0.3 | l3 ±0.3 | a ±0.3 | e min. | WAF | Mass (kg) per piece |
|----------------|---------------------|-------------|----------|----|------------|------------|-----------|-----------|-----|---------------------------|
| CS 8 M 5 | 10 33 4408 8002/... | 8 | M 5 | 8 | 10.2 | 9 | 22 | 10.2 | 7 | 0.015 |
| CS 10 M 6 | 10 33 4410 8002/... | 10 | M 6 | 10 | 12.5 | 11 | 25 | 11.5 | 8 | 0.025 |
| CS 13 M 8 | 10 33 4413 8002/... | 13 | M 8 | 13 | 16.5 | 13 | 30 | 14 | 11 | 0.053 |
| CS 16 M 10 | 10 33 4416 8002/... | 16 | M 10 | 16 | 20 | 16 | 35 | 15.5 | 13 | 0.104 |
| CS 16 M 12 | 10 33 4416 8122/... | 16 | M 12 | 16 | 20 | 16 | 35 | 15.5 | 13 | 0.104 |
| CS 19 M 14 | 10 33 4419 8002/... | 19 | M 14 | 22 | 28 | 20 | 45 | 21.5 | 16 | 0.221 |
| CS 19 M 14x1.5 | 16 33 4419 8002/... | 19 | M 14x1.5 | 22 | 28 | 20 | 45 | 21.5 | 16 | 0.221 |
| CS 19 M 16 | 10 33 4419 8162/... | 19 | M 16 | 22 | 28 | 20 | 45 | 21.5 | 16 | 0.221 |

Material:

Ball stud: steel, minimum tensile strength $R_m = 600 \text{ N/mm}^2$

Ball socket: steel, min. tensile strength $R_m = 500 \text{ N/mm}^2$

alternative: stainless steel 1.4305 (X8CrNiS18-9)

(supplement to order number .../000)

stainless steel 1.4404 (X2CrNiMo17-12-2)

(supplement to order number .../4404)



Snap ring and circlip: stainless steel

Material for sealing caps:

chloroprene (CN)

must be usable in temperatures ranging from $-30 \text{ }^\circ\text{C}$ to $+110 \text{ }^\circ\text{C}$ (for short periods up to $+140 \text{ }^\circ\text{C}$)

Angle joints in all standard versions (form B/BS and C/CS) and axial joints are available with sealing caps.

Surface protection:

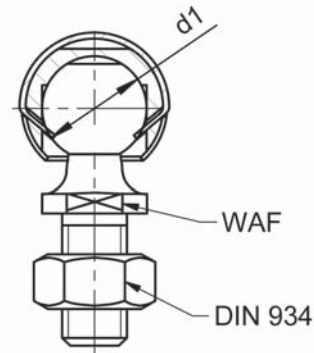
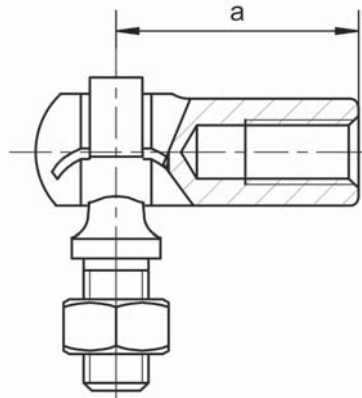
| Identifier | Supplement to order number |
|---|----------------------------|
| bright | .../003 |
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 5 µm) | .../013 |
| electr. galvanised yellow (layer min. 5 µm) | .../023 |

Special versions upon request



16_06
12/2012





Hexagonal nut is supplied loose

| Order number | Ball socket | | | Ball stud DIN 71803 | | | Mass (kg) per piece |
|---------------------|-------------|------|-----------|---------------------|-----------|--------|---------------------|
| | d1 | d2 | a ±0.3 | Form B | | Form C | |
| | | | | Short | Long | | |
| 10 39 1220 5008/... | 8 | M 5 | 22 | B 8 x 4 | - | - | - |
| 10 39 2220 5008/... | 8 | M 5 | 22 | - | B 8 x 7.5 | - | - |
| 10 39 3220 5008/... | 8 | M 5 | 22 | - | - | C 8 | - |
| 10 39 1250 6010/... | 10 | M 6 | 25 | B 10 x 4.5 | - | - | - |
| 10 39 2250 6010/... | 10 | M 6 | 25 | - | B 10 x 8 | - | - |
| 10 39 3250 6010/... | 10 | M 6 | 25 | - | - | C 10 | - |
| 10 39 1190 6010/... | 10 | M 6 | 19 | B 10 x 4.5 | - | - | - |
| 10 39 2190 6010/... | 10 | M 6 | 19 | - | B 10 x 8 | - | - |
| 10 39 3190 6010/... | 10 | M 6 | 19 | - | - | C 10 | - |
| 10 39 1190 8010/... | 10 | M 8 | 19 | B 10 x 4.5 | - | - | - |
| 10 39 2190 8010/... | 10 | M 8 | 19 | - | B 10 x 8 | - | - |
| 10 39 3190 8010/... | 10 | M 8 | 19 | - | - | C 10 | - |
| 10 39 1220 6013/... | 13 | M 6 | 22 | B 13 x 5 | - | - | - |
| 10 39 2220 6013/... | 13 | M 6 | 22 | - | B 13 x 10 | - | - |
| 10 39 3220 6013/... | 13 | M 6 | 22 | - | - | C 13 | - |
| 10 39 1220 8013/... | 13 | M 8 | 22 | B 13 x 5 | - | - | - |
| 10 39 2220 8013/... | 13 | M 8 | 22 | - | B 13 x 10 | - | - |
| 10 39 3220 8013/... | 13 | M 8 | 22 | - | - | C 13 | - |
| 10 39 1300 8013/... | 13 | M 8 | 30 | B 13 x 5 | - | - | - |
| 10 39 2300 8013/... | 13 | M 8 | 30 | - | B 13 x 10 | - | - |
| 10 39 3300 8013/... | 13 | M 8 | 30 | - | - | C 13 | - |
| 10 39 1235 8016/... | 16 | M 8 | 23.5 | B 16 x 6 | - | - | - |
| 10 39 2235 8016/... | 16 | M 8 | 23.5 | - | B 16 x 13 | - | - |
| 10 39 3235 8016/... | 16 | M 8 | 23.5 | - | - | C 16 | - |
| 10 39 1350 1016/... | 16 | M 10 | 35 | B 16 x 6 | - | - | - |
| 10 39 2350 1016/... | 16 | M 10 | 35 | - | B 16 x 13 | - | - |
| 10 39 3350 1016/... | 16 | M 10 | 35 | - | - | C 16 | - |

Material:

Ball stud: steel, minimum tensile strength $R_m = 600 \text{ N/mm}^2$
 Ball socket: steel, min. tensile strength $R_m = 500 \text{ N/mm}^2$
 Clip: spring steel, zinc-flake-coated

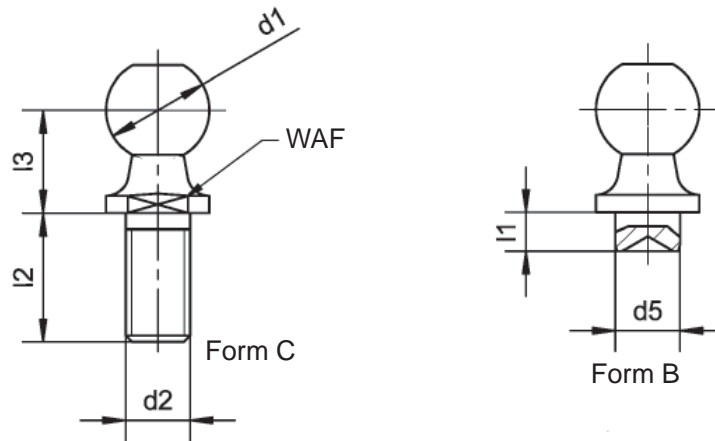
Surface protection:

| Identifier | Supplement to order number |
|-------------------------------------|----------------------------|
| zinc/nickel black (layer min. 8 µm) | .../069 |

Special versions upon request

16_07
 08/2011





Form B - with rivet stud for angle joints form B, BS

| Identifier | Order number | d1 | d5 h11 | l1 ±0.2 | l3 ±0.3 | WAF | Mass (kg) per piece |
|------------|---------------------|----|-----------|------------|------------|-----|---------------------------|
| B 6 x 3.5 | 10 03 1003 1006/... | 6 | 4 | 3.5 | 8.5 | - | 0.002 |
| B 8 x 4 | 10 03 1003 1008/... | 8 | 5 | 4 | 9 | - | 0.004 |
| B 8 x 7.5 | 10 03 1003 2008/... | 8 | 5 | 7.5 | 9 | - | 0.004 |
| B 10 x 4.5 | 10 03 1003 1010/... | 10 | 6 | 4.5 | 11 | - | 0.007 |
| B 10 x 8 | 10 03 1003 2010/... | 10 | 6 | 8 | 11 | - | 0.008 |
| B 13 x 5 | 10 03 1003 1013/... | 13 | 8 | 5 | 13 | - | 0.015 |
| B 13 x 10 | 10 03 1003 2013/... | 13 | 8 | 10 | 13 | - | 0.017 |
| B 16 x 6 | 10 03 1003 1016/... | 16 | 10 | 6 | 16 | - | 0.027 |
| B 16 x 13 | 10 03 1003 2016/... | 16 | 10 | 13 | 16 | - | 0.032 |
| B 19 x 12 | 10 03 1003 1019/... | 19 | 14 | 12 | 20 | - | 0.056 |
| B 19 x 18 | 10 03 1003 2019/... | 19 | 14 | 18 | 20 | - | 0.064 |

Form C - with threaded stud and spanner surface for angle joints form C, CS

| Identifier | Order number | d1 | d2 | l2 ±0.3 | l3 ±0.3 | WAF | Mass (kg) per piece |
|-----------------------|---------------------|----|----------|------------|------------|-----|---------------------------|
| C 6 M 4 ¹⁾ | 10 03 4003 0006/... | 6 | M 4 | 8.5 | 8.5 | 5 | 0.002 |
| C 8 M 5 | 10 03 4003 0008/... | 8 | M 5 | 10.2 | 9 | 7 | 0.005 |
| C 10 M 6 | 10 03 4003 0010/... | 10 | M 6 | 12.5 | 11 | 8 | 0.008 |
| C 13 M 8 | 10 03 4003 0013/... | 13 | M 8 | 16.5 | 13 | 11 | 0.018 |
| C 16 M 10 | 10 03 4003 0016/... | 16 | M 10 | 20 | 16 | 13 | 0.034 |
| C 16 M 12 | 10 03 4003 1612/... | 16 | M 12 | 20 | 16 | 13 | 0.038 |
| C 19 M 14 | 10 03 4003 0019/... | 19 | M 14 | 28 | 20 | 16 | 0.070 |
| C 19 M 14x1.5 | 16 03 4003 0019/... | 19 | M 14x1.5 | 28 | 20 | 16 | 0.070 |
| C 19 M 16 | 10 03 4003 1916/... | 19 | M 16 | 28 | 20 | 16 | 0.079 |

1) similar to DIN 71803

Material:

Ball stud: steel, minimum tensile strength $R_m = 600 \text{ N/mm}^2$
 alternative: stainless steel 1.4305 (X8CrNiS18-9)
 (supplement to order number .../000)
 stainless steel 1.4404 (X2CrNiMo17-12-2)
 (supplement to order number .../4404)



Surface protection:

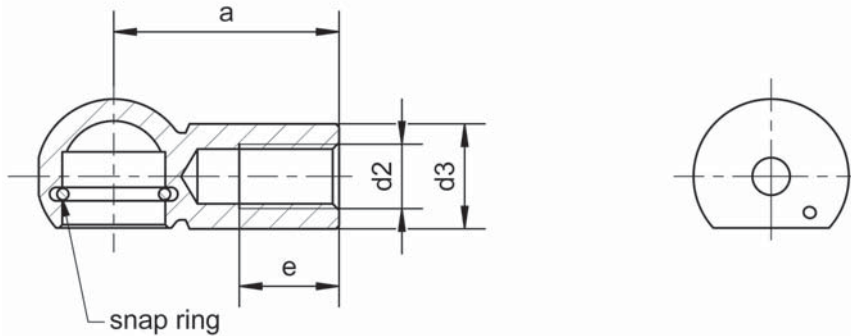
| Identifier | Supplement to order number |
|---|----------------------------|
| bright | .../003 |
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 5 µm) | .../013 |
| electr. galvanised yellow (layer min. 5 µm) | .../023 |

Special versions upon request



16_08
12/2012



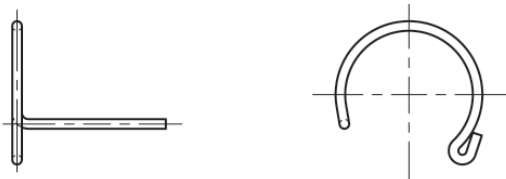


Form B - with snap ring and groove for circlip; for angle joints form C, CS

| Identifier | Order number | d2 | d3 | a ±0.3 | e Min. | Mass (kg) per piece |
|-----------------------|---------------------|----------|----|-----------|-----------|---------------------------|
| A 6 M 4 ¹⁾ | 10 03 0000 0006/... | M 4 | 7 | 22 | 10.2 | 0.008 |
| B 8 M 5 | 10 03 0000 1008/... | M 5 | 8 | 22 | 10.2 | 0.009 |
| B 10 M 6 | 10 03 0000 1010/... | M 6 | 10 | 25 | 11.5 | 0.015 |
| B 13 M 8 | 10 03 0000 1013/... | M 8 | 13 | 30 | 14 | 0.029 |
| B 16 M 10 | 10 03 0000 1016/... | M 10 | 16 | 35 | 15.5 | 0.057 |
| B 16 M 12 | 10 03 0000 2016/... | M 12 | 16 | 35 | 15.5 | 0.049 |
| B 19 M 14 | 10 03 0000 1019/... | M 14 | 22 | 45 | 21.5 | 0.125 |
| B 19 M 14x1.5 | 16 03 0000 1019/... | M 14x1.5 | 22 | 45 | 21.5 | 0.124 |
| B 19 M 16 | 10 03 0000 2019/... | M 16 | 22 | 45 | 21.5 | 0.125 |

1) size A 6 M 4 without groove for circlip (form A)

Circlip according to DIN 71805 - form S



Material:

Ball socket: steel, min. tensile strength $R_m = 500 \text{ N/mm}^2$

alternative: stainless steel 1.4305 (X8CrNiS18-9)

(supplement to order number .../000)

stainless steel 1.4404 (X2CrNiMo17-12-2)

(supplement to order number .../4404)



Circlip: stainless steel

Snap ring: stainless steel

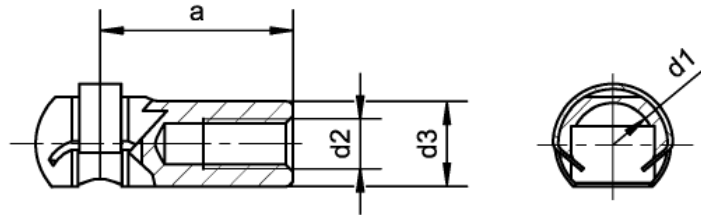
Surface protection:

| Identifier | Supplement to order number |
|---|----------------------------|
| bright | .../003 |
| phosphatised oiled | .../002 |
| electr. galvanised white (layer min. 5 µm) | .../013 |
| electr. galvanised yellow (layer min. 5 µm) | .../023 |

Special versions upon request



16_09
12/2012



| Order number | Ball socket | | | | Mass (kg) per piece |
|---------------------|-------------|------|----|-----------|---------------------------|
| | d1 | d2 | d3 | a ±0.3 | |
| 10 38 0220 5008/... | 8 | M 5 | 8 | 22 | - |
| 10 38 0250 6010/... | 10 | M 6 | 10 | 25 | - |
| 10 38 0190 6010/... | 10 | M 6 | 10 | 19 | - |
| 10 38 0190 8010/... | 10 | M 8 | 10 | 19 | - |
| 10 38 0220 6013/... | 13 | M 6 | 13 | 22 | - |
| 10 38 0220 8013/... | 13 | M 8 | 13 | 22 | - |
| 10 38 0300 8013/... | 13 | M 8 | 13 | 30 | - |
| 10 38 0235 8016/... | 16 | M 8 | 16 | 23.5 | - |
| 10 38 0350 0016/... | 16 | M 10 | 16 | 35 | - |

Material:

Ball socket: steel, min. tensile strength $R_m = 500 \text{ N/mm}^2$
Clip: spring steel, zinc-flake-coated

Surface protection:

| Identifier | Supplement to order number |
|-------------------------------------|----------------------------|
| zinc/nickel black (layer min. 8 µm) | .../069 |

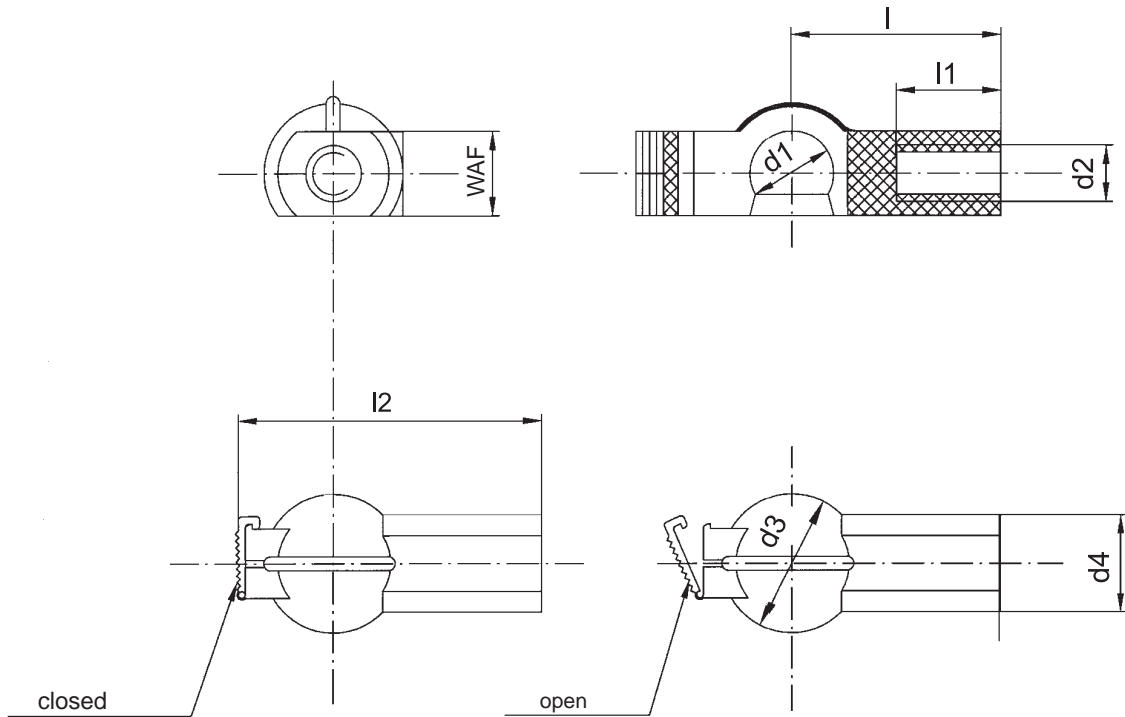
Special versions upon request

16_10
08/2011



mbo standard 43

maintenance-free
no abrasion



| Identifier | Order number | Ball d1 ²⁾ | d2 | d3 ±0.3 | d4 ±0.3 | l ±0.5 | l1 min. | l2 ≈ | WAF | Short term axial thrust max. N ¹⁾ | Mass (kg) per 100 pieces |
|------------|-----------------|-----------------------|-----|---------|---------|--------|---------|------|-----|--|--------------------------|
| 8 mbo 43 | 10 43 0000 0008 | 8 | M 5 | 12.5 | 9.5 | 22 | 12 | 32 | 8 | 400 | 0.150 |
| 10 mbo 43 | 10 43 0000 0010 | 10 | M 6 | 15 | 12 | 25 | 14 | 36.5 | 10 | 700 | 0.340 |
| 13 mbo 43 | 10 43 0000 0013 | 13 | M 8 | 19 | 15 | 30 | 17 | 44.5 | 12 | 900 | 0.670 |

1) guide value for standard atmosphere 23/50 DIN 50014

2) suitable for ball studs DIN 71803 (h9)

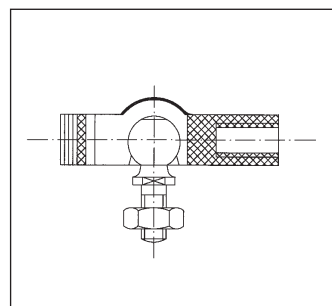
Material:

PA 6.6 (black)

Temperature from -40 °C to +90 °C (for a short time up to +140 °C) possible

This ball socket can be completed with ball studs according to DIN 71803 (steel), alternatively ball unhardened

(see mbo catalogue page 16_08/page 71)



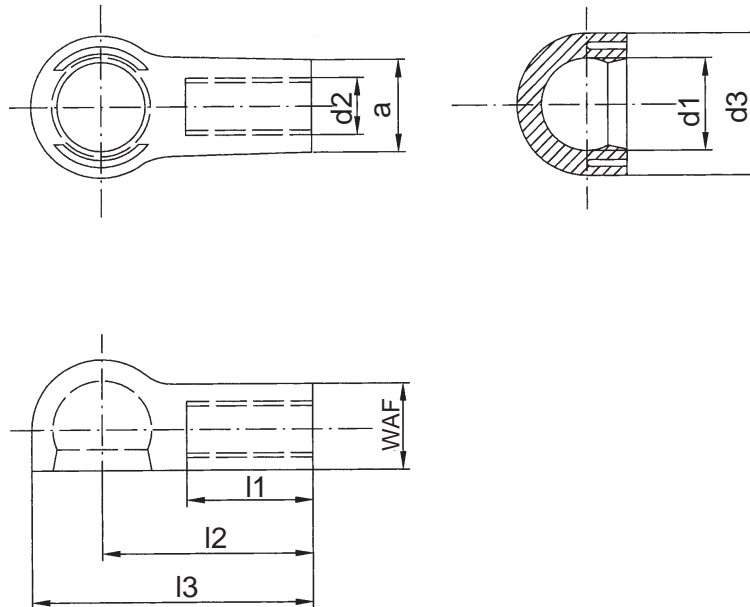
16_11
08/2011





mbo standard 44

maintenance-free
no abrasion



| Identifier | Order number | Ball d1 ²⁾ | d2 | d3 ±0.3 | a ±0.3 | l1 min. | l2 ±0.5 | l3 ±0.5 | WAF | Short term axial thrust max. N ¹⁾ | Mass (kg) per 100 pieces |
|------------|-----------------|-----------------------|-----|---------|--------|---------|---------|---------|-----|--|--------------------------|
| 8 mbo 44 | 10 44 0000 0008 | 8 | M 5 | 14 | 9.5 | 14 | 22 | 29 | 8 | 1300 | 0.250 |
| 10 mbo 44 | 10 44 0000 0010 | 10 | M 6 | 16 | 10.5 | 16 | 25 | 33 | 9 | 1500 | 0.372 |
| 13 mbo 44 | 10 44 0000 0013 | 13 | M 8 | 20 | 13 | 19 | 30 | 40 | 12 | 2300 | 0.660 |

1) guide value for standard atmosphere 23/50 DIN 50014

2) suitable for ball studs DIN 71803 (h9)

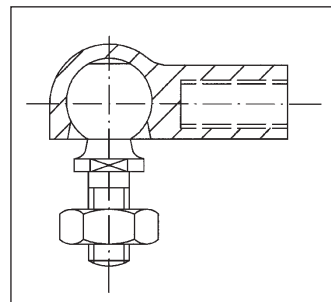
Material:

POM

Temperature from -40 °C to +100 °C (for a short time up to +120 °C) possible

This ball socket can be completed with ball studs according to DIN 71803 (steel), alternatively ball unhardened

(see mbo catalogue page 16_08/page 71)



16_12
08/2011



Rod ends DIN ISO 12240-4 (DIN 648) with female and male thread

| K series - selection | | |
|---|--|--|
| maintenance-free | | |
| mbo standard 52 | high-performance version | mbo catalogue page 17_07/page 82 and 17_08/page 83 |
| mbo standard 54 | high-performance version | mbo catalogue page 17_11/page 86 and 17_12/page 87 |
| mbo standard 56 stainless steel | high-performance version | mbo catalogue page 17_15/page 90 and 17_16/page 91 |
| mbo standard 58 | | mbo catalogue page 17_18/page 93 |
| can be regreased | | |
| mbo standard 50 | standard version | mbo catalogue page 17_03/page 78 and 17_04/page 79 |
| mbo standard 51 | high-performance version | mbo catalogue page 17_05/page 80 and 17_06/page 81 |
| mbo standard 53 | high-performance version | mbo catalogue page 17_09/page 84 and 17_10/page 85 |
| mbo standard 55 stainless steel | high-performance version | mbo catalogue page 17_13/page 88 and 17_14/page 89 |
| mbo standard 57 | steel/steel version | mbo catalogue page 17_17/page 92 |

| E series - selection | | |
|---|---------------------|--|
| maintenance-free | | |
| mbo standard 80 | | mbo catalogue page 17_29/page 104 and 17_30/page 105 |
| mbo standard 81 sealing | | mbo catalogue page 17_29/page 104 and 17_30/page 105 |
| mbo standard 84 stainless steel | | mbo catalogue page 17_33/page 108 and 17_34/page 109 |
| can be regreased | | |
| mbo standard 82 | steel/steel version | mbo catalogue page 17_31/page 106 and 17_32/page 107 |
| mbo standard 83 sealing | steel/steel version | mbo catalogue page 17_31/page 106 and 17_32/page 107 |

Pivoting bearings DIN ISO 12240-1 (DIN 648)

| K series - selection | | |
|---|--------------------------|---|
| maintenance-free | | |
| mbo standard 73 | high-performance version | mbo catalogue page 17_25/page 100 |
| mbo standard 74 stainless steel | high-performance version | mbo catalogue page 17_26/page 101 |
| mbo standard 76 without outer ring | high-performance version | mbo catalogue page 17_28/page 103 |
| can be regreased | | |
| mbo standard 70 | standard version | mbo catalogue page 17_22/page 97 |
| mbo standard 71 | high-performance version | mbo catalogue page 17_23/page 98 |
| mbo standard 72 stainless steel | high-performance version | mbo catalogue page 17_24/page 99 |
| mbo standard 75 without outer ring | high-performance version | mbo catalogue page 17_27/page 102 |

| E series - selection | | |
|---|---------------------|---|
| maintenance-free | | |
| mbo standard 91 | | mbo catalogue page 17_36/page 111 |
| mbo standard 92 sealing | | mbo catalogue page 17_36/page 111 |
| mbo standard 93 stainless steel | | mbo catalogue page 17_37/page 112 |
| can be regreased | | |
| mbo standard 89 | steel/steel version | mbo catalogue page 17_35/page 110 |
| mbo standard 90 sealing | steel/steel version | mbo catalogue page 17_35/page 110 |

Rod ends hydraulic DIN 24338 / ISO 6982 - selection

| needs maintenance | | |
|--------------------------|-----------------------------|-----------------------------------|
| mbo standard 94 | bearing with retaining ring | mbo catalogue page 17_38/page 113 |

Rod ends hydraulic DIN 24555 / ISO 8133 - selection

| needs maintenance | | |
|--------------------------|-----------------|-----------------------------------|
| mbo standard 95 | bearing caulked | mbo catalogue page 17_39/page 114 |

17_01
08/2011



Static basic load rating C_0 (kN)

The static basic load rating C_0 denotes the value with which a rod end can in normal applications with a static load be stressed in the weakest cross-section without being permanently deformed. It represents the permissible radial bearing strain at rest. The basic load ratings quoted have been calculated using the respective material characteristic values and can be verified by tensile experiments at room temperature. The yield point was used to 80%, making the safety factor until yield start 1.25.

The static basic load rating also enables the permissible thrust load to be calculated:

$$F_a = F_a \text{ perm.} = p \cdot C_0 \text{ (kN)}$$

$p \leq 0.4$ for rod ends according to mbo standard 50 and mbo standard 57

$p \leq 0.2$ for rod ends according to mbo standard 51 up to mbo standard 55

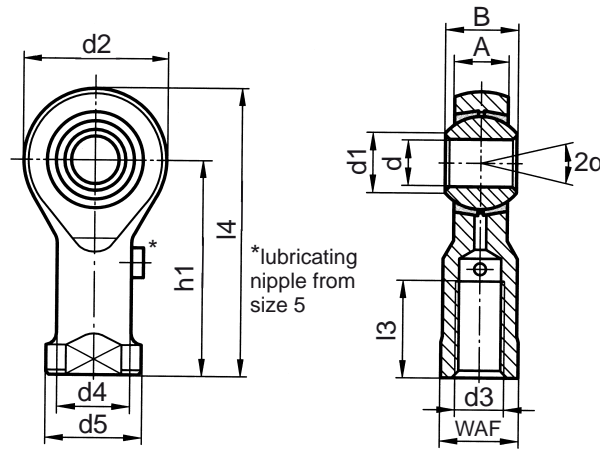
$p \leq 0.1$ for rod ends according to mbo standard 82 up to mbo standard 84

Dynamic basic load ratings for rod ends as well as static and dynamic basic load ratings for pivoting bearings are available on request.

17_02
08/2011



mbo standard 50
standard version
can be regreased
suitable for
axial thrusts



| Size | Order number | d _{H7} | A | B | d1 | d2 | Thread d3 | d4 | d5 | h1 | l3 | l4 | WAF | Static basic load rating C ₀ ¹⁾ (kN) | Permissible rpm | Angle of misalignment α° | Weight per piece ≈ g |
|------|---------------------|-----------------|------|----|------|----|-----------|------|----|----|----|-----|-----|--|-----------------|--------------------------|----------------------|
| 5 | 10 50 6481 1005/013 | 5 | 6 | 8 | 7.7 | 18 | M 5 | 9 | 11 | 27 | 10 | 36 | 9 | 9.9 | 900 | 13 | 18 |
| 6 | 10 50 6481 1006/013 | 6 | 6.75 | 9 | 8.9 | 20 | M 6 | 10 | 13 | 30 | 12 | 40 | 11 | 11.9 | 760 | 13 | 27 |
| 8 | 10 50 6481 1008/013 | 8 | 9 | 12 | 10.4 | 24 | M 8 | 12.5 | 16 | 36 | 16 | 48 | 13 | 17.1 | 620 | 14 | 46 |
| 10 | 10 50 6481 1010/013 | 10 | 10.5 | 14 | 12.9 | 28 | M 10 | 15 | 19 | 43 | 20 | 57 | 17 | 21.4 | 500 | 13 | 76 |
| 12 | 10 50 6481 1012/013 | 12 | 12 | 16 | 15.4 | 32 | M 12 | 17.5 | 22 | 50 | 22 | 66 | 19 | 27 | 450 | 13 | 115 |
| 14 | 10 50 6481 1014/013 | 14 | 13.5 | 19 | 16.8 | 36 | M 14 | 20 | 25 | 57 | 25 | 75 | 22 | 24.5 | 360 | 16 | 170 |
| 16 | 10 50 6481 1016/013 | 16 | 15 | 21 | 19.3 | 42 | M 16 | 22 | 27 | 64 | 28 | 85 | 22 | 37 | 350 | 15 | 230 |
| 18 | 16 50 6481 1018/013 | 18 | 16.5 | 23 | 21.8 | 46 | M 18x1.5 | 25 | 31 | 71 | 32 | 94 | 27 | 43 | 320 | 15 | 320 |
| 20 | 16 50 6481 1020/013 | 20 | 18 | 25 | 24.3 | 50 | M 20x1.5 | 27.5 | 34 | 77 | 33 | 102 | 32 | 49.5 | 280 | 14 | 415 |
| 22 | 16 50 6481 1022/013 | 22 | 20 | 28 | 25.8 | 54 | M 22x1.5 | 30 | 37 | 84 | 37 | 111 | 32 | 57 | 250 | 15 | 540 |
| 25 | 18 50 6481 1025/013 | 25 | 22 | 31 | 29.6 | 60 | M 24x2 | 33.5 | 42 | 94 | 42 | 124 | 36 | 68 | 230 | 15 | 750 |

1) see mbo catalogue page 17_02/page 77

Material:

Housing: up to size 12 undercut steel 1.0718 (11SMnPb30+C), lathe work, galvanised;
from size 14 thermal treatment steel 1.0402 (C22), forged, galvanised

Bearing shell: plain bearing - special brass CuZn40Al1

Internal ring: ball bearing steel 1.2067 (100Cr6), hardened, grinded, polished
alternative: hard chrome-plated

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 2 - 10 | 0.005 - 0.035 |
| 12 - 20 | 0.010 - 0.040 |
| 22 - 40 | 0.010 - 0.050 |

Cetop connection dimensions:

see mbo catalogue page 17_19/page 94

Lubrication:

via cupped-type lubricating nipple DIN 3405;
regular lubrication required using non-soap high-temperature grease with a high drop point to ensure consistent lubrication at high operating temperatures;
working range: -50 °C up to +200 °C;
initial lubrication must be performed during initial operation

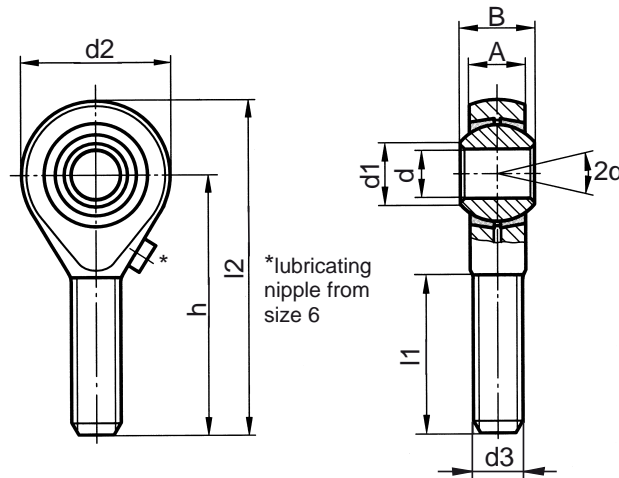
Special versions upon request

17_03
08/2011





mbo standard 50
standard version
can be regreased
suitable for
axial thrusts



| Size | Order number | d H7 | A | B | d1 | d2 | Thread d3 | h | l1 | l2 | Static basic load rating C ₀ ¹⁾ (kN) | Per- missible rpm | Angle of misalign- ment α° | Weight per piece ≈ g |
|-----------------|---------------------|---------|------|----|------|----|--------------|----|----|-----|--|-------------------------|-------------------------------------|----------------------------|
| 5 ²⁾ | 10 50 6481 2005/013 | 5 | 6 | 8 | 7.7 | 18 | M 5 | 33 | 20 | 42 | 4.3 | 900 | 13 | 13 |
| 6 | 10 50 6481 2006/013 | 6 | 6.75 | 9 | 8.9 | 20 | M 6 | 36 | 22 | 46 | 6 | 760 | 13 | 20 |
| 8 | 10 50 6481 2008/013 | 8 | 9 | 12 | 10.4 | 24 | M 8 | 42 | 25 | 54 | 11 | 620 | 14 | 33 |
| 10 | 10 50 6481 2010/013 | 10 | 10.5 | 14 | 12.9 | 28 | M 10 | 48 | 29 | 62 | 17.4 | 500 | 13 | 56 |
| 12 | 10 50 6481 2012/013 | 12 | 12 | 16 | 15.4 | 32 | M 12 | 54 | 33 | 70 | 25.5 | 450 | 13 | 87 |
| 14 | 10 50 6481 2014/013 | 14 | 13.5 | 19 | 16.8 | 36 | M 14 | 60 | 38 | 78 | 24.5 | 360 | 16 | 129 |
| 16 | 10 50 6481 2016/013 | 16 | 15 | 21 | 19.3 | 42 | M 16 | 66 | 40 | 87 | 36.5 | 350 | 15 | 189 |
| 18 | 16 50 6481 2018/013 | 18 | 16.5 | 23 | 21.8 | 46 | M 18x1.5 | 72 | 44 | 95 | 43 | 320 | 15 | 267 |
| 20 | 16 50 6481 2020/013 | 20 | 18 | 25 | 24.3 | 50 | M 20x1.5 | 78 | 47 | 103 | 49.5 | 280 | 14 | 348 |
| 22 | 16 50 6481 2022/013 | 22 | 20 | 28 | 25.8 | 54 | M 22x1.5 | 84 | 51 | 111 | 57 | 250 | 15 | 443 |
| 25 | 18 50 6481 2025/013 | 25 | 22 | 31 | 29.6 | 60 | M 24x2 | 94 | 58 | 124 | 68 | 230 | 15 | 600 |

1) see mbo catalogue page 17_02/page 77

2) can not be regreased

Material:

Housing: up to size 12 undercut steel 1.0718 (11SMnPb30+C), lathe work, galvanised; from size 14 thermal treatment steel 1.0402 (C22), forged, galvanised

Bearing shell: plain bearing - special brass CuZn40Al1

Internal ring: ball bearing steel 1.2067 (100Cr6), hardened, grinded, polished
alternative: hard chrome-plated

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 2 - 10 | 0.005 - 0.035 |
| 12 - 20 | 0.010 - 0.040 |
| 22 - 40 | 0.010 - 0.050 |

Lubrication:

via cupped-type lubricating nipple DIN 3405; regular lubrication required using non-soap high-temperature grease with a high drop point to ensure consistent lubrication at high operating temperatures; working range: -50 °C up to +200 °C; initial lubrication must be performed during initial operation

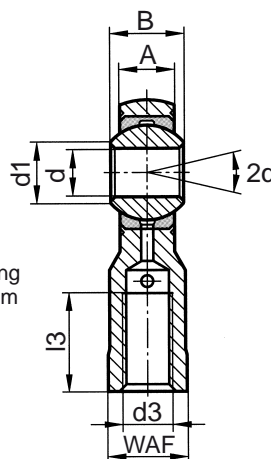
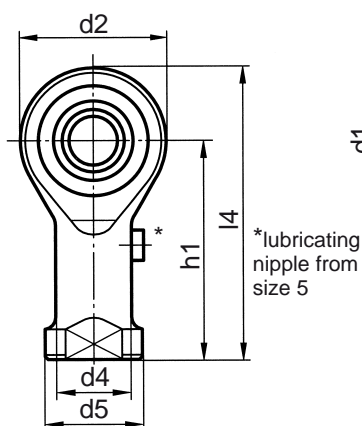
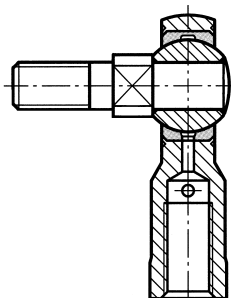
Special versions upon request

17_04
08/2011





mbo standard 51
high-performance version
can be regreased
suitable for
high speeds



see mbo catalogue page 17_20/page 95
(Order number: .. 51 6482 1...)

| Size | Order number | d _{H7} | A | B | d1 | d2 | Thread d3 | d4 | d5 | h1 | l3 | l4 | WAF | Static basic load rating C ₀ ¹⁾ (kN) | Permissible rpm | Angle of misalignment α° | Weight per piece ≈ g |
|-----------------|---------------------|-----------------|------|-----|------|-----|-----------|------|-----|-----|----|------|-----|--|-----------------|--------------------------|----------------------|
| 2 ²⁾ | 10 51 6481 1002/013 | 2 | 3.6 | 4.5 | 2.6 | 9 | M 2 | 3.8 | 4.5 | 16 | 7 | 20.5 | 4 | 3 | - | 16 | 3 |
| 3 ²⁾ | 10 51 6481 1003/013 | 3 | 4.5 | 6 | 5.1 | 14 | M 3 | 5 | 6.5 | 21 | 10 | 27 | 5.5 | 4.1 | - | 14 | 6 |
| 5 | 10 51 6481 1005/013 | 5 | 6 | 8 | 7.7 | 18 | M 5 | 9 | 11 | 27 | 10 | 36 | 9 | 8 | 1200 | 13 | 18 |
| 6 | 10 51 6481 1006/013 | 6 | 6.75 | 9 | 8.9 | 20 | M 6 | 10 | 13 | 30 | 12 | 40 | 11 | 8.9 | 1500 | 13 | 27 |
| 8 | 10 51 6481 1008/013 | 8 | 9 | 12 | 10.4 | 24 | M 8 | 12.5 | 16 | 36 | 16 | 48 | 13 | 14.1 | 1200 | 14 | 46 |
| 10 | 10 51 6481 1010/013 | 10 | 10.5 | 14 | 12.9 | 28 | M 10 | 15 | 19 | 43 | 20 | 57 | 17 | 19.3 | 1000 | 13 | 76 |
| 12 | 10 51 6481 1012/013 | 12 | 12 | 16 | 15.4 | 32 | M 12 | 17.5 | 22 | 50 | 22 | 66 | 19 | 23.5 | 860 | 13 | 115 |
| 14 | 10 51 6481 1014/013 | 14 | 13.5 | 19 | 16.8 | 36 | M 14 | 20 | 25 | 57 | 25 | 75 | 22 | 21 | 750 | 16 | 170 |
| 16 | 10 51 6481 1016/013 | 16 | 15 | 21 | 19.3 | 42 | M 16 | 22 | 27 | 64 | 28 | 85 | 22 | 32 | 660 | 15 | 230 |
| 18 | 16 51 6481 1018/013 | 18 | 16.5 | 23 | 21.8 | 46 | M 18x1.5 | 25 | 31 | 71 | 32 | 94 | 27 | 38.5 | 600 | 15 | 320 |
| 20 | 16 51 6481 1020/013 | 20 | 18 | 25 | 24.3 | 50 | M 20x1.5 | 27.5 | 34 | 77 | 33 | 102 | 32 | 44 | 540 | 14 | 415 |
| 22 | 16 51 6481 1022/013 | 22 | 20 | 28 | 25.8 | 54 | M 22x1.5 | 30 | 37 | 84 | 37 | 111 | 32 | 53 | 500 | 15 | 540 |
| 25 | 18 51 6481 1025/013 | 25 | 22 | 31 | 29.6 | 60 | M 24x2 | 33.5 | 42 | 94 | 42 | 124 | 36 | 62 | 440 | 15 | 750 |
| 30 | 18 51 6481 1030/013 | 30 | 25 | 37 | 34.8 | 70 | M 30x2 | 40 | 51 | 110 | 51 | 145 | 41 | 82 | 370 | 17 | 1130 |
| 35 | 18 51 6481 1035/013 | 35 | 28 | 43 | 37.7 | 80 | M 36x2 | 46 | 58 | 125 | 56 | 165 | 50 | 101 | 330 | 19 | 1600 |
| 40 | 18 51 6481 1040/013 | 40 | 35 | 49 | 44.2 | 90 | M 42x2 | 57 | 69 | 142 | 60 | 187 | 60 | 124 | 290 | 16 | 2770 |
| 50 | 18 51 6481 1050/013 | 50 | 45 | 60 | 55.9 | 116 | M 48x2 | 65 | 78 | 160 | 65 | 218 | 65 | 308 | 230 | 14 | 5000 |

1) see mbo catalogue page 17_02/page 77

2) can not be regreased

Material:

Housing: up to size 12 undercut steel 1.0718 (11SMnPb30+C), lathe work, galvanised;
from size 14 thermal treatment steel 1.0402 (C22), forged, galvanised;
size 50 thermal treatment steel 1.0503 (C45), lathe work

Bearing shell: special bronze CuSn8

Internal ring: ball bearing steel 1.2067 (100Cr6), hardened, grinded, polished
alternative: hard chrome-plated

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 2 - 10 | 0.005 - 0.035 |
| 12 - 20 | 0.010 - 0.040 |
| 22 - 40 | 0.010 - 0.050 |

Cetop connection dimensions:

see mbo catalogue page 17_19/page 94

Lubrication:

via cupped-type lubricating nipple DIN 3405;
regular lubrication required using non-soap high-temperature grease with a high drop point to ensure consistent lubrication at high operating temperatures;
working range: -50 °C up to +250 °C;
initial lubrication must be performed during initial operation

This version is available with sealing:

see mbo catalogue page 17_21/page 96
(Order number: .. 51 6483 1...)

Special versions upon request

17_05
08/2011





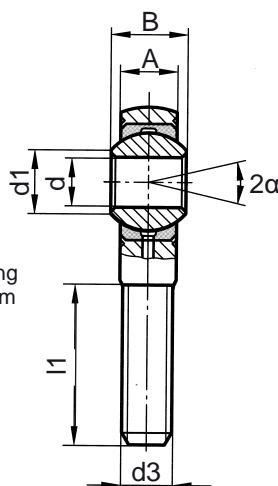
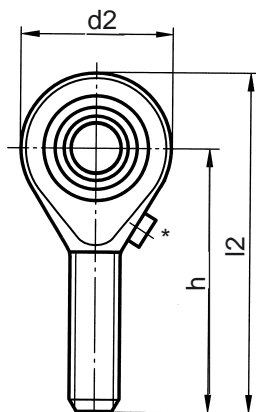
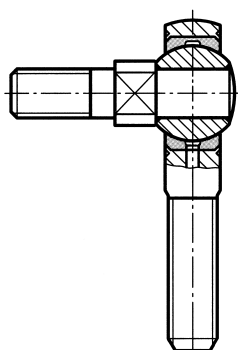
Rod ends DIN ISO 12240-4 (DIN 648)

K series

with male thread



mbo standard 51
high-performance version
can be regreased
suitable for
high speeds



see mbo catalogue page 17_20/page 95
(Order number: .. 51 6482 2...)

| Size | Order number | d H7 | A | B | d1 | d2 | Thread d3 | h | l1 | l2 | Static basic load rating C ₀ ¹⁾ (kN) | Per- missible rpm | Angle of misalign- ment α° | Weight per piece ≈ g |
|-----------------|---------------------|---------|------|-----|------|-----|--------------|-----|-----|------|--|-------------------------|-------------------------------------|----------------------------|
| 2 ²⁾ | 10 51 6481 2002/013 | 2 | 3.6 | 4.5 | 2.6 | 9 | M 2 | 20 | 12 | 24.5 | 0.6 | - | 16 | 3 |
| 3 ²⁾ | 10 51 6481 2003/013 | 3 | 4.5 | 6 | 5.1 | 14 | M 3 | 26 | 15 | 33 | 1.5 | - | 14 | 6 |
| 5 ²⁾ | 10 51 6481 2005/013 | 5 | 6 | 8 | 7.7 | 18 | M 5 | 33 | 20 | 42 | 4.3 | - | 13 | 13 |
| 6 | 10 51 6481 2006/013 | 6 | 6.75 | 9 | 8.9 | 20 | M 6 | 36 | 22 | 46 | 6 | 1500 | 13 | 20 |
| 8 | 10 51 6481 2008/013 | 8 | 9 | 12 | 10.4 | 24 | M 8 | 42 | 25 | 54 | 11 | 1200 | 14 | 33 |
| 10 | 10 51 6481 2010/013 | 10 | 10.5 | 14 | 12.9 | 28 | M 10 | 48 | 29 | 62 | 17.4 | 1000 | 13 | 56 |
| 12 | 10 51 6481 2012/013 | 12 | 12 | 16 | 15.4 | 32 | M 12 | 54 | 33 | 70 | 23.5 | 860 | 13 | 87 |
| 14 | 10 51 6481 2014/013 | 14 | 13.5 | 19 | 16.8 | 36 | M 14 | 60 | 38 | 78 | 21 | 750 | 16 | 129 |
| 16 | 10 51 6481 2016/013 | 16 | 15 | 21 | 19.3 | 42 | M 16 | 66 | 40 | 87 | 32 | 660 | 15 | 189 |
| 18 | 16 51 6481 2018/013 | 18 | 16.5 | 23 | 21.8 | 46 | M 18x1.5 | 72 | 44 | 95 | 38.5 | 600 | 15 | 267 |
| 20 | 16 51 6481 2020/013 | 20 | 18 | 25 | 24.3 | 50 | M 20x1.5 | 78 | 47 | 103 | 44 | 540 | 14 | 348 |
| 22 | 16 51 6481 2022/013 | 22 | 20 | 28 | 25.8 | 54 | M 22x1.5 | 84 | 51 | 111 | 53 | 500 | 15 | 443 |
| 25 | 18 51 6481 2025/013 | 25 | 22 | 31 | 29.6 | 60 | M 24x2 | 94 | 58 | 124 | 62 | 440 | 15 | 600 |
| 30 | 18 51 6481 2030/013 | 30 | 25 | 37 | 34.8 | 70 | M 30x2 | 110 | 71 | 145 | 82 | 370 | 17 | 1030 |
| 35 | 18 51 6481 2035/013 | 35 | 28 | 43 | 37.7 | 80 | M 36x2 | 125 | 73 | 165 | 101 | 330 | 19 | 1600 |
| 40 | 18 51 6481 2040/013 | 40 | 35 | 49 | 44.2 | 90 | M 42x2 | 142 | 78 | 187 | 124 | 290 | 16 | 2550 |
| 50 | 18 51 6481 2050/013 | 50 | 45 | 60 | 55.9 | 116 | M 48x2 | 185 | 105 | 243 | 308 | 230 | 14 | 4800 |

1) see mbo catalogue page 17_02/page 77

2) can not be regreased

Material:

Housing: up to size 12 undercut steel 1.0718 (11SMnPb30+C), lathe work, galvanised;
from size 14 thermal treatment steel 1.0402 (C22), forged, galvanised;
size 50 thermal treatment steel 1.0503 (C45), lathe work

Bearing shell: special bronze CuSn8

Internal ring: ball bearing steel 1.2067 (100Cr6), hardened, grinded, polished
alternative: hard chrome-plated

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 2 - 10 | 0.005 - 0.035 |
| 12 - 20 | 0.010 - 0.040 |
| 22 - 40 | 0.010 - 0.050 |

Lubrication:

via cupped-type lubricating nipple DIN 3405;
regular lubrication required using non-soap high-temperature grease with a high drop point to ensure consistent lubrication at high operating temperatures;
working range: -50 °C up to +250 °C;
initial lubrication must be performed during initial operation

This version is available with sealing:

see mbo catalogue page 17_21/page 96
(Order number: .. 51 6483 2...)

Special versions upon request

mbo Osswald GmbH & Co KG

Metal processing · Linking technology

www.mbo-osswald.com · info@mbo-osswald.de
Tel: + 49 (0) 9345-670-0 · Fax: + 49 (0) 9345-6255



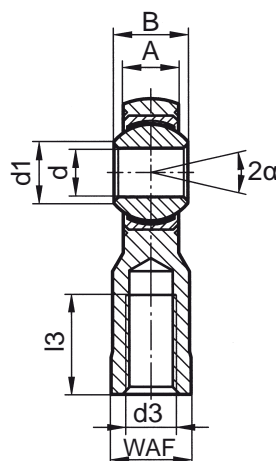
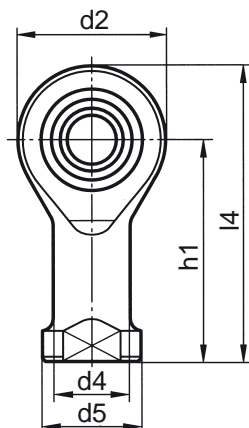
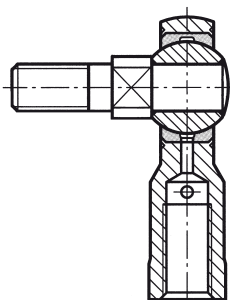
General tolerances
DIN ISO 2768-medium

Subject to technical
alterations

We accept no responsibility for
incorrect or incomplete details or
information given



mbo standard 52
high-performance version
maintenance-free
suitable for low speeds
under high pressure with
dynamic loads



see mbo catalogue page 17_20/page 95
(Order number: .. 52 6482 1...)

| Size | Order number | d _{H7} | A | B | d1 | d2 | Thread d3 | d4 | d5 | h1 | l3 | l4 | WAF | Static basic load rating C ₀ ¹⁾ (kN) | Permissible rpm | Angle of misalignment α° | Weight per piece ≈ g |
|------|---------------------|-----------------|------|----|------|-----|-----------|------|----|-----|----|-----|-----|--|-----------------|--------------------------|----------------------|
| 5 | 10 52 6481 1005/013 | 5 | 6 | 8 | 7.7 | 18 | M 5 | 9 | 11 | 27 | 10 | 36 | 9 | 8 | 600 | 13 | 18 |
| 6 | 10 52 6481 1006/013 | 6 | 6.75 | 9 | 8.9 | 20 | M 6 | 10 | 13 | 30 | 12 | 40 | 11 | 8.9 | 530 | 13 | 27 |
| 8 | 10 52 6481 1008/013 | 8 | 9 | 12 | 10.4 | 24 | M 8 | 12.5 | 16 | 36 | 16 | 48 | 13 | 14.1 | 420 | 14 | 46 |
| 10 | 10 52 6481 1010/013 | 10 | 10.5 | 14 | 12.9 | 28 | M 10 | 15 | 19 | 43 | 20 | 57 | 17 | 19.3 | 350 | 13 | 76 |
| 12 | 10 52 6481 1012/013 | 12 | 12 | 16 | 15.4 | 32 | M 12 | 17.5 | 22 | 50 | 22 | 66 | 19 | 23.5 | 300 | 13 | 115 |
| 14 | 10 52 6481 1014/013 | 14 | 13.5 | 19 | 16.8 | 36 | M 14 | 20 | 25 | 57 | 25 | 75 | 22 | 21 | 260 | 16 | 170 |
| 16 | 10 52 6481 1016/013 | 16 | 15 | 21 | 19.3 | 42 | M 16 | 22 | 27 | 64 | 28 | 85 | 22 | 32 | 230 | 15 | 230 |
| 18 | 16 52 6481 1018/013 | 18 | 16.5 | 23 | 21.8 | 46 | M 18x1.5 | 25 | 31 | 71 | 32 | 94 | 27 | 38.5 | 210 | 15 | 320 |
| 20 | 16 52 6481 1020/013 | 20 | 18 | 25 | 24.3 | 50 | M 20x1.5 | 27.5 | 34 | 77 | 33 | 102 | 32 | 44 | 190 | 14 | 415 |
| 22 | 16 52 6481 1022/013 | 22 | 20 | 28 | 25.8 | 54 | M 22x1.5 | 30 | 37 | 84 | 37 | 111 | 32 | 53 | 170 | 15 | 540 |
| 25 | 18 52 6481 1025/013 | 25 | 22 | 31 | 29.6 | 60 | M 24x2 | 33.5 | 42 | 94 | 42 | 124 | 36 | 62 | 150 | 15 | 750 |
| 30 | 18 52 6481 1030/013 | 30 | 25 | 37 | 34.8 | 70 | M 30x2 | 40 | 51 | 110 | 51 | 145 | 41 | 82 | 130 | 17 | 1130 |
| 35 | 18 52 6481 1035/013 | 35 | 28 | 43 | 37.7 | 80 | M 36x2 | 46 | 58 | 125 | 56 | 165 | 50 | 101 | 110 | 19 | 1600 |
| 40 | 18 52 6481 1040/013 | 40 | 35 | 49 | 44.2 | 90 | M 42x2 | 57 | 69 | 142 | 60 | 187 | 60 | 124 | 100 | 16 | 2770 |
| 50 | 18 52 6481 1050/013 | 50 | 45 | 60 | 55.9 | 116 | M 48x2 | 65 | 78 | 160 | 65 | 218 | 65 | 308 | 80 | 14 | 5000 |

1) see mbo catalogue page 17_02/page 77

Material:

Housing: up to size 12 undercut steel 1.0718 (11SMnPb30+C), lathe work, galvanised;
from size 14 thermal treatment steel 1.0402 (C22), forged, galvanised;
size 50 thermal treatment steel 1.0503 (C45), lathe work

Bearing shell: undercut steel 1.0718 (11SMnPb30+C), galvanised with glued-in PTFE fabric on the bearing surface

Internal ring: ball bearing steel 1.2067 (100Cr6), hardened, grinded, polished
alternative: hard chrome-plated

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 5 - 10 | 0.005 - 0.030 |
| 12 - 18 | 0.005 - 0.035 |
| 20 - 25 | 0.005 - 0.045 |
| 30 - 40 | 0.005 - 0.055 |

Cetop connection dimensions:

see mbo catalogue page 17_19/page 94

Lubrication:

no lubrication required; the ball slides on the PTFE fabric located in the bearing shell;
working range: -150 °C up to +250 °C

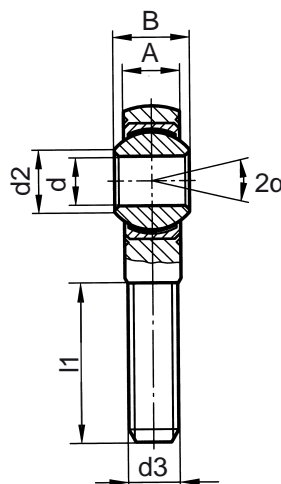
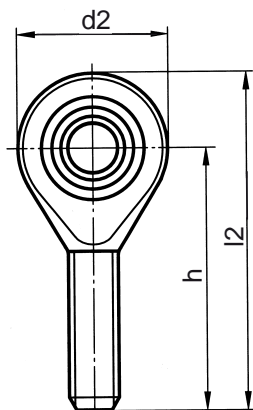
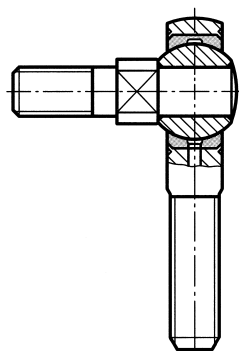
This version is available with sealing:

see mbo catalogue page 17_21/page 96
(Order number: .. 52 6483 1...)

Special versions upon request

17_07
08/2011





mbo standard 52
high-performance version
maintenance-free
suitable for low speeds
under high pressure with
dynamic loads

see mbo catalogue page 17_20 /page 95
(Order number: .. 52 6482 2...)

| Size | Order number | d H7 | A | B | d1 | d2 | Thread d3 | h | l1 | l2 | Static basic load rating C ₀ ¹⁾ (kN) | Per- missible rpm | Angle of misalign- ment α° | Weight per piece ≈ g |
|------|---------------------|---------|------|----|------|-----|--------------|-----|-----|-----|--|-------------------------|-------------------------------------|----------------------------|
| 5 | 10 52 6481 2005/013 | 5 | 6 | 8 | 7.7 | 18 | M 5 | 33 | 20 | 42 | 4.3 | 600 | 13 | 13 |
| 6 | 10 52 6481 2006/013 | 6 | 6.75 | 9 | 8.9 | 20 | M 6 | 36 | 22 | 46 | 6 | 530 | 13 | 20 |
| 8 | 10 52 6481 2008/013 | 8 | 9 | 12 | 10.4 | 24 | M 8 | 42 | 25 | 54 | 11 | 420 | 14 | 33 |
| 10 | 10 52 6481 2010/013 | 10 | 10.5 | 14 | 12.9 | 28 | M 10 | 48 | 29 | 62 | 17.4 | 350 | 13 | 56 |
| 12 | 10 52 6481 2012/013 | 12 | 12 | 16 | 15.4 | 32 | M 12 | 54 | 33 | 70 | 23.5 | 300 | 13 | 87 |
| 14 | 10 52 6481 2014/013 | 14 | 13.5 | 19 | 16.8 | 36 | M 14 | 60 | 38 | 78 | 21 | 260 | 16 | 129 |
| 16 | 10 52 6481 2016/013 | 16 | 15 | 21 | 19.3 | 42 | M 16 | 66 | 40 | 87 | 32 | 230 | 15 | 189 |
| 18 | 16 52 6481 2018/013 | 18 | 16.5 | 23 | 21.8 | 46 | M 18x1.5 | 72 | 44 | 95 | 38.5 | 210 | 15 | 267 |
| 20 | 16 52 6481 2020/013 | 20 | 18 | 25 | 24.3 | 50 | M 20x1.5 | 78 | 47 | 103 | 44 | 190 | 14 | 348 |
| 22 | 16 52 6481 2022/013 | 22 | 20 | 28 | 25.8 | 54 | M 22x1.5 | 84 | 51 | 111 | 53 | 170 | 15 | 443 |
| 25 | 18 52 6481 2025/013 | 25 | 22 | 31 | 29.6 | 60 | M 24x2 | 94 | 58 | 124 | 61 | 150 | 15 | 600 |
| 30 | 18 52 6481 2030/013 | 30 | 25 | 37 | 34.8 | 70 | M 30x2 | 110 | 71 | 145 | 82 | 130 | 17 | 1030 |
| 35 | 18 52 6481 2035/013 | 35 | 28 | 43 | 37.7 | 80 | M 36x2 | 125 | 73 | 165 | 101 | 110 | 19 | 1600 |
| 40 | 18 52 6481 2040/013 | 40 | 35 | 49 | 44.2 | 90 | M 42x2 | 142 | 78 | 187 | 124 | 100 | 16 | 2570 |
| 50 | 18 52 6481 2050/013 | 50 | 45 | 60 | 55.9 | 116 | M 48x2 | 185 | 105 | 243 | 308 | 80 | 14 | 4800 |

1) see mbo catalogue page 17_02/page 77

Material:

Housing: up to size 12 undercut steel 1.0718 (11SMnPb30+C), lathe work, galvanised;
from size 14 thermal treatment steel 1.0402 (C22), forged, galvanised;
size 50 thermal treatment steel 1.0503 (C45), lathe work

Bearing shell: undercut steel 1.0718 (11SMnPb30+C), galvanised with glued-in PTFE fabric on the bearing surface

Internal ring: ball bearing steel 1.2067 (100Cr6), hardened, grinded, polished
alternative: hard chrome-plated

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 5 - 10 | 0.005 - 0.030 |
| 12 - 18 | 0.005 - 0.035 |
| 20 - 25 | 0.005 - 0.045 |
| 30 - 40 | 0.005 - 0.055 |

Lubrication:

no lubrication required; the ball slides on the PTFE fabric located in the bearing shell;
working range: -150 °C up to +250 °C

This version is available with sealing:

see mbo catalogue page 17_21/page 96
(Order number: .. 52 6483 2...)

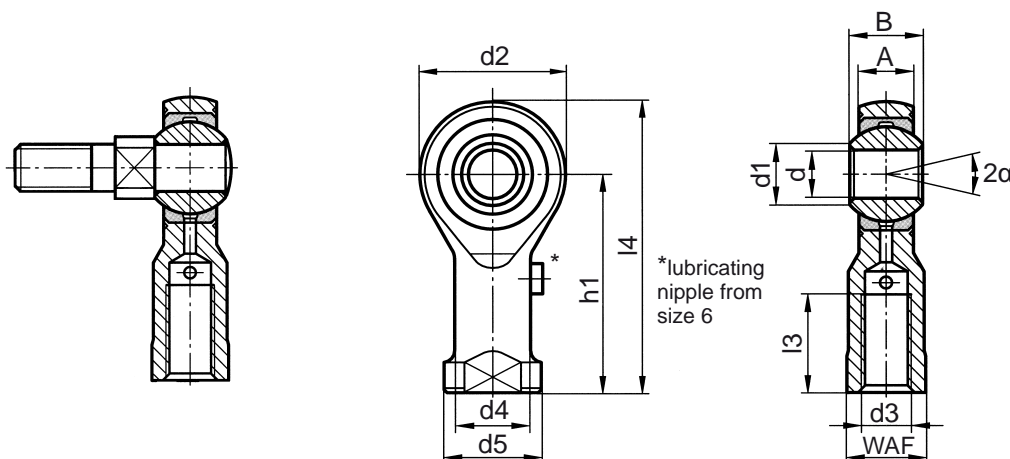
Special versions upon request

17_08
08/2011





mbo standard 53
high-performance version
can be regreased
suitable for high pressure
loads and tensile forces



see mbo catalogue page 17_20/page 95
(Order number: .. 53 6482 1...)

| Size | Order number | d H7 | A | B | d1 | d2 | Thread d3 | d4 | d5 | h1 | l3 | l4 | WAF | Static basic load rating C ₀ ¹⁾ (kN) | Per- missible rpm | Angle of misalign- ment α° | Weight per piece ≈ g |
|------|---------------------|---------|------|----|------|----|--------------|------|----|-----|----|-----|-----|--|-------------------------|-------------------------------------|----------------------------|
| 6 | 10 53 6481 1006/013 | 6 | 6.75 | 9 | 8.9 | 20 | M 6 | 10 | 13 | 30 | 12 | 40 | 11 | 16.7 | 1500 | 13 | 27 |
| 8 | 10 53 6481 1008/013 | 8 | 9 | 12 | 10.4 | 24 | M 8 | 12.5 | 16 | 36 | 16 | 48 | 13 | 25.5 | 1200 | 14 | 46 |
| 10 | 10 53 6481 1010/013 | 10 | 10.5 | 14 | 12.9 | 28 | M 10 | 15 | 19 | 43 | 20 | 57 | 17 | 34.8 | 1000 | 13 | 76 |
| 12 | 10 53 6481 1012/013 | 12 | 12 | 16 | 15.4 | 32 | M 12 | 17.5 | 22 | 50 | 22 | 66 | 19 | 42 | 860 | 13 | 115 |
| 14 | 10 53 6481 1014/013 | 14 | 13.5 | 19 | 16.8 | 36 | M 14 | 20 | 25 | 57 | 25 | 75 | 22 | 57 | 750 | 16 | 170 |
| 16 | 10 53 6481 1016/013 | 16 | 15 | 21 | 19.3 | 42 | M 16 | 22 | 27 | 64 | 28 | 85 | 22 | 67.5 | 660 | 15 | 230 |
| 18 | 16 53 6481 1018/013 | 18 | 16.5 | 23 | 21.8 | 46 | M 18x1.5 | 25 | 31 | 71 | 32 | 94 | 27 | 81.5 | 600 | 15 | 320 |
| 20 | 16 53 6481 1020/013 | 20 | 18 | 25 | 24.3 | 50 | M 20x1.5 | 27.5 | 34 | 77 | 33 | 102 | 32 | 93.5 | 540 | 14 | 415 |
| 22 | 16 53 6481 1022/013 | 22 | 20 | 28 | 25.8 | 54 | M 22x1.5 | 30 | 37 | 84 | 37 | 111 | 32 | 114 | 500 | 15 | 540 |
| 25 | 18 53 6481 1025/013 | 25 | 22 | 31 | 29.6 | 60 | M 24x2 | 33.5 | 42 | 94 | 42 | 124 | 36 | 135 | 440 | 15 | 750 |
| 30 | 18 53 6481 1030/013 | 30 | 25 | 37 | 34.8 | 70 | M 30x2 | 40 | 51 | 110 | 51 | 145 | 41 | 184 | 370 | 17 | 1130 |

1) see mbo catalogue page 17_02/page 77

Material:

Housing: thermal treatment steel 1.7225 (42CrMo4),
forged, galvanised

Bearing shell: special bronze CuSn8

Internal ring: ball bearing steel 1.2067 (100Cr6), hardened,
grinded, polished
alternative: hard chrome-plated

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 2 - 10 | 0.005 - 0.035 |
| 12 - 20 | 0.010 - 0.040 |
| 22 - 40 | 0.010 - 0.050 |

Cetop connection dimensions:

see mbo catalogue page 17_19/page 94

Lubrication:

via cupped-type lubricating nipple DIN 3405;
regular lubrication required using non-soap high-tempera-
ture grease with a high drop point to ensure consistent
lubrication at high operating temperatures;
working range: -50 °C up to +250 °C;
initial lubrication must be performed during initial
operation

This version is available with sealing:

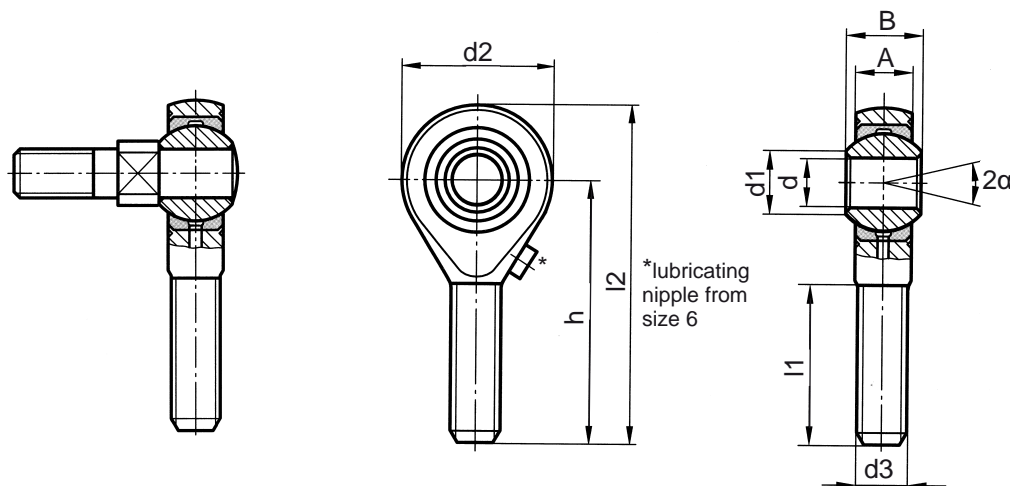
see mbo catalogue page 17_21/page 96
(Order number: .. 53 6483 1...)

Special versions upon request

17_09
08/2011



mbo standard 53
high-performance version
can be regreased
suitable for high pressure
loads and tensile forces



see mbo catalogue page 17_20/page 95
(Order number: .. 53 6482 2...)

| Size | Order number | d H7 | A | B | d1 | d2 | Thread d3 | h | l1 | l2 | Static basic load rating C ₀ ¹⁾ (kN) | Per- missible rpm | Angle of misalign- ment α° | Weight per piece ≈ g |
|------|---------------------|---------|------|----|------|----|--------------|-----|----|-----|--|-------------------------|-------------------------------------|----------------------------|
| 6 | 10 53 6481 2006/013 | 6 | 6.75 | 9 | 8.9 | 20 | M 6 | 36 | 22 | 46 | 9.8 | 1500 | 13 | 20 |
| 8 | 10 53 6481 2008/013 | 8 | 9 | 12 | 10.4 | 24 | M 8 | 42 | 25 | 54 | 19.5 | 1200 | 14 | 33 |
| 10 | 10 53 6481 2010/013 | 10 | 10.5 | 14 | 12.9 | 28 | M 10 | 48 | 29 | 62 | 31.4 | 1000 | 13 | 56 |
| 12 | 10 53 6481 2012/013 | 12 | 12 | 16 | 15.4 | 32 | M 12 | 54 | 33 | 70 | 42 | 860 | 13 | 87 |
| 14 | 10 53 6481 2014/013 | 14 | 13.5 | 19 | 16.8 | 36 | M 14 | 60 | 38 | 78 | 57 | 750 | 16 | 129 |
| 16 | 10 53 6481 2016/013 | 16 | 15 | 21 | 19.3 | 42 | M 16 | 66 | 40 | 87 | 67.5 | 660 | 15 | 189 |
| 18 | 16 53 6481 2018/013 | 18 | 16.5 | 23 | 21.8 | 46 | M 18x1.5 | 72 | 44 | 95 | 81.5 | 600 | 15 | 267 |
| 20 | 16 53 6481 2020/013 | 20 | 18 | 25 | 24.3 | 50 | M 20x1.5 | 78 | 47 | 103 | 93.5 | 540 | 14 | 348 |
| 22 | 16 53 6481 2022/013 | 22 | 20 | 28 | 25.8 | 54 | M 22x1.5 | 84 | 51 | 111 | 114 | 500 | 15 | 443 |
| 25 | 18 53 6481 2025/013 | 25 | 22 | 31 | 29.6 | 60 | M 24x2 | 94 | 58 | 124 | 135 | 440 | 15 | 600 |
| 30 | 18 53 6481 2030/013 | 30 | 25 | 37 | 34.8 | 70 | M 30x2 | 110 | 71 | 145 | 184 | 370 | 17 | 1030 |

1) see mbo catalogue page 17_02/page 77

Material:

Housing: thermal treatment steel 1.7225 (42CrMo4),
forged, galvanised

Bearing shell: special bronze CuSn8

Internal ring: ball bearing steel 1.2067 (100Cr6), hardened,
grinded, polished
alternative: hard chrome-plated

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 2 - 10 | 0.005 - 0.035 |
| 12 - 20 | 0.010 - 0.040 |
| 22 - 40 | 0.010 - 0.050 |

Lubrication:

via cupped-type lubricating nipple DIN 3405;
regular lubrication required using non-soap high-tempera-
ture grease with a high drop point to ensure consistent
lubrication at high operating temperatures;
working range: -50 °C up to +250 °C;
initial lubrication must be performed during initial
operation

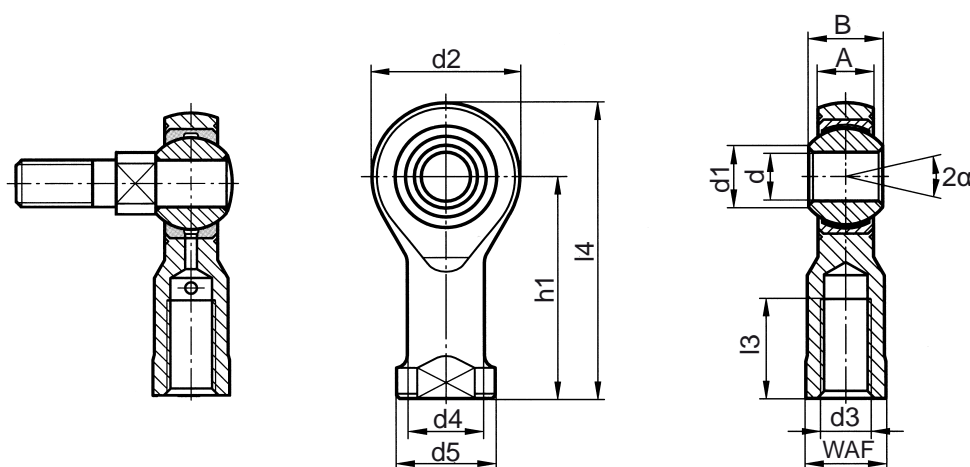
This version is available with sealing:

see mbo catalogue page 17_21/page 96
(Order number: .. 53 6483 2...)

Special versions upon request

17_10
08/2011





mbo standard 54
 high-performance version
 maintenance-free
 suitable for low speeds
 and high dynamic pressure
 loads and tensile forces

see mbo catalogue page 17_20/page 95
 (Order number: .. 54 6482 1...)

| Size | Order number | d H7 | A | B | d1 | d2 | Thread d3 | d4 | d5 | h1 | l3 | l4 | WAF | Static basic load rating C ₀ ¹⁾ (kN) | Per- missible rpm | Angle of misalign- ment α° | Weight per piece ≈ g |
|------|---------------------|---------|------|----|------|----|--------------|------|----|-----|----|-----|-----|--|-------------------------|-------------------------------------|----------------------------|
| 6 | 10 54 6481 1006/013 | 6 | 6.75 | 9 | 8.9 | 20 | M 6 | 10 | 13 | 30 | 12 | 40 | 11 | 16.7 | 530 | 13 | 27 |
| 8 | 10 54 6481 1008/013 | 8 | 9 | 12 | 10.4 | 24 | M 8 | 12.5 | 16 | 36 | 16 | 48 | 13 | 25.5 | 420 | 14 | 46 |
| 10 | 10 54 6481 1010/013 | 10 | 10.5 | 14 | 12.9 | 28 | M 10 | 15 | 19 | 43 | 20 | 57 | 17 | 34.8 | 350 | 13 | 76 |
| 12 | 10 54 6481 1012/013 | 12 | 12 | 16 | 15.4 | 32 | M 12 | 17.5 | 22 | 50 | 22 | 66 | 19 | 42 | 300 | 13 | 115 |
| 14 | 10 54 6481 1014/013 | 14 | 13.5 | 19 | 16.8 | 36 | M 14 | 20 | 25 | 57 | 25 | 75 | 22 | 57 | 260 | 16 | 170 |
| 16 | 10 54 6481 1016/013 | 16 | 15 | 21 | 19.3 | 42 | M 16 | 22 | 27 | 64 | 28 | 85 | 22 | 67.5 | 230 | 15 | 230 |
| 18 | 16 54 6481 1018/013 | 18 | 16.5 | 23 | 21.8 | 46 | M 18x1.5 | 25 | 31 | 71 | 32 | 94 | 27 | 81.5 | 210 | 15 | 320 |
| 20 | 16 54 6481 1020/013 | 20 | 18 | 25 | 24.3 | 50 | M 20x1.5 | 27.5 | 34 | 77 | 33 | 102 | 32 | 93.5 | 190 | 14 | 415 |
| 22 | 16 54 6481 1022/013 | 22 | 20 | 28 | 25.8 | 54 | M 22x1.5 | 30 | 37 | 84 | 37 | 111 | 32 | 114 | 170 | 15 | 540 |
| 25 | 18 54 6481 1025/013 | 25 | 22 | 31 | 29.6 | 60 | M 24x2 | 33.5 | 42 | 94 | 42 | 124 | 36 | 135 | 150 | 15 | 750 |
| 30 | 18 54 6481 1030/013 | 30 | 25 | 37 | 34.8 | 70 | M 30x2 | 40 | 51 | 110 | 51 | 145 | 41 | 184 | 130 | 17 | 1130 |
| 35 | 18 54 6481 1035/013 | 35 | 28 | 43 | 37.7 | 80 | M 36x2 | 46 | 58 | 125 | 56 | 165 | 50 | 230 | 110 | 19 | 1600 |

1) see mbo catalogue page 17_02/page 77

Material:

Housing: thermal treatment steel 1.7225 (42CrMo4),
 forged, galvanised

Bearing shell: undercut steel 1.0718 (11SMnPb30+C),
 galvanised with glued-in PTFE fabric on the
 bearing surface

Internal ring: ball bearing steel 1.2067 (100Cr6), hardened,
 grinded, polished
 alternative: hard chrome-plated

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 5 - 10 | 0.005 - 0.030 |
| 12 - 18 | 0.005 - 0.035 |
| 20 - 25 | 0.005 - 0.045 |
| 30 - 40 | 0.005 - 0.055 |

Cetop connection dimensions:

see mbo catalogue page 17_19/page 94

Lubrication:

no lubrication required; the ball slides on the PTFE fabric
 located in the bearing shell;
 working range: -150 °C up to +250 °C

This version is available with sealing:

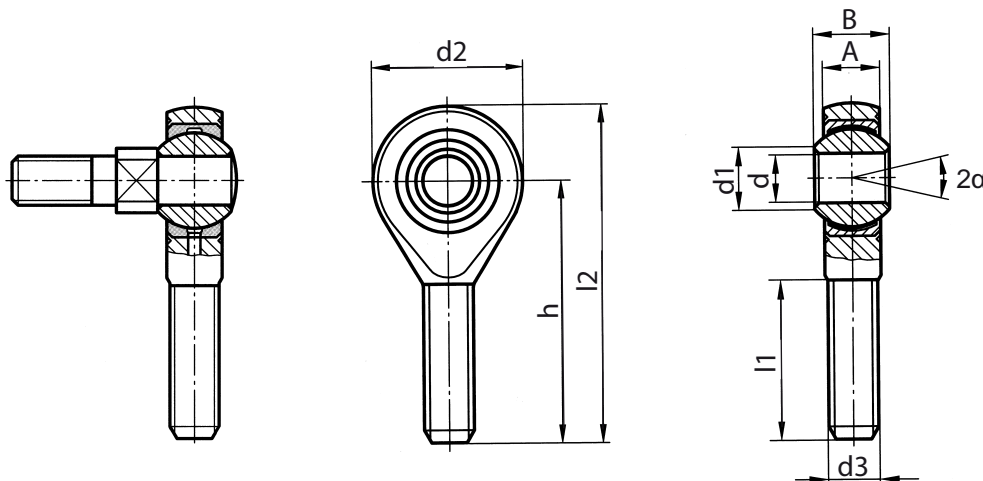
see mbo catalogue page 17_21/page 96
 (Order number: .. 54 6483 1...)

Special versions upon request

17_11
 08/2011



mbo standard 54
 high-performance version
 maintenance-free
 suitable for low speeds
 and high dynamic pressure
 loads and tensile forces



see mbo catalogue page 17_20/page 95
 (Order number: .. 54 6482 2...)

| Size | Order number | d H7 | A | B | d1 | d2 | Thread d3 | h | l1 | l2 | Static basic load rating C ₀ ¹⁾ (kN) | Per- missible rpm | Angle of misalign- ment α° | Weight per piece ≈ g |
|------|---------------------|---------|------|----|------|----|--------------|-----|----|-----|--|-------------------------|-------------------------------------|----------------------------|
| 6 | 10 54 6481 2006/013 | 6 | 6.75 | 9 | 8.9 | 20 | M 6 | 36 | 22 | 46 | 9.8 | 530 | 13 | 20 |
| 8 | 10 54 6481 2008/013 | 8 | 9 | 12 | 10.4 | 24 | M 8 | 42 | 25 | 54 | 19.5 | 420 | 14 | 33 |
| 10 | 10 54 6481 2010/013 | 10 | 10.5 | 14 | 12.9 | 28 | M 10 | 48 | 29 | 62 | 31.4 | 350 | 13 | 56 |
| 12 | 10 54 6481 2012/013 | 12 | 12 | 16 | 15.4 | 32 | M 12 | 54 | 33 | 70 | 42 | 300 | 13 | 87 |
| 14 | 10 54 6481 2014/013 | 14 | 13.5 | 19 | 16.8 | 36 | M 14 | 60 | 38 | 78 | 57 | 260 | 16 | 129 |
| 16 | 10 54 6481 2016/013 | 16 | 15 | 21 | 19.3 | 42 | M 16 | 66 | 40 | 87 | 67 | 230 | 15 | 189 |
| 18 | 16 54 6481 2018/013 | 18 | 16.5 | 23 | 21.8 | 46 | M 18x1.5 | 72 | 44 | 95 | 81.5 | 210 | 15 | 267 |
| 20 | 16 54 6481 2020/013 | 20 | 18 | 25 | 24.3 | 50 | M 20x1.5 | 78 | 47 | 103 | 93.5 | 190 | 14 | 348 |
| 22 | 16 54 6481 2022/013 | 22 | 20 | 28 | 25.8 | 54 | M 22x1.5 | 84 | 51 | 111 | 114 | 170 | 15 | 443 |
| 25 | 18 54 6481 2025/013 | 25 | 22 | 31 | 29.6 | 60 | M 24x2 | 94 | 58 | 124 | 135 | 150 | 15 | 600 |
| 30 | 18 54 6481 2030/013 | 30 | 25 | 37 | 34.8 | 70 | M 30x2 | 110 | 71 | 145 | 184 | 130 | 17 | 1030 |
| 35 | 18 54 6481 2035/013 | 35 | 28 | 43 | 37.7 | 80 | M 36x2 | 125 | 73 | 165 | 230 | 110 | 19 | 1600 |

1) see mbo catalogue page 17_02/page 77

Material:

Housing: thermal treatment steel 1.7225 (42CrMo4),
 forged, galvanised

Bearing shell: undercut steel 1.0718 (11SMnPb30+C),
 galvanised with glued-in PTFE fabric on the
 bearing surface

Internal ring: ball bearing steel 1.2067 (100Cr6), hardened,
 grinded, polished
 alternative: hard chrome-plated

Lubrication:

no lubrication required; the ball slides on the PTFE fabric
 located in the bearing shell;
 working range: -150 °C up to +250 °C

This version is available with sealing:

see mbo catalogue page 17_21/page 96
 (Order number: .. 54 6483 2...)

Special versions upon request

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 5 - 10 | 0.005 - 0.030 |
| 12 - 18 | 0.005 - 0.035 |
| 20 - 25 | 0.005 - 0.045 |
| 30 - 40 | 0.005 - 0.055 |

17_12
 08/2011

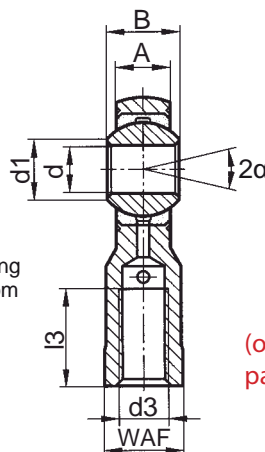
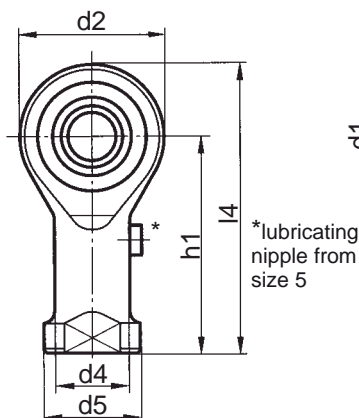
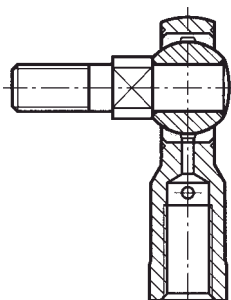


mbo standard 55 stainless version can be regreased suitable for high speeds



STAINLESS STEEL

(observe standard material pairing)



see mbo catalogue page 17_20/page 95
(Order number: .. 55 6482 1...)

| Size | Order number | d _{H7} | A | B | d1 | d2 | Thread d3 | d4 | d5 | h1 | l3 | l4 | WAF | Static basic load rating C ₀ ¹⁾ (kN) | Permissible rpm | Angle of misalignment α° | Weight per piece ≈ g |
|-----------------|---------------------|-----------------|------|----|------|----|-----------|------|-----|-----|----|-----|-----|--|-----------------|--------------------------|----------------------|
| 3 ²⁾ | 10 55 6481 1003/000 | 3 | 4.5 | 6 | 5.1 | 14 | M 3 | 5 | 6.5 | 21 | 10 | 27 | 5.5 | 8 | - | 14 | 6 |
| 5 | 10 55 6481 1005/000 | 5 | 6 | 8 | 7.7 | 18 | M 5 | 9 | 11 | 27 | 10 | 36 | 9 | 11.8 | 1200 | 13 | 18 |
| 6 | 10 55 6481 1006/000 | 6 | 6.75 | 9 | 8.9 | 20 | M 6 | 10 | 13 | 30 | 12 | 40 | 11 | 13.1 | 1500 | 13 | 27 |
| 8 | 10 55 6481 1008/000 | 8 | 9 | 12 | 10.4 | 24 | M 8 | 12.5 | 16 | 36 | 16 | 48 | 13 | 20.7 | 1200 | 14 | 46 |
| 10 | 10 55 6481 1010/000 | 10 | 10.5 | 14 | 12.9 | 28 | M 10 | 15 | 19 | 43 | 20 | 57 | 17 | 28.3 | 1000 | 13 | 76 |
| 12 | 10 55 6481 1012/000 | 12 | 12 | 16 | 15.4 | 32 | M 12 | 17.5 | 22 | 50 | 22 | 66 | 19 | 34.5 | 860 | 13 | 115 |
| 14 | 10 55 6481 1014/000 | 14 | 13.5 | 19 | 16.8 | 36 | M 14 | 20 | 25 | 57 | 25 | 75 | 22 | 39.5 | 750 | 16 | 170 |
| 16 | 10 55 6481 1016/000 | 16 | 15 | 21 | 19.3 | 42 | M 16 | 22 | 27 | 64 | 28 | 85 | 22 | 60.5 | 660 | 15 | 230 |
| 18 | 16 55 6481 1018/000 | 18 | 16.5 | 23 | 21.8 | 46 | M 18x1.5 | 25 | 31 | 71 | 32 | 94 | 27 | 73 | 600 | 15 | 320 |
| 20 | 16 55 6481 1020/000 | 20 | 18 | 25 | 24.3 | 50 | M 20x1.5 | 27.5 | 34 | 77 | 33 | 102 | 32 | 83 | 540 | 14 | 415 |
| 22 | 16 55 6481 1022/000 | 22 | 20 | 28 | 25.8 | 54 | M 22x1.5 | 30 | 37 | 84 | 37 | 111 | 32 | 100 | 500 | 15 | 540 |
| 25 | 18 55 6481 1025/000 | 25 | 22 | 31 | 29.6 | 60 | M 24x2 | 33.5 | 42 | 94 | 42 | 124 | 36 | 118 | 440 | 15 | 750 |
| 30 | 18 55 6481 1030/000 | 30 | 25 | 37 | 34.8 | 70 | M 30x2 | 40 | 51 | 110 | 51 | 145 | 41 | 155 | 370 | 17 | 1130 |
| 35 | 18 55 6481 1035/000 | 35 | 28 | 43 | 37.7 | 80 | M 36x2 | 46 | 58 | 125 | 56 | 165 | 50 | 191 | 330 | 19 | 1600 |
| 40 | 18 55 6481 1040/000 | 40 | 35 | 49 | 44.2 | 90 | M 42x2 | 57 | 69 | 142 | 60 | 187 | 60 | 235 | 290 | 16 | 2770 |

1) see mbo catalogue page 17_02/page 77

2) can not be regreased

Material:

Housing: stainless steel 1.4057 (X17CrNi16-2), forged;
size 40 stainless steel 1.4057, lathe work

Bearing shell: **special bronze CuSn8**
alternative: stainless steel 1.4301 (X5CrNi18-10), 1.4542 (17-4Ph) etc.

Internal ring: **ball bearing steel 1.2067 (100Cr6), hardened, grinded, polished, hard chrome-plated**
alternative: stainless steel 1.4034 (X46Cr13), hardened, grinded, polished

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 2 - 10 | 0.005 - 0.035 |
| 12 - 20 | 0.010 - 0.040 |
| 22 - 40 | 0.010 - 0.050 |

Cetop connection dimensions:

see mbo catalogue page 17_19/page 94

Lubrication:

via cupped-type lubricating nipple DIN 3405;
regular lubrication required using non-soap high-temperature grease with a high drop point to ensure consistent lubrication at high operating temperatures;
working range: -50 °C up to +250 °C;
initial lubrication must be performed during initial operation

This version is available with sealing:

see mbo catalogue page 17_21/page 96
(Order number: .. 55 6483 1...)

Special versions upon request

17_13
08/2011



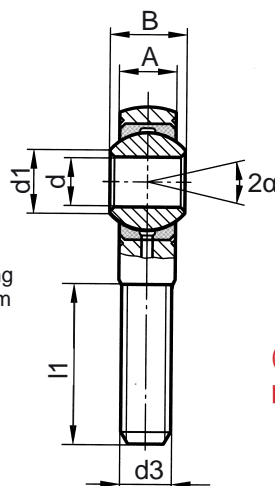
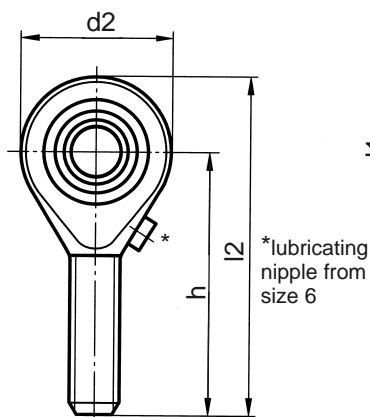
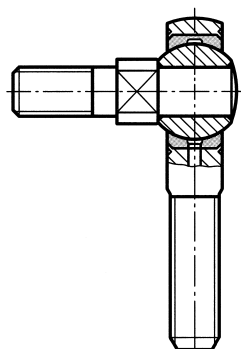
Rod ends DIN ISO 12240-4 (DIN 648)

K series

with male thread



mbo standard 55 stainless version can be regreased suitable for high speeds



STAINLESS STEEL

(observe standard material pairing)

see mbo catalogue page 17_20/page 95
(Order number: .. 55 6482 2...)

| Size | Order number | d _{H7} | A | B | d1 | d2 | Thread d3 | h | l1 | l2 | Static basic load rating C ₀ ¹⁾ (kN) | Permissible rpm | Angle of misalignment α° | Weight per piece ≈ g |
|-----------------|---------------------|-----------------|------|----|------|----|-----------|-----|----|-----|--|-----------------|--------------------------|----------------------|
| 3 ²⁾ | 10 55 6481 2003/000 | 3 | 4.5 | 6 | 5.1 | 14 | M 3 | 26 | 15 | 33 | 7 | - | 14 | 6 |
| 5 ²⁾ | 10 55 6481 2005/000 | 5 | 6 | 8 | 7.7 | 18 | M 5 | 33 | 20 | 42 | 6.2 | - | 13 | 13 |
| 6 | 10 55 6481 2006/000 | 6 | 6.75 | 9 | 8.9 | 20 | M 6 | 36 | 22 | 46 | 8.8 | 1500 | 13 | 20 |
| 8 | 10 55 6481 2008/000 | 8 | 9 | 12 | 10.4 | 24 | M 8 | 42 | 25 | 54 | 16.1 | 1200 | 14 | 33 |
| 10 | 10 55 6481 2010/000 | 10 | 10.5 | 14 | 12.9 | 28 | M 10 | 48 | 29 | 62 | 25.5 | 1000 | 13 | 56 |
| 12 | 10 55 6481 2012/000 | 12 | 12 | 16 | 15.4 | 32 | M 12 | 54 | 33 | 70 | 34.5 | 860 | 13 | 87 |
| 14 | 10 55 6481 2014/000 | 14 | 13.5 | 19 | 16.8 | 36 | M 14 | 60 | 38 | 78 | 39.5 | 750 | 16 | 129 |
| 16 | 10 55 6481 2016/000 | 16 | 15 | 21 | 19.3 | 42 | M 16 | 66 | 40 | 87 | 60.5 | 660 | 15 | 189 |
| 18 | 16 55 6481 2018/000 | 18 | 16.5 | 23 | 21.8 | 46 | M 18x1.5 | 72 | 44 | 95 | 73 | 600 | 15 | 267 |
| 20 | 16 55 6481 2020/000 | 20 | 18 | 25 | 24.3 | 50 | M 20x1.5 | 78 | 47 | 103 | 83 | 540 | 14 | 348 |
| 22 | 16 55 6481 2022/000 | 22 | 20 | 28 | 25.8 | 54 | M 22x1.5 | 84 | 51 | 111 | 100 | 500 | 15 | 443 |
| 25 | 18 55 6481 2025/000 | 25 | 22 | 31 | 29.6 | 60 | M 24x2 | 94 | 58 | 124 | 118 | 440 | 15 | 600 |
| 30 | 18 55 6481 2030/000 | 30 | 25 | 37 | 34.8 | 70 | M 30x2 | 110 | 71 | 145 | 155 | 370 | 17 | 1030 |
| 35 | 18 55 6481 2035/000 | 35 | 28 | 43 | 37.7 | 80 | M 36x2 | 125 | 73 | 165 | 191 | 330 | 19 | 1600 |
| 40 | 18 55 6481 2040/000 | 40 | 35 | 49 | 44.2 | 90 | M 42x2 | 142 | 78 | 187 | 235 | 290 | 16 | 2570 |

1) see mbo catalogue page 17_02/page 77

2) can not be regreased

Material:

Housing: stainless steel 1.4057 (X17CrNi16-2), forged;
size 40 stainless steel 1.4057, lathe work

Bearing shell: **special bronze CuSn8**
alternative: stainless steel 1.4301
(X5CrNi18-10), 1.4542 (17-4Ph) etc.

Internal ring: **ball bearing steel 1.2067 (100Cr6), hardened, grinded, polished, hard chrome-plated**
alternative: stainless steel 1.4034 (X46Cr13), hardened, grinded, polished

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 2 - 10 | 0.005 - 0.035 |
| 12 - 20 | 0.010 - 0.040 |
| 22 - 40 | 0.010 - 0.050 |

Lubrication:

via cupped-type lubricating nipple DIN 3405;
regular lubrication required using non-soap high-temperature grease with a high drop point to ensure consistent lubrication at high operating temperatures;
working range: -50 °C up to +250 °C;
initial lubrication must be performed during initial operation

This version is available with sealing:

see mbo catalogue page 17_21/page 96
(Order number: .. 55 6483 2...)

Special versions upon request

17_14
08/2011

mbo Osswald GmbH & Co KG

Metal processing · Linking technology

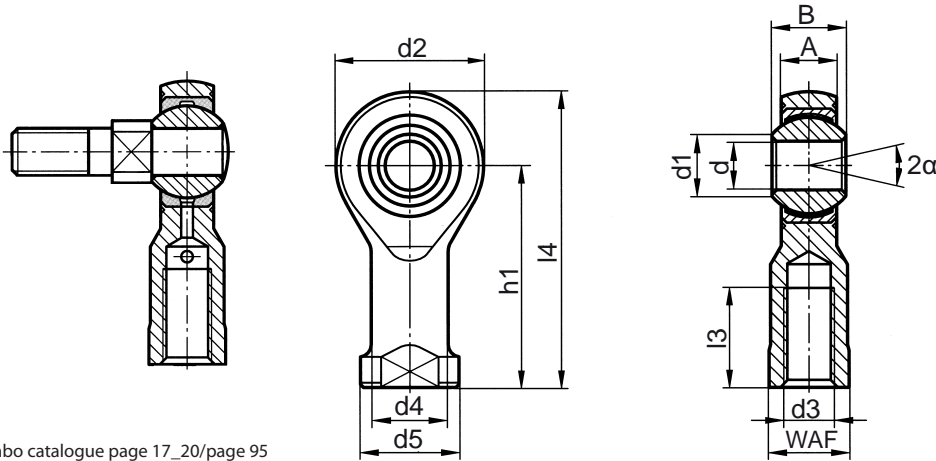
www.mbo-osswald.com · info@mbo-osswald.de
Tel: + 49 (0) 9345-670-0 · Fax: + 49 (0) 9345-6255



General tolerances
DIN ISO 2768-medium

Subject to technical alterations

We accept no responsibility for incorrect or incomplete details or information given



see mbo catalogue page 17_20/page 95
(Order number: .. 56 6482 1...)

mbo standard 56
stainless version
high-performance version
maintenance-free
suitable for low speeds
and high dynamic pressure
loads and tensile forces



(observe standard material pairing)

| Size | Order number | d _{H7} | A | B | d1 | d2 | Thread d3 | d4 | d5 | h1 | l3 | l4 | WAF | Static basic load rating C ₀ ¹⁾ (kN) | Permissible rpm | Angle of misalignment α° | Weight per piece ≈ g |
|-----------------|---------------------|-----------------|------|----|------|----|-----------|------|-----|-----|----|-----|-----|--|-----------------|--------------------------|----------------------|
| 4 ²⁾ | 10 56 6481 1004/000 | 4 | 5.25 | 7 | 6.5 | 14 | M 4 | 7.8 | 9.5 | 24 | 12 | 31 | 8 | 2.7 | - | 14 | 11 |
| 5 | 10 56 6481 1005/000 | 5 | 6 | 8 | 7.7 | 18 | M 5 | 9 | 11 | 27 | 10 | 36 | 9 | 11.8 | 600 | 13 | 18 |
| 6 | 10 56 6481 1006/000 | 6 | 6.75 | 9 | 8.9 | 20 | M 6 | 10 | 13 | 30 | 12 | 40 | 11 | 13.1 | 530 | 13 | 27 |
| 8 | 10 56 6481 1008/000 | 8 | 9 | 12 | 10.4 | 24 | M 8 | 12.5 | 16 | 36 | 16 | 48 | 13 | 20.7 | 420 | 14 | 46 |
| 10 | 10 56 6481 1010/000 | 10 | 10.5 | 14 | 12.9 | 28 | M 10 | 15 | 19 | 43 | 20 | 57 | 17 | 28.3 | 350 | 13 | 76 |
| 12 | 10 56 6481 1012/000 | 12 | 12 | 16 | 15.4 | 32 | M 12 | 17.5 | 22 | 50 | 22 | 66 | 19 | 34.5 | 300 | 13 | 115 |
| 14 | 10 56 6481 1014/000 | 14 | 13.5 | 19 | 16.8 | 36 | M 14 | 20 | 25 | 57 | 25 | 75 | 22 | 39.5 | 260 | 16 | 170 |
| 16 | 10 56 6481 1016/000 | 16 | 15 | 21 | 19.3 | 42 | M 16 | 22 | 27 | 64 | 28 | 85 | 22 | 60.5 | 230 | 15 | 230 |
| 18 | 16 56 6481 1018/000 | 18 | 16.5 | 23 | 21.8 | 46 | M 18x1.5 | 25 | 31 | 71 | 32 | 94 | 27 | 73 | 210 | 15 | 320 |
| 20 | 16 56 6481 1020/000 | 20 | 18 | 25 | 24.3 | 50 | M 20x1.5 | 27.5 | 34 | 77 | 33 | 102 | 32 | 83 | 190 | 14 | 415 |
| 22 | 16 56 6481 1022/000 | 22 | 20 | 28 | 25.8 | 54 | M 22x1.5 | 30 | 37 | 84 | 37 | 111 | 32 | 100 | 170 | 15 | 540 |
| 25 | 18 56 6481 1025/000 | 25 | 22 | 31 | 29.6 | 60 | M 24x2 | 33.5 | 42 | 94 | 42 | 124 | 36 | 118 | 150 | 15 | 750 |
| 30 | 18 56 6481 1030/000 | 30 | 25 | 37 | 34.8 | 70 | M 30x2 | 40 | 51 | 110 | 51 | 145 | 41 | 155 | 130 | 17 | 1130 |
| 35 | 18 56 6481 1035/000 | 35 | 28 | 43 | 37.7 | 80 | M 36x2 | 46 | 58 | 125 | 56 | 165 | 50 | 191 | 110 | 19 | 1600 |
| 40 | 18 56 6481 1040/000 | 40 | 35 | 49 | 44.2 | 90 | M 42x2 | 57 | 69 | 142 | 60 | 187 | 60 | 235 | 100 | 16 | 2770 |

1) see mbo catalogue page 17_02/page 77
2) upon request

Material:

Housing: size 4 stainless steel 1.4305 (X8CrNiS18-9),
lathe work;
from size 5 stainless steel 1.4057
(X17CrNi16-2), forged;
size 40 stainless steel 1.4057, lathe work

Bearing shell: special bronze CuSn8 with glued-in
PTFE fabric on the bearing surface
alternative: stainless steel 1.4571
(X6CrNiMoTi17-12-2)

Internal ring: ball bearing steel 1.2067 (100Cr6), hardened,
grinded, polished, hard chrome-plated
alternative: stainless steel 1.4034 (X46Cr13),
hardened, grinded, polished or
stainless steel 1.4401 (X5CrNiMo17-12-2),
unhardened, grinded, polished

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 5 - 10 | 0.005 - 0.030 |
| 12 - 18 | 0.005 - 0.035 |
| 20 - 25 | 0.005 - 0.045 |
| 30 - 40 | 0.005 - 0.055 |

Cetop connection dimensions:

see mbo catalogue page 17_19/page 94

Lubrication:

no lubrication required; the ball slides on the PTFE fabric
located in the bearing shell;
working range: -150 °C up to +250 °C

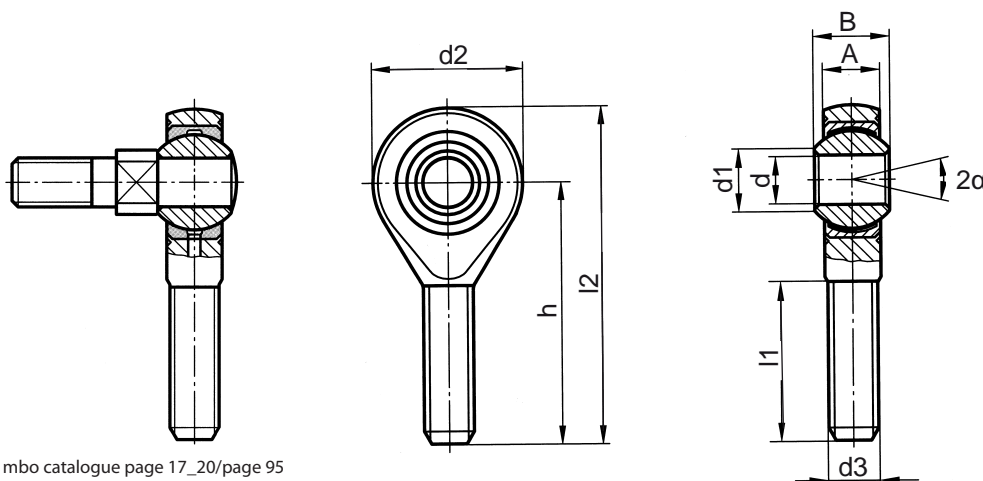
This version is available with sealing:

see mbo catalogue page 17_21/page 96
(Order number: .. 56 6483 1...)

Special versions upon request

17_15
08/2011





mbo standard 56
stainless version
high-performance version
maintenance-free
suitable for low speeds
and high dynamic pressure
loads and tensile forces



see mbo catalogue page 17_20/page 95
(Order number: .. 56 6482 2...)

(observe standard material pairing)

| Size | Order number | d H7 | A | B | d1 | d2 | Thread d3 | h | l1 | l2 | Static basic load rating C ₀ ¹⁾ (kN) | Per- missible rpm | Angle of misalignment α° | Weight per piece ≈ g |
|-----------------|---------------------|---------|------|----|------|----|--------------|-----|----|-----|--|-------------------------|--------------------------------|----------------------------|
| 4 ²⁾ | 10 56 6481 2004/000 | 4 | 5.25 | 7 | 6.5 | 14 | M 4 | 30 | 19 | 37 | 1.3 | - | 14 | 9 |
| 5 | 10 56 6481 2005/000 | 5 | 6 | 8 | 7.7 | 18 | M 5 | 33 | 20 | 42 | 6.2 | 600 | 13 | 13 |
| 6 | 10 56 6481 2006/000 | 6 | 6.75 | 9 | 8.9 | 20 | M 6 | 36 | 22 | 46 | 8.8 | 530 | 13 | 20 |
| 8 | 10 56 6481 2008/000 | 8 | 9 | 12 | 10.4 | 24 | M 8 | 42 | 25 | 54 | 16.1 | 420 | 14 | 33 |
| 10 | 10 56 6481 2010/000 | 10 | 10.5 | 14 | 12.9 | 28 | M 10 | 48 | 29 | 62 | 25.5 | 350 | 13 | 56 |
| 12 | 10 56 6481 2012/000 | 12 | 12 | 16 | 15.4 | 32 | M 12 | 54 | 33 | 70 | 34.5 | 300 | 13 | 87 |
| 14 | 10 56 6481 2014/000 | 14 | 13.5 | 19 | 16.8 | 36 | M 14 | 60 | 38 | 78 | 39.5 | 260 | 16 | 129 |
| 16 | 10 56 6481 2016/000 | 16 | 15 | 21 | 19.3 | 42 | M 16 | 66 | 40 | 87 | 60.5 | 230 | 15 | 189 |
| 18 | 16 56 6481 2018/000 | 18 | 16.5 | 23 | 21.8 | 46 | M 18x1.5 | 72 | 44 | 95 | 73 | 210 | 15 | 267 |
| 20 | 16 56 6481 2020/000 | 20 | 18 | 25 | 24.3 | 50 | M 20x1.5 | 78 | 47 | 103 | 83 | 190 | 14 | 348 |
| 22 | 16 56 6481 2022/000 | 22 | 20 | 28 | 25.8 | 54 | M 22x1.5 | 84 | 51 | 111 | 100 | 170 | 15 | 443 |
| 25 | 18 56 6481 2025/000 | 25 | 22 | 31 | 29.6 | 60 | M 24x2 | 94 | 58 | 124 | 118 | 150 | 15 | 600 |
| 30 | 18 56 6481 2030/000 | 30 | 25 | 37 | 34.8 | 70 | M 30x2 | 110 | 71 | 145 | 155 | 130 | 17 | 1030 |
| 35 | 18 56 6481 2035/000 | 35 | 28 | 43 | 37.7 | 80 | M 36x2 | 125 | 73 | 165 | 191 | 110 | 19 | 1600 |
| 40 | 18 56 6481 2040/000 | 40 | 35 | 49 | 44.2 | 90 | M 42x2 | 142 | 78 | 187 | 235 | 100 | 16 | 2570 |

1) see mbo catalogue page 17_02/page 77

2) upon request

Material:

Housing: size 4 stainless steel 1.4305 (X8CrNiS18-9),
lathe work;
from size 5 stainless steel 1.4057
(X17CrNi16-2), forged;
size 40 stainless steel 1.4057, lathe work

Bearing shell: special bronze CuSn8 with glued-in
PTFE fabric on the bearing surface
alternative: stainless steel 1.4571
(X6CrNiMoTi17-12-2)

Internal ring: ball bearing steel 1.2067 (100Cr6), hardened,
grinded, polished, hard chrome-plated
alternative: stainless steel 1.4034 (X46Cr13),
hardened, grinded, polished or
stainless steel 1.4401 (X5CrNiMo17-12-2),
unhardened, grinded, polished

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 5 - 10 | 0.005 - 0.030 |
| 12 - 18 | 0.005 - 0.035 |
| 20 - 25 | 0.005 - 0.045 |
| 30 - 40 | 0.005 - 0.055 |

Lubrication:

no lubrication required; the ball slides on the PTFE fabric
located in the bearing shell;
working range: -150 °C up to +250 °C

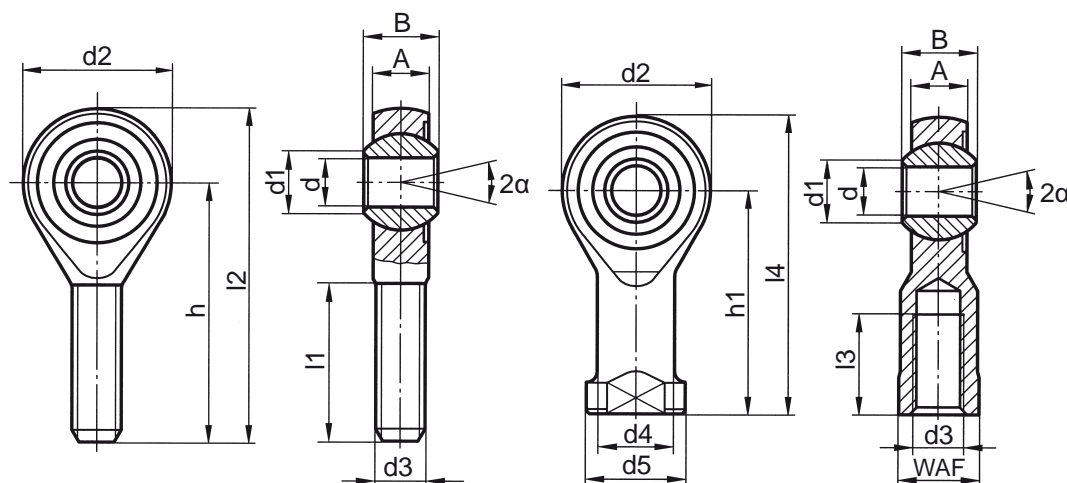
This version is available with sealing:

see mbo catalogue page 17_21/page 96
(Order number: .. 56 6483 2...)

Special versions upon request

17_16
07/2012





mbo standard 57 female/male thread can be regreased suitable for high unidirectional thrust loads application only for low swivelling movements unsuitable for complete revolutions

with female thread

| Size | Order number | d _{H7} | A | B | d1 | d2 | Thread d3 | d4 | d5 | h1 | l3 | l4 | WAF | Static basic load rating C ₀ ¹⁾ (kN) | Angle of misalignment α° | Weight per piece ≈ g |
|------|---------------------|-----------------|------|----|------|----|-----------|------|----|----|----|-----|-----|--|--------------------------|----------------------|
| 5 | 10 57 6481 1005/013 | 5 | 6 | 8 | 7.7 | 18 | M 5 | 9 | 11 | 27 | 10 | 36 | 9 | 12 | 13 | 18 |
| 6 | 10 57 6481 1006/013 | 6 | 6.75 | 9 | 8.9 | 20 | M 6 | 10 | 13 | 30 | 12 | 40 | 11 | 14.3 | 13 | 27 |
| 8 | 10 57 6481 1008/013 | 8 | 9 | 12 | 10.4 | 24 | M 8 | 12.5 | 16 | 36 | 16 | 48 | 13 | 21.7 | 14 | 46 |
| 10 | 10 57 6481 1010/013 | 10 | 10.5 | 14 | 12.9 | 28 | M 10 | 15 | 19 | 43 | 20 | 57 | 17 | 27.8 | 13 | 76 |
| 12 | 10 57 6481 1012/013 | 12 | 12 | 16 | 15.4 | 32 | M 12 | 17.5 | 22 | 50 | 22 | 66 | 19 | 35 | 13 | 115 |
| 14 | 10 57 6481 1014/013 | 14 | 13.5 | 19 | 16.8 | 36 | M 14 | 20 | 25 | 57 | 25 | 75 | 22 | 32.5 | 16 | 170 |
| 16 | 10 57 6481 1016/013 | 16 | 15 | 21 | 19.3 | 42 | M 16 | 22 | 27 | 64 | 28 | 85 | 22 | 46 | 15 | 230 |
| 20 | 16 57 6481 1020/013 | 20 | 18 | 25 | 24.3 | 50 | M 20x1.5 | 27.5 | 34 | 77 | 33 | 102 | 32 | 63 | 14 | 415 |

with male thread

| Size | Order number | d _{H7} | A | B | d1 | d2 | Thread d3 | h | l1 | l2 | Static basic load rating C ₀ ¹⁾ (kN) | Angle of misalignment α° | Weight per piece ≈ g |
|------|---------------------|-----------------|------|----|------|----|-----------|----|----|-----|--|--------------------------|----------------------|
| 5 | 10 57 6481 2005/013 | 5 | 6 | 8 | 7.7 | 18 | M 5 | 33 | 20 | 42 | 4.3 | 13 | 13 |
| 6 | 10 57 6481 2006/013 | 6 | 6.75 | 9 | 8.9 | 20 | M 6 | 36 | 22 | 46 | 6 | 13 | 20 |
| 8 | 10 57 6481 2008/013 | 8 | 9 | 12 | 10.4 | 24 | M 8 | 42 | 25 | 54 | 11 | 14 | 33 |
| 10 | 10 57 6481 2010/013 | 10 | 10.5 | 14 | 12.9 | 28 | M 10 | 48 | 29 | 62 | 17.4 | 13 | 56 |
| 12 | 10 57 6481 2012/013 | 12 | 12 | 16 | 15.4 | 32 | M 12 | 54 | 33 | 70 | 25.5 | 13 | 87 |
| 14 | 10 57 6481 2014/013 | 14 | 13.5 | 19 | 16.8 | 36 | M 14 | 60 | 38 | 78 | 26.5 | 16 | 129 |
| 16 | 10 57 6481 2016/013 | 16 | 15 | 21 | 19.3 | 42 | M 16 | 66 | 40 | 87 | 36.5 | 15 | 189 |
| 20 | 16 57 6481 2020/013 | 20 | 18 | 25 | 24.3 | 50 | M 20x1.5 | 78 | 47 | 103 | 63 | 14 | 348 |

1) see mbo catalogue page 17_02/page 77

Material:

Housing: up to size 12 undercut steel 1.0718 (11SMnPb30+C), lathe work, galvanised; from size 14 thermal treatment steel 1.0402 (C22), forged, galvanised

Internal ring: ball bearing steel 1.2067 (100Cr6), hardened, grinded, polished

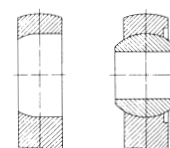
Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|----------------------------------|
| 5 - 10 | 0.01 - 0.05 |
| 12 - 20 | 0.01 - 0.06 |

Lubrication:

the steel/steel version is supplied without a lubricating nipple; regular lubrication required using non-soap high-temperature grease with a high drop point to ensure consistent lubrication at high operating temperatures; working range: -50 °C up to +200 °C; initial lubrication must be performed during initial operation

The boring in the steel housing is cylindrically taper-bored from one side and starts from the middle depending on the shape of the ball (see cutaway). This enables a high thrust load towards the ball mug.



Cetop connection dimensions:

see mbo catalogue page 17_19/page 94

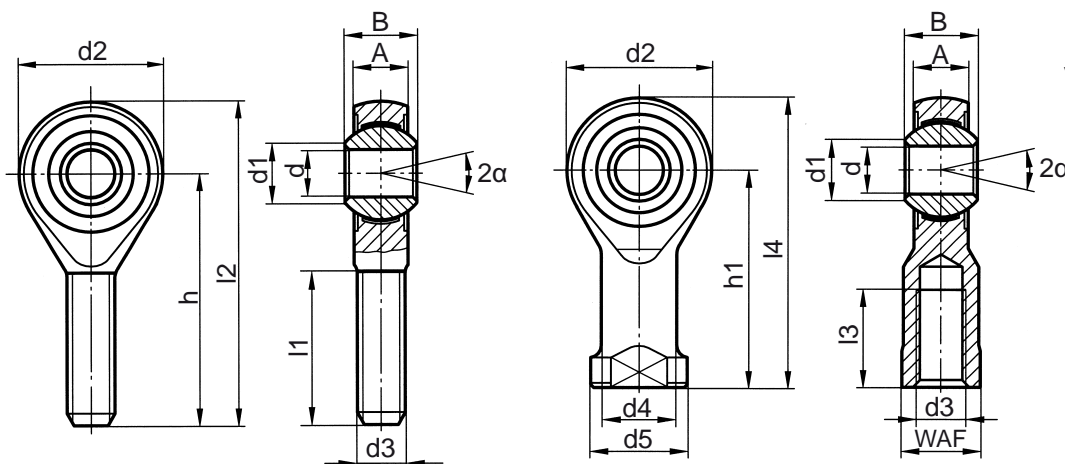
Special versions upon request

17_17
08/2011





mbo standard 58
female/male thread
maintenance-free
version suitable for low axial
forces and for low
swivelling movements
unsuitable for
complete revolutions



with female thread

| Size | Order number | d _{H7} | A | B | d1 | d2 | Thread d3 | d4 | d5 | h1 | l3 | l4 | WAF | Static basic load rating C ₀ ¹⁾ (kN) | Angle of misalignment α° | Weight per piece ≈ g |
|------|---------------------|-----------------|------|----|------|----|-----------|------|-----|----|----|-----|-----|--|--------------------------|----------------------|
| 4 | 10 58 6481 1004/013 | 4 | 5.25 | 7 | 6.5 | 14 | M 4 | 7.8 | 9.5 | 24 | 12 | 31 | 8 | 5.2 | 14 | 11 |
| 5 | 10 58 6481 1005/013 | 5 | 6 | 8 | 7.7 | 18 | M 5 | 9 | 11 | 27 | 10 | 36 | 9 | 9.8 | 13 | 18 |
| 6 | 10 58 6481 1006/013 | 6 | 6.75 | 9 | 8.9 | 20 | M 6 | 10 | 13 | 30 | 12 | 40 | 11 | 11.8 | 13 | 27 |
| 8 | 10 58 6481 1008/013 | 8 | 9 | 12 | 10.4 | 24 | M 8 | 12.5 | 16 | 36 | 16 | 48 | 13 | 17.3 | 14 | 46 |
| 10 | 10 58 6481 1010/013 | 10 | 10.5 | 14 | 12.9 | 28 | M 10 | 15 | 19 | 43 | 20 | 57 | 17 | 22.3 | 13 | 76 |
| 12 | 10 58 6481 1012/013 | 12 | 12 | 16 | 15.4 | 32 | M 12 | 17.5 | 22 | 50 | 22 | 66 | 19 | 28.5 | 13 | 115 |
| 14 | 10 58 6481 1014/013 | 14 | 13.5 | 19 | 16.8 | 36 | M 14 | 20 | 25 | 57 | 25 | 75 | 22 | 26 | 16 | 170 |
| 16 | 10 58 6481 1016/013 | 16 | 15 | 21 | 19.3 | 42 | M 16 | 22 | 27 | 64 | 28 | 85 | 22 | 39 | 15 | 230 |
| 20 | 16 58 6481 1020/013 | 20 | 18 | 25 | 24.3 | 50 | M 20x1.5 | 27.5 | 34 | 77 | 33 | 102 | 32 | 53 | 14 | 415 |

with male thread

| Size | Order number | d _{H7} | A | B | d1 | d2 | Thread d3 | h | l1 | l2 | Static basic load rating C ₀ ¹⁾ (kN) | Angle of misalignment α° | Weight per piece ≈ g |
|------|---------------------|-----------------|------|----|------|----|-----------|----|----|-----|--|--------------------------|----------------------|
| 4 | 10 58 6481 2004/013 | 4 | 5.25 | 7 | 6.5 | 14 | M 4 | 30 | 19 | 37 | 2.6 | 14 | 9 |
| 5 | 10 58 6481 2005/013 | 5 | 6 | 8 | 7.7 | 18 | M 5 | 33 | 20 | 42 | 4.3 | 13 | 13 |
| 6 | 10 58 6481 2006/013 | 6 | 6.75 | 9 | 8.9 | 20 | M 6 | 36 | 22 | 46 | 6 | 13 | 20 |
| 8 | 10 58 6481 2008/013 | 8 | 9 | 12 | 10.4 | 24 | M 8 | 42 | 25 | 54 | 11 | 14 | 33 |
| 10 | 10 58 6481 2010/013 | 10 | 10.5 | 14 | 12.9 | 28 | M 10 | 48 | 29 | 62 | 17.4 | 13 | 56 |
| 12 | 10 58 6481 2012/013 | 12 | 12 | 16 | 15.4 | 32 | M 12 | 54 | 33 | 70 | 25.5 | 13 | 87 |
| 14 | 10 58 6481 2014/013 | 14 | 13.5 | 19 | 16.8 | 36 | M 14 | 60 | 38 | 78 | 26 | 16 | 129 |
| 16 | 10 58 6481 2016/013 | 16 | 15 | 21 | 19.3 | 42 | M 16 | 66 | 40 | 87 | 36.5 | 15 | 189 |
| 20 | 16 58 6481 2020/013 | 20 | 18 | 25 | 24.3 | 50 | M 20x1.5 | 78 | 47 | 103 | 63 | 14 | 348 |

1) see mbo catalogue page 17_02/page 77

Material:

Housing: up to size 12 undercut steel 1.0718 (11SMnPb30+C), lathe work, galvanised;
from size 14 thermal treatment steel 1.0402 (C22), forged, galvanised,
PTFE glass fibre fabric on the bearing surface

Internal ring: ball bearing steel 1.2067 (100Cr6), hardened, grinded, polished

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|----------------------------------|
| 4 - 10 | 0.005 - 0.04 |
| 12 - 20 | 0.005 - 0.05 |

Cetop connection dimensions:

see mbo catalogue page 17_19/page 94

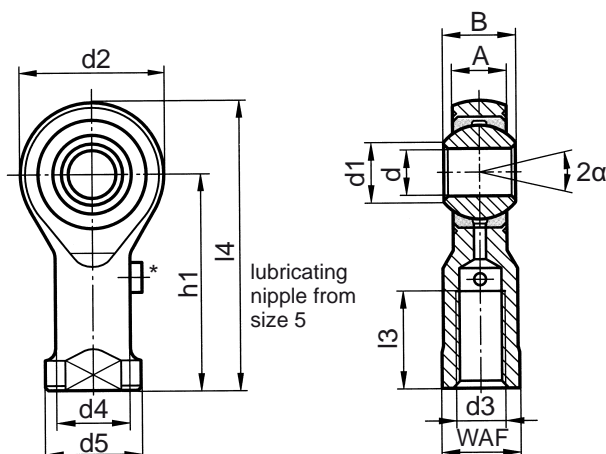
Lubrication:

no lubrication required; the ball slides on the PTFE glass fibre fabric located in the bearing shell;
working range: -75 °C up to +150 °C

Special versions upon request

17_18
08/2011





All series with female threads can be supplied with CETOP dimensions for pneumatic cylinders. Assembly dimensions DIN ISO 8139

Figures for K series

| Size | d _{H7} | A | B | d1 | d2 | Thread d3 | d4 | d5 | h1 | l3 | l4 | WAF | Static basic load rating C ₀ ¹⁾ (kN) | Permissible rpm | Angle of misalignment α° | Weight per piece ≈ g | Cylinder diameter |
|------|-----------------|------|----|------|-----|-----------|------|----|-----|----|-----|-----|--|-----------------|--------------------------|----------------------|-------------------|
| 5 | 5 | 6 | 8 | 7.7 | 18 | M 4x0.7 | 9 | 11 | 27 | 10 | 36 | 9 | Data specifications about materials refer to mbo standard 50 - 58/ page 78 - 93 (K series) or mbo standard 80 - 84/ page 104 - 109 (E series) | | 13 | 18 | 8 / 10 |
| 6 | 6 | 6.75 | 9 | 8.9 | 20 | M 6x1 | 10 | 13 | 30 | 12 | 40 | 11 | | | 13 | 27 | 12 / 16 |
| 8 | 8 | 9 | 12 | 10.4 | 24 | M 8x1.25 | 12.5 | 16 | 36 | 16 | 48 | 13 | | | 14 | 46 | 20 |
| 10 | 10 | 10.5 | 14 | 12.9 | 28 | M 10x1.25 | 15 | 19 | 43 | 20 | 57 | 17 | | | 13 | 76 | 25 / 32 |
| 12 | 12 | 12 | 16 | 15.4 | 32 | M 12x1.25 | 17.5 | 22 | 50 | 22 | 66 | 19 | | | 13 | 115 | 40 / 50 |
| 16 | 16 | 15 | 21 | 19.3 | 42 | M 16x1.5 | 22 | 27 | 64 | 28 | 85 | 22 | | | 15 | 230 | 50 / 63 |
| 20 | 20 | 18 | 25 | 24.3 | 50 | M 20x1.5 | 27.5 | 34 | 77 | 33 | 102 | 32 | | | 14 | 415 | 80 / 100 |
| 25 | 25 | 22 | 31 | 29.6 | 60 | M 24x2 | 33.5 | 42 | 94 | 42 | 124 | 36 | | | 15 | 750 | 125 |
| 30 | 30 | 25 | 37 | 34.8 | 70 | M 30x2 | 40 | 51 | 110 | 51 | 145 | 41 | | | 17 | 1130 | 125 |
| 35 | 35 | 28 | 43 | 37.7 | 80 | M 36x2 | 46 | 58 | 125 | 56 | 165 | 50 | | | 19 | 1600 | 160 / 200 |
| 40 | 40 | 35 | 49 | 44.2 | 90 | M 42x2 | 57 | 69 | 142 | 60 | 187 | 60 | | | 16 | 2770 | 250 |
| 50 | 50 | 45 | 60 | 55.9 | 116 | M 48x2 | 65 | 78 | 160 | 65 | 218 | 65 | | | 14 | 5000 | 320 |

Material:

Data specifications about materials refer to mbo standard 50 - 58/page 78 - 93 (K series), or mbo standard 80 - 84/page 104 - 109 (E series)

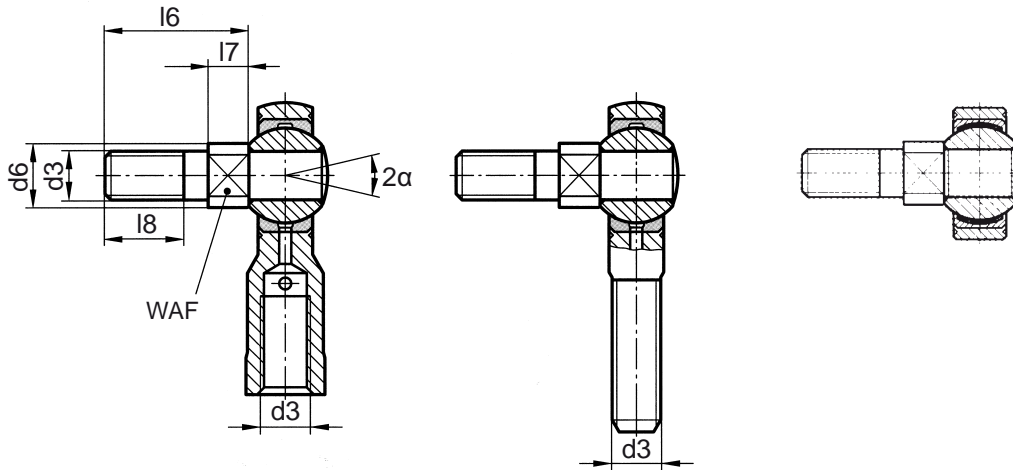
Version: K series/E series

Data specifications about versions refer to mbo standard 50 - 58/page 78 - 93 (K series), or mbo standard 80 - 84/page 104 - 109 (E series)

Special thread upon request

Special versions upon request





Example for ordering: Rod end mbo standard 52 with female thread, size 10, d3 = M 10, with threaded bolt
Order number: 10 52 6482 1010/013

| Size | Order number | Thread d3 | d6 | l6 | l7 | l8 | WAF | Weight per piece per bolt ≈ g |
|------|---------------------|-----------|------|------|-----|----|-----|-------------------------------|
| 5 | 10 •• 6482 •005/... | M 5 | 7.8 | 16 | 5 | 9 | 7 | 5 |
| 6 | 10 •• 6482 •006/... | M 6 | 9 | 18.5 | 5.5 | 10 | 8 | 10 |
| 8 | 10 •• 6482 •008/... | M 8 | 10.5 | 23.5 | 6.5 | 13 | 8 | 12 |
| 10 | 10 •• 6482 •010/... | M 10 | 13 | 28 | 7 | 17 | 12 | 25 |
| 12 | 10 •• 6482 •012/... | M 12 | 15 | 32.5 | 7.5 | 20 | 14 | 40 |
| 14 | 10 •• 6482 •014/... | M 14 | 17 | 37.5 | 8.5 | 22 | 14 | 65 |
| 16 | 10 •• 6482 •016/... | M 16 | 19 | 42.5 | 9.5 | 24 | 17 | 90 |
| 20 | 10 •• 6482 •020/... | M 20 | 24 | 57 | 12 | 35 | 22 | 200 |

•• please quote the required mbo standard (for rod ends: 51 - 56/page 80-91, for pivoting bearings: 71 - 76/page 98-103)
• state **1** for female thread, **2** for male thread and **0** for the pivoting bearings

Additional sizes upon request

Material:

Rod end/pivoting bearing: see corresponding versions
mbo standard 51 up to standard 56/page 80-91/
mbo standard 71 up to mbo standard 76/page 98-103

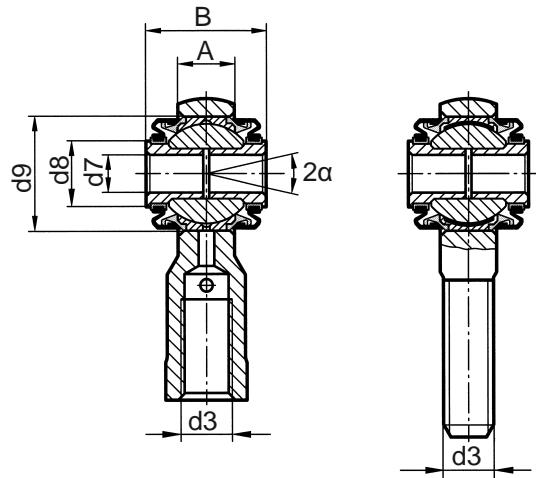
Threaded bolt: undercut steel 1.0718 (11SMnPb30+C),
galvanised or stainless steel 1.4305 (X8CrNiS18-9)



Special versions upon request

17_20
08/2011





Example for ordering: Rod end mbo standard 52 with male thread, size 12, d3 = M 12, with sealing
Order number: 10 55 6483 2012/000

| Size | Order number | A | B ≈ | Thread d3 | d7 | d8 | d9 | Angle of misalignment α° |
|------|---------------------|------|--------|--------------|----|------|------|--------------------------------|
| 8 | 10 •• 6483 •008/... | 9 | 19 | M 8 | 6 | 10.5 | 18 | 10 |
| 10 | 10 •• 6483 •010/... | 10.5 | 21 | M 10 | 8 | 12.5 | 21 | 10 |
| 12 | 10 •• 6483 •012/... | 12 | 23 | M 12 | 10 | 15.5 | 25.5 | 10 |
| 14 | 10 •• 6483 •014/... | 13.5 | 26 | M 14 | 12 | 17 | 29 | 12 |
| 16 | 10 •• 6483 •016/... | 15 | 28 | M 16 | 14 | 18.5 | 32 | 12 |
| 20 | 16 •• 6483 •020/... | 18 | 32 | M 20x1.5 | 18 | 22 | 38 | 12 |

•• please quote the required mbo standard (for rod ends: 51 - 56/page 80-91)
• state **1** for female thread, **2** for male thread

Additional sizes upon request

Material:

Rod end: see corresponding versions
mbo standard 51 up to mbo standard 56/page 80-91

Sealing: NBR elastomer, temperature resistance -30 °C up to +120 °C,
resistant against mineral oils, greases and gasoline

Fitting rings: brass

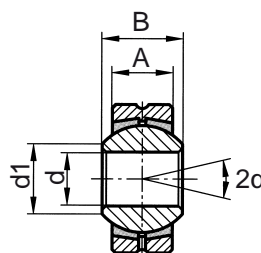
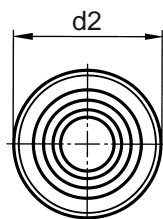
Distance liner: stainless steel 1.4305 (X8CrNiS18-9)

Special versions upon request

17_21
08/2011



mbo standard 70
standard version
can be regreased
suitable for
axial thrusts



| Size | Order number | d H7 | A | B | d1 | d2 h6 | Static basic load rating $C_0^{1)}$ (kN) | Per- missible rpm | Angle of misalignment α° | Weight per piece \approx g |
|------|---------------------|---------|------|----|------|----------|--|-------------------------|--|------------------------------------|
| 5 | 10 70 0000 0005/013 | 5 | 6 | 8 | 7.7 | 16 | 10 | 900 | 13 | 8 |
| 6 | 10 70 0000 0006/013 | 6 | 6.75 | 9 | 8.9 | 18 | 12.8 | 760 | 13 | 12 |
| 8 | 10 70 0000 0008/013 | 8 | 9 | 12 | 10.4 | 22 | 21.6 | 620 | 14 | 23 |
| 10 | 10 70 0000 0010/013 | 10 | 10.5 | 14 | 12.9 | 26 | 30 | 500 | 13 | 38 |
| 12 | 10 70 0000 0012/013 | 12 | 12 | 16 | 15.4 | 30 | 40 | 450 | 13 | 58 |
| 14 | 10 70 0000 0014/013 | 14 | 13.5 | 19 | 16.8 | 34 | 51.5 | 360 | 16 | 83 |
| 16 | 10 70 0000 0016/013 | 16 | 15 | 21 | 19.3 | 38 | 64.5 | 350 | 15 | 115 |
| 18 | 10 70 0000 0018/013 | 18 | 16.5 | 23 | 21.8 | 42 | 78.5 | 320 | 15 | 150 |
| 20 | 10 70 0000 0020/013 | 20 | 18 | 25 | 24.3 | 46 | 94.5 | 280 | 14 | 200 |
| 22 | 10 70 0000 0022/013 | 22 | 20 | 28 | 25.8 | 50 | 114 | 250 | 15 | 270 |
| 25 | 10 70 0000 0025/013 | 25 | 22 | 31 | 29.6 | 56 | 142 | 230 | 15 | 375 |

1) see mbo catalogue page 17_02/page 77

Material:

Outer ring: undercut steel 1.0718 (11SMnPb30+C),
lathe work, galvanised

Bearing shell: special brass CuZn40Al1

Internal ring: ball bearing steel 1.2067 (100Cr6), hardened,
grinded, polished

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 2 - 10 | 0.005 - 0.04 |
| 12 - 18 | 0.005 - 0.05 |
| 20 - 25 | 0.010 - 0.06 |

Recommended fits for housing bores for installing pivoting bearings:

| Load | Steel housing | Light-alloy housing |
|--------|---------------|---------------------|
| normal | J7/H7 | K7 |
| high | K7 | M7 |

Lubrication:

regular lubrication required using non-soap high-temperature grease with a high drop point to ensure consistent lubrication at high operating temperatures;
working range: -50 °C up to +200 °C;
initial lubrication must be performed during initial operation

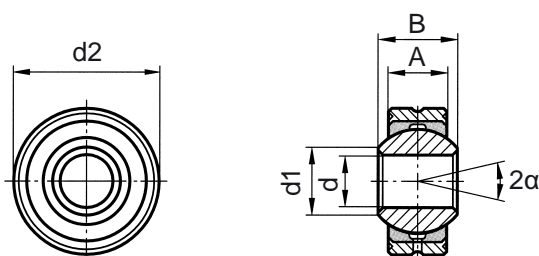
Special versions upon request

17_22
08/2011





mbo standard 71
high-performance version
can be regreased
suitable for
high speeds



| Size | Order number | d H7 | A | B | d1 | d2 h6 | Static basic load rating C ₀ ¹⁾ (kN) | Per- missible rpm | Angle of misalignment α° | Weight per piece ≈ g |
|-------------------|---------------------|---------|------|----|------|----------|--|-------------------------|--------------------------------|----------------------------|
| 3 ²⁾³⁾ | 10 71 0000 0003/013 | 3 | 4.5 | 6 | 5.1 | 12 | 10.8 | - | 14 | 4 |
| 4 ²⁾³⁾ | 10 71 0000 0004/013 | 4 | 5.25 | 7 | 6.5 | 14 | 14.5 | - | 14 | 6 |
| 5 | 10 71 0000 0005/013 | 5 | 6 | 8 | 7.7 | 16 | 19.8 | 1200 | 13 | 8 |
| 6 | 10 71 0000 0006/013 | 6 | 6.75 | 9 | 8.9 | 18 | 25.8 | 1500 | 13 | 12 |
| 8 | 10 71 0000 0008/013 | 8 | 9 | 12 | 10.4 | 22 | 42.6 | 1200 | 14 | 23 |
| 10 | 10 71 0000 0010/013 | 10 | 10.5 | 14 | 12.9 | 26 | 60 | 1000 | 13 | 38 |
| 12 | 10 71 0000 0012/013 | 12 | 12 | 16 | 15.4 | 30 | 80 | 860 | 13 | 58 |
| 14 | 10 71 0000 0014/013 | 14 | 13.5 | 19 | 16.8 | 34 | 102.5 | 750 | 16 | 83 |
| 16 | 10 71 0000 0016/013 | 16 | 15 | 21 | 19.3 | 38 | 128.5 | 660 | 15 | 115 |
| 18 | 10 71 0000 0018/013 | 18 | 16.5 | 23 | 21.8 | 42 | 157 | 600 | 15 | 150 |
| 20 | 10 71 0000 0020/013 | 20 | 18 | 25 | 24.3 | 46 | 188.5 | 540 | 14 | 200 |
| 22 | 10 71 0000 0022/013 | 22 | 20 | 28 | 25.8 | 50 | 229 | 500 | 15 | 270 |
| 25 | 10 71 0000 0025/013 | 25 | 22 | 31 | 29.6 | 56 | 293 | 440 | 15 | 375 |
| 30 | 10 71 0000 0030/013 | 30 | 25 | 37 | 34.8 | 66 | 381 | 370 | 17 | 540 |
| 35 | 10 71 0000 0035/013 | 35 | 28 | 43 | 37.7 | 78 | 480 | 330 | 19 | 850 |
| 40 | 10 71 0000 0040/013 | 40 | 35 | 49 | 44.2 | 87 | 693 | 290 | 16 | 1400 |

1) see mbo catalogue page 17_02/page 77

2) can not be regreased

3) one-piece outer ring made of CuSn8

Material:

Outer ring: undercut steel 1.0718 (11SMnPb30+C),
lathe work, galvanised

Bearing shell: special bronze CuSn8

Internal ring: ball bearing steel 1.2067 (100Cr6), hardened,
grinded, polished

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 2 - 10 | 0.005 - 0.040 |
| 12 - 18 | 0.005 - 0.050 |
| 20 - 25 | 0.010 - 0.060 |
| 30 - 40 | 0.010 - 0.075 |

Recommended fits for housing bores for installing pivoting bearings:

| Load | Steel housing | Light-alloy housing |
|--------|---------------|---------------------|
| normal | J7/H7 | K7 |
| high | K7 | M7 |

Lubrication:

regular lubrication required using non-soap high-temperature grease with a high drop point to ensure consistent lubrication at high operating temperatures;
working range: -50 °C up to +250 °C;
initial lubrication must be performed during initial operation

This version is available with threaded bolt:

see mbo catalogue page 17_20 /page 95

Special versions upon request

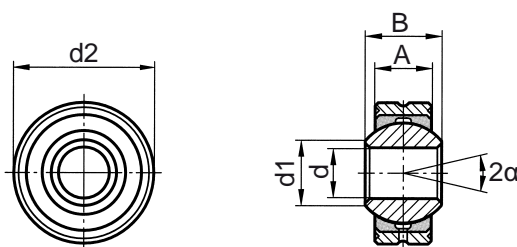
17_23
08/2011



Pivoting bearings DIN ISO 12240-1 (DIN 648) K series



mbo standard 72
stainless version
can be regreased
suitable for
high speeds



(observe standard material pairing)

| Size | Order number | d H7 | A | B | d1 | d2 h6 | Static basic load rating C ₀ ¹⁾ (kN) | Per- missible rpm | Angle of misalignment α° | Weight per piece ≈ g |
|-------------------|---------------------|---------|------|----|------|----------|--|-------------------------|--------------------------------|----------------------------|
| 3 ²⁾³⁾ | 10 72 0000 0003/000 | 3 | 4.5 | 6 | 5.1 | 12 | 10.8 | - | 14 | 5 |
| 5 | 10 72 0000 0005/000 | 5 | 6 | 8 | 7.7 | 16 | 19.8 | 1200 | 13 | 8 |
| 6 | 10 72 0000 0006/000 | 6 | 6.75 | 9 | 8.9 | 18 | 25.8 | 1500 | 13 | 12 |
| 8 | 10 72 0000 0008/000 | 8 | 9 | 12 | 10.4 | 22 | 42.6 | 1200 | 14 | 23 |
| 10 | 10 72 0000 0010/000 | 10 | 10.5 | 14 | 12.9 | 26 | 60 | 1000 | 13 | 38 |
| 12 | 10 72 0000 0012/000 | 12 | 12 | 16 | 15.4 | 30 | 80 | 860 | 13 | 58 |
| 14 | 10 72 0000 0014/000 | 14 | 13.5 | 19 | 16.8 | 34 | 102.5 | 750 | 16 | 83 |
| 16 | 10 72 0000 0016/000 | 16 | 15 | 21 | 19.3 | 38 | 128.5 | 660 | 15 | 115 |
| 18 | 10 72 0000 0018/000 | 18 | 16.5 | 23 | 21.8 | 42 | 157 | 600 | 15 | 150 |
| 20 | 10 72 0000 0020/000 | 20 | 18 | 25 | 24.3 | 46 | 188.5 | 540 | 14 | 200 |
| 22 | 10 72 0000 0022/000 | 22 | 20 | 28 | 25.8 | 50 | 229 | 500 | 15 | 270 |
| 25 | 10 72 0000 0025/000 | 25 | 22 | 31 | 29.6 | 56 | 293 | 440 | 15 | 375 |
| 30 | 10 72 0000 0030/000 | 30 | 25 | 37 | 34.8 | 66 | 381 | 370 | 17 | 540 |
| 35 | 10 72 0000 0035/000 | 35 | 28 | 43 | 37.7 | 78 | 480 | 330 | 19 | 850 |
| 40 | 10 72 0000 0040/000 | 40 | 35 | 49 | 44.2 | 87 | 693 | 290 | 16 | 1400 |

1) see mbo catalogue page 17_02/page 77

2) can not be regreased

3) one-piece outer ring made of CuSn8

Material:

Outer ring: stainless steel 1.4305 (X8CrNiS18-9),
lathe work

Bearing shell: special bronze CuSn8

Internal ring: ball bearing steel 1.2067 (100Cr6), hardened,
grinded, polished, hard chrome-plated
alternative: stainless steel 1.4034 (X46Cr13),
hardened, grinded, polished

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 2 - 10 | 0.005 - 0.040 |
| 12 - 18 | 0.005 - 0.050 |
| 20 - 25 | 0.010 - 0.060 |
| 30 - 40 | 0.010 - 0.075 |

Recommended fits for housing bores for installing pivoting bearings:

| Load | Steel housing | Light-alloy housing |
|--------|---------------|---------------------|
| normal | J7/H7 | K7 |
| high | K7 | M7 |

Lubrication:

regular lubrication required using non-soap high-temperature grease with a high drop point to ensure consistent lubrication at high operating temperatures;
working range: -50 °C up to +250 °C;
initial lubrication must be performed during initial operation

This version is available with threaded bolt:

see mbo catalogue page 17_20 /page 95

Special versions upon request

17_24
08/2011

mbo Osswald GmbH & Co KG

Metal processing · Linking technology

www.mbo-osswald.com · info@mbo-osswald.de
Tel: + 49 (0) 9345-670-0 · Fax: + 49 (0) 9345-6255



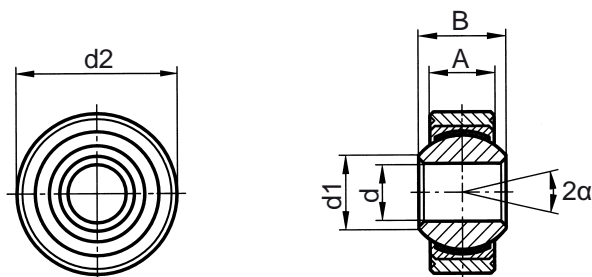
General tolerances
DIN ISO 2768-medium

Subject to technical
alterations

We accept no responsibility for
incorrect or incomplete details or
information given



mbo standard 73
 high-performance version
 maintenance-free
 suitable for low speeds
 and high dynamic pressure
 loads and tensile forces



| Size | Order number | d H7 | A | B | d1 | d2 h6 | Static basic load rating C ₀ ¹⁾ (kN) | Per- missible rpm | Angle of misalignment α° | Weight per piece ≈ g |
|-----------------|---------------------|---------|------|----|------|----------|--|-------------------------|--------------------------------|----------------------------|
| 4 ²⁾ | 10 73 0000 0004/013 | 4 | 5.25 | 7 | 6.5 | 14 | 9.5 | 700 | 14 | 5 |
| 5 | 10 73 0000 0005/013 | 5 | 6 | 8 | 7.7 | 16 | 12.5 | 600 | 13 | 8 |
| 6 | 10 73 0000 0006/013 | 6 | 6.75 | 9 | 8.9 | 18 | 15.5 | 530 | 13 | 12 |
| 8 | 10 73 0000 0008/013 | 8 | 9 | 12 | 10.4 | 22 | 27.8 | 420 | 14 | 23 |
| 10 | 10 73 0000 0010/013 | 10 | 10.5 | 14 | 12.9 | 26 | 39 | 350 | 13 | 38 |
| 12 | 10 73 0000 0012/013 | 12 | 12 | 16 | 15.4 | 30 | 53.5 | 300 | 13 | 58 |
| 14 | 10 73 0000 0014/013 | 14 | 13.5 | 19 | 16.8 | 34 | 70 | 260 | 16 | 83 |
| 16 | 10 73 0000 0016/013 | 16 | 15 | 21 | 19.3 | 38 | 88 | 230 | 15 | 115 |
| 18 | 10 73 0000 0018/013 | 18 | 16.5 | 23 | 21.8 | 42 | 106.5 | 210 | 15 | 150 |
| 20 | 10 73 0000 0020/013 | 20 | 18 | 25 | 24.3 | 46 | 130 | 190 | 14 | 200 |
| 22 | 10 73 0000 0022/013 | 22 | 20 | 28 | 25.8 | 50 | 162 | 170 | 15 | 270 |
| 25 | 10 73 0000 0025/013 | 25 | 22 | 31 | 29.6 | 56 | 204 | 150 | 15 | 375 |
| 30 | 10 73 0000 0030/013 | 30 | 25 | 37 | 34.8 | 66 | 281 | 130 | 17 | 540 |
| 35 | 10 73 0000 0035/013 | 35 | 28 | 43 | 37.7 | 78 | 343 | 110 | 19 | 850 |
| 40 | 10 73 0000 0040/013 | 40 | 35 | 49 | 44.2 | 87 | 495 | 100 | 16 | 1400 |

1) see mbo catalogue page 17_02/page 77

2) one-piece outer ring made of 45S20

Material:

Outer ring: undercut steel 1.0718 (11SMnPb30+C),
 lathe work, galvanised

Bearing shell: undercut steel 1.0718 (11SMnPb30+C),
 galvanised, with glued-in PTFE fabric

Internal ring: ball bearing steel 1.2067 (100Cr6), hardened,
 grinded, polished

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 3 - 10 | 0.005 - 0.035 |
| 12 - 18 | 0.005 - 0.040 |
| 20 - 25 | 0.005 - 0.050 |
| 30 - 40 | 0.010 - 0.060 |

Recommended fits for housing bores for installing pivoting bearings:

| Load | Steel housing | Light-alloy housing |
|--------|---------------|---------------------|
| normal | K7 | M7 |
| high | M7 | N7 |

Lubrication:

no lubrication required; the ball slides on the PTFE fabric
 located in the bearing shell;
 working range: -150 °C up to +250 °C

This version is available with threaded bolt:

see mbo catalogue page 17_20 /page 95

Special versions upon request



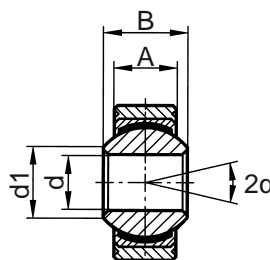
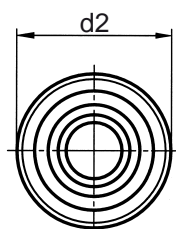


Pivoting bearings DIN ISO 12240-1 (DIN 648)

K series



mbo standard 74
 high-performance version
 stainless version
 maintenance-free
 suitable for low speeds
 and high dynamic pressure
 loads and tensile forces



(observe standard material pairing)

| Size | Order number | d H7 | A | B | d1 | d2 h6 | Static basic load rating C ₀ ¹⁾ (kN) | Per- missible rpm | Angle of misalignment α° | Weight per piece ≈ g |
|-----------------|---------------------|---------|------|----|------|----------|--|-------------------------|--------------------------------|----------------------------|
| 4 ²⁾ | 10 74 0000 0004/000 | 4 | 5.25 | 7 | 6.5 | 14 | 9.5 | 700 | 14 | 5 |
| 5 | 10 74 0000 0005/000 | 5 | 6 | 8 | 7.7 | 16 | 12.5 | 600 | 13 | 8 |
| 6 | 10 74 0000 0006/000 | 6 | 6.75 | 9 | 8.9 | 18 | 15.5 | 530 | 13 | 12 |
| 8 | 10 74 0000 0008/000 | 8 | 9 | 12 | 10.4 | 22 | 27.8 | 420 | 14 | 23 |
| 10 | 10 74 0000 0010/000 | 10 | 10.5 | 14 | 12.9 | 26 | 39 | 350 | 13 | 38 |
| 12 | 10 74 0000 0012/000 | 12 | 12 | 16 | 15.4 | 30 | 53.5 | 300 | 13 | 58 |
| 14 | 10 74 0000 0014/000 | 14 | 13.5 | 19 | 16.8 | 34 | 70 | 260 | 16 | 83 |
| 16 | 10 74 0000 0016/000 | 16 | 15 | 21 | 19.3 | 38 | 88 | 230 | 15 | 115 |
| 18 | 10 74 0000 0018/000 | 18 | 16.5 | 23 | 21.8 | 42 | 106.5 | 210 | 15 | 150 |
| 20 | 10 74 0000 0020/000 | 20 | 18 | 25 | 24.3 | 46 | 130 | 190 | 14 | 200 |
| 22 | 10 74 0000 0022/000 | 22 | 20 | 28 | 25.8 | 50 | 162 | 170 | 15 | 270 |
| 25 | 10 74 0000 0025/000 | 25 | 22 | 31 | 29.6 | 56 | 204 | 150 | 15 | 375 |
| 30 | 10 74 0000 0030/000 | 30 | 25 | 37 | 34.8 | 66 | 281 | 130 | 17 | 540 |
| 35 | 10 74 0000 0035/000 | 35 | 28 | 43 | 37.7 | 78 | 343 | 110 | 19 | 850 |
| 40 | 10 74 0000 0040/000 | 40 | 35 | 49 | 44.2 | 87 | 495 | 100 | 16 | 1400 |

1) see mbo catalogue page 17_02/page 77

2) one-piece outer ring made of stainless steel 1.4305 (X8CrNiS18-9)

Material:

Outer ring: stainless steel 1.4305 (X8CrNiS18-9),
lathe work

Bearing shell: **special bronze CuSn8** with glued-in
PTFE fabric
alternative: stainless steel 1.4571
(X6CrNiMoTi17-12-2)

Internal ring: **ball bearing steel 1.2067 (100Cr6), hardened,
grinded, polished, hard chrome-plated**
alternative: stainless steel 1.4034 (X46Cr13),
hardened, grinded, polished or
stainless steel 1.4401 (X5CrNiMo17-12-2),
unhardened, grinded, polished

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 3 - 10 | 0.005 - 0.035 |
| 12 - 18 | 0.005 - 0.040 |
| 20 - 25 | 0.005 - 0.050 |
| 30 - 40 | 0.010 - 0.060 |

Recommended fits for housing bores for installing pivoting bearings:

| Load | Steel housing | Light-alloy housing |
|--------|---------------|---------------------|
| normal | K7 | M7 |
| high | M7 | N7 |

Lubrication:

no lubrication required; the ball slides on the PTFE fabric
located in the bearing shell;
working range: -150 °C up to +250 °C

This version is available with threaded bolt:

see mbo catalogue page 17_20 /page 95

Special versions upon request

17_26
08/2011

mbo Osswald GmbH & Co KG

Metal processing · Linking technology

www.mbo-osswald.com · info@mbo-osswald.de
Tel: + 49 (0) 9345-670-0 · Fax: + 49 (0) 9345-6255



General tolerances
DIN ISO 2768-medium

Subject to technical
alterations

We accept no responsibility for
incorrect or incomplete details or
information given

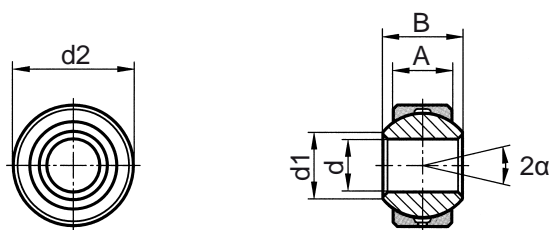


Pivoting bearings DIN ISO 12240-1 (DIN 648)

K series



mbo standard 75
high-performance version
without outer ring
can be regreased
suitable for high speeds



| Size | Order number | d H7 | A | B | d1 | d2 h6 | Static basic load rating C ₀ ¹⁾ (kN) | Per- missible rpm | Angle of misalignment α° | Weight per piece ≈ g |
|-----------------|---------------------|---------|------|-----|------|----------|--|-------------------------|--------------------------------|----------------------------|
| 2 ²⁾ | 10 75 0000 0002/001 | 2 | 3.6 | 4.5 | 2.6 | 6.5 | 6.6 | - | 16 | 3 |
| 3 ²⁾ | 10 75 0000 0003/001 | 3 | 4.5 | 6 | 5.1 | 9 | 10.8 | - | 14 | 4 |
| 4 ²⁾ | 10 75 0000 0004/001 | 4 | 5.25 | 7 | 6.5 | 12 | 14.5 | - | 14 | 4 |
| 5 ²⁾ | 10 75 0000 0005/001 | 5 | 6 | 8 | 7.7 | 13 | 19.8 | - | 13 | 5 |
| 6 | 10 75 0000 0006/001 | 6 | 6.75 | 9 | 8.9 | 15 | 25.8 | 1500 | 13 | 8 |
| 6.16 | 10 75 0000 0616/001 | 6 | 6.75 | 9 | 8.9 | 16 | 25.8 | 1500 | 13 | 9 |
| 8 | 10 75 0000 0008/001 | 8 | 9 | 12 | 10.4 | 18 | 42.6 | 1200 | 14 | 14 |
| 8.19 | 10 75 0000 0819/001 | 8 | 9 | 12 | 10.4 | 19 | 42.6 | 1200 | 14 | 16 |
| 10 | 10 75 0000 0010/001 | 10 | 10.5 | 14 | 12.9 | 21 | 60 | 1000 | 13 | 22 |
| 10.22 | 10 75 0000 1022/001 | 10 | 10.5 | 14 | 12.9 | 22 | 60 | 1000 | 13 | 25 |
| 12 | 10 75 0000 0012/001 | 12 | 12 | 16 | 15.4 | 24.5 | 80 | 860 | 13 | 35 |
| 12.26 | 10 75 0000 1226/001 | 12 | 12 | 16 | 15.4 | 26 | 80 | 860 | 13 | 40 |
| 14 | 10 75 0000 0014/001 | 14 | 13.5 | 19 | 16.8 | 28 | 102.5 | 750 | 16 | 51 |
| 14.29 | 10 75 0000 1429/001 | 14 | 13.5 | 19 | 16.8 | 29 | 102.5 | 750 | 16 | 56 |
| 16 | 10 75 0000 0016/001 | 16 | 15 | 21 | 19.3 | 31.5 | 128.5 | 660 | 15 | 72 |
| 16.32 | 10 75 0000 1632/001 | 16 | 15 | 21 | 19.3 | 32 | 128.5 | 660 | 15 | 76 |
| 18 | 10 75 0000 0018/001 | 18 | 16.5 | 23 | 21.8 | 34.5 | 157 | 600 | 15 | 94 |
| 18.35 | 10 75 0000 1835/001 | 18 | 16.5 | 23 | 21.8 | 35 | 157 | 600 | 15 | 97 |
| 20 | 10 75 0000 0020/001 | 20 | 18 | 25 | 24.3 | 38 | 188.5 | 540 | 14 | 124 |
| 20.40 | 10 75 0000 2040/001 | 20 | 18 | 25 | 24.3 | 40 | 188.5 | 540 | 14 | 141 |
| 22 | 10 75 0000 0022/001 | 22 | 20 | 28 | 25.8 | 41 | 229 | 500 | 15 | 158 |
| 22.42 | 10 75 0000 2242/001 | 22 | 20 | 28 | 25.8 | 42 | 229 | 500 | 15 | 168 |
| 25 | 10 75 0000 0025/001 | 25 | 22 | 31 | 29.6 | 46 | 293 | 440 | 15 | 218 |
| 25.47 | 10 75 0000 2547/001 | 25 | 22 | 31 | 29.6 | 47 | 293 | 440 | 15 | 231 |
| 30 | 10 75 0000 0030/001 | 30 | 25 | 37 | 34.8 | 54 | 381 | 370 | 17 | 349 |
| 30.55 | 10 75 0000 3055/001 | 30 | 25 | 37 | 34.8 | 55 | 381 | 370 | 17 | 362 |
| 35 | 10 75 0000 0035/001 | 35 | 28 | 43 | 37.7 | 62 | 480 | 330 | 19 | 502 |
| 35.65 | 10 75 0000 3565/001 | 35 | 28 | 43 | 37.7 | 65 | 480 | 330 | 19 | 518 |
| 40 | 10 75 0000 0040/001 | 40 | 35 | 49 | 44.2 | 72 | 693 | 290 | 16 | 832 |
| 40.75 | 10 75 0000 4075/001 | 40 | 35 | 49 | 44.2 | 75 | 693 | 290 | 16 | 850 |
| 50 | 10 75 0000 0050/001 | 50 | 45 | 60 | 55.9 | 90 | 1100 | 230 | 14 | 1600 |

1) see mbo catalogue page 17_02/page 77

2) can not be regreased

Material:

Bearing shell: special bronze CuSn8

Internal ring: ball bearing steel 1.2067 (100Cr6), hardened, grinded, polished

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 2 - 10 | 0.005 - 0.040 |
| 12 - 18 | 0.005 - 0.050 |
| 20 - 25 | 0.010 - 0.060 |
| 30 - 40 | 0.010 - 0.075 |
| 40 - 50 | 0.015 - 0.095 |

Special versions upon request

Recommended fits for housing bores for installing pivoting bearings:

| Load | Steel housing | Light-alloy housing |
|--------|---------------|---------------------|
| normal | J7/H7 | K7 |
| high | K7 | M7 |

Lubrication:

regular lubrication required using non-soap high-temperature grease with a high drop point to ensure consistent lubrication at high operating temperatures;
working range: -50 °C up to +250 °C;
initial lubrication must be performed during initial operation

This version is available with threaded bolt:

see mbo catalogue page 17_20 /page 95

17_27
08/2011

mbo Osswald GmbH & Co KG

Metal processing · Linking technology

www.mbo-osswald.com · info@mbo-osswald.de
Tel: + 49 (0) 9345-670-0 · Fax: + 49 (0) 9345-6255



General tolerances
DIN ISO 2768-medium

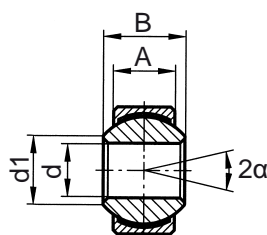
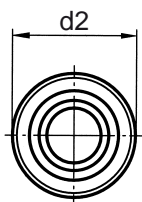
Subject to technical
alterations

We accept no responsibility for
incorrect or incomplete details or
information given



Pivoting bearings DIN ISO 12240-1 (DIN 648)

K series



mbo standard 76
maintenance-free
without outer ring
suitable for low speeds
and high dynamic pressure
loads and tensile forces

| Size | Order number | d H7 | A | B | d1 | d2 h6 | Static basic load rating C ₀ ¹⁾ (kN) | Per- missible rpm | Angle of misalignment α° | Weight per piece ≈ g |
|-------|---------------------|---------|------|----|------|----------|--|-------------------------|--------------------------------|----------------------------|
| 4 | 10 76 0000 0004/013 | 4 | 5.25 | 7 | 6.5 | 12 | 9.5 | 700 | 14 | 4 |
| 5 | 10 76 0000 0005/013 | 5 | 6 | 8 | 7.7 | 13 | 12.5 | 600 | 13 | 6 |
| 6 | 10 76 0000 0006/013 | 6 | 6.75 | 9 | 8.9 | 15 | 15.5 | 530 | 13 | 8 |
| 6.16 | 10 76 0000 0616/013 | 6 | 6.75 | 9 | 8.9 | 16 | 15.5 | 530 | 13 | 9 |
| 8 | 10 76 0000 0008/013 | 8 | 9 | 12 | 10.4 | 18 | 27.8 | 420 | 14 | 15 |
| 8.19 | 10 76 0000 0819/013 | 8 | 9 | 12 | 10.4 | 19 | 27.8 | 420 | 14 | 17 |
| 10 | 10 76 0000 0010/013 | 10 | 10.5 | 14 | 12.9 | 21 | 39 | 350 | 13 | 23 |
| 10.22 | 10 76 0000 1022/013 | 10 | 10.5 | 14 | 12.9 | 22 | 39 | 350 | 13 | 26 |
| 12 | 10 76 0000 0012/013 | 12 | 12 | 16 | 15.4 | 24.5 | 53.5 | 300 | 13 | 35 |
| 12.26 | 10 76 0000 1226/013 | 12 | 12 | 16 | 15.4 | 26 | 53.5 | 300 | 13 | 41 |
| 14 | 10 76 0000 0014/013 | 14 | 13.5 | 19 | 16.8 | 28 | 70 | 260 | 16 | 52 |
| 14.29 | 10 76 0000 1429/013 | 14 | 13.5 | 19 | 16.8 | 29 | 70 | 260 | 16 | 56 |
| 16 | 10 76 0000 0016/013 | 16 | 15 | 21 | 19.3 | 31.5 | 88 | 230 | 15 | 72 |
| 16.32 | 10 76 0000 1632/013 | 16 | 15 | 21 | 19.3 | 32 | 88 | 230 | 15 | 75 |
| 18 | 10 76 0000 0018/013 | 18 | 16.5 | 23 | 21.8 | 34.5 | 106.5 | 210 | 15 | 95 |
| 18.35 | 10 76 0000 1835/013 | 18 | 16.5 | 23 | 21.8 | 35 | 106.5 | 210 | 15 | 97 |
| 20 | 10 76 0000 0020/013 | 20 | 18 | 25 | 24.3 | 38 | 130 | 190 | 14 | 127 |
| 20.40 | 10 76 0000 2040/013 | 20 | 18 | 25 | 24.3 | 40 | 130 | 190 | 14 | 142 |
| 22 | 10 76 0000 0022/013 | 22 | 20 | 28 | 25.8 | 41 | 162 | 170 | 15 | 158 |
| 22.42 | 10 76 0000 2242/013 | 22 | 20 | 28 | 25.8 | 42 | 162 | 170 | 15 | 169 |
| 25 | 10 76 0000 0025/013 | 25 | 22 | 31 | 29.6 | 46 | 204 | 150 | 15 | 222 |
| 25.47 | 10 76 0000 2547/013 | 25 | 22 | 31 | 29.6 | 47 | 204 | 150 | 15 | 230 |
| 30 | 10 76 0000 0030/013 | 30 | 25 | 37 | 34.8 | 54 | 281 | 130 | 17 | 350 |
| 30.55 | 10 76 0000 3055/013 | 30 | 25 | 37 | 34.8 | 55 | 281 | 130 | 17 | 369 |
| 35 | 10 76 0000 0035/013 | 35 | 28 | 43 | 37.7 | 62 | 343 | 110 | 19 | 505 |
| 35.65 | 10 76 0000 3565/013 | 35 | 28 | 43 | 37.7 | 65 | 343 | 110 | 19 | 545 |
| 40 | 10 76 0000 0040/013 | 40 | 35 | 49 | 44.2 | 72 | 495 | 100 | 16 | 832 |
| 40.75 | 10 76 0000 4075/013 | 40 | 35 | 49 | 44.2 | 75 | 495 | 100 | 16 | 894 |
| 50 | 10 76 0000 0050/013 | 50 | 45 | 60 | 55.9 | 90 | 800 | 80 | 14 | 1640 |

1) see mbo catalogue page 17_02/page 77

Material:

Bearing shell: undercut steel 1.0718 (11SMnPb30+C),
galvanised, with glued-in PTFE fabric

Internal ring: ball bearing steel 1.2067 (100Cr6), hardened,
grinded, polished

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 3 - 10 | 0.005 - 0.035 |
| 12 - 18 | 0.005 - 0.040 |
| 20 - 25 | 0.005 - 0.050 |
| 30 - 40 | 0.010 - 0.060 |
| 40 - 50 | 0.010 - 0.075 |

Recommended fits for housing bores for installing pivoting bearings:

| Load | Steel housing | Light-alloy housing |
|--------|---------------|---------------------|
| normal | K7 | M7 |
| high | M7 | N7 |

Lubrication:

no lubrication required; the ball slides on the PTFE fabric
located in the bearing shell;
working range -50 °C up to +200 °C

This version is available with threaded bolt:

see mbo catalogue page 17_20 /page 95

Special versions upon request

17_28
08/2011

mbo Osswald GmbH & Co KG

Metal processing · Linking technology

www.mbo-osswald.com · info@mbo-osswald.de
Tel: + 49 (0) 9345-670-0 · Fax: + 49 (0) 9345-6255



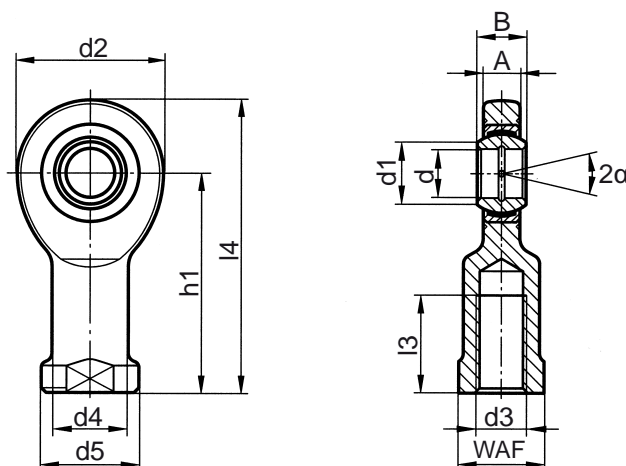
General tolerances
DIN ISO 2768-medium

Subject to technical
alterations

We accept no responsibility for
incorrect or incomplete details or
information given



mbo standard 80
mbo standard 81
maintenance-free
suitable for high
unidirectional loads



| Size | Order number | d | A | B | d1 | d2 | Thread d3 | d4 | d5 | h1 | l3 | l4 | WAF | Static basic load rating C ₀ ¹⁾ (kN) | Angle of misalign- ment α° | Weight per piece ≈ g |
|------|---------------------|----|-----|----|------|-----|--------------|------|-----|-----|----|-------|-----|--|-------------------------------------|----------------------------|
| 6 | 10 80 6481 1006/013 | 6 | 4.4 | 6 | 8 | 20 | M 6 | 10 | 13 | 30 | 12 | 40 | 11 | 10.3 | 13 | 21 |
| 8 | 10 80 6481 1008/013 | 8 | 6 | 8 | 10.2 | 24 | M 8 | 12.5 | 16 | 36 | 16 | 48 | 14 | 15.8 | 15 | 38 |
| 10 | 10 80 6481 1010/013 | 10 | 7 | 9 | 13.2 | 28 | M 10 | 15 | 19 | 43 | 20 | 57 | 17 | 23.4 | 12 | 60 |
| 12 | 10 80 6481 1012/013 | 12 | 8 | 10 | 14.9 | 34 | M 12 | 17.5 | 22 | 50 | 23 | 67 | 19 | 31 | 11 | 96 |
| 15 | 10 80 6481 1015/013 | 15 | 10 | 12 | 18.4 | 40 | M 14 | 21 | 26 | 61 | 29 | 81 | 22 | 42.5 | 8 | 180 |
| 16 | 10 80 6481 1016/013 | 16 | 11 | 14 | 20.7 | 46 | M 16 | 24 | 30 | 67 | 33 | 90 | 27 | 54 | 10 | 220 |
| 17 | 10 80 6481 1017/013 | 17 | 11 | 14 | 20.7 | 46 | M 16 | 24 | 30 | 67 | 33 | 90 | 27 | 54.5 | 10 | 220 |
| 20 | 16 80 6481 1020/013 | 20 | 13 | 16 | 24.2 | 53 | M 20x1.5 | 27.5 | 35 | 77 | 40 | 103.5 | 32 | 62.5 | 9 | 350 |
| 25 | 18 80 6481 1025/013 | 25 | 17 | 20 | 29.3 | 64 | M 24x2 | 33.5 | 42 | 94 | 48 | 126 | 36 | 92 | 7 | 640 |
| 30 | 18 80 6481 1030/013 | 30 | 19 | 22 | 34.2 | 73 | M 30x2 | 40 | 50 | 110 | 56 | 146.5 | 41 | 124 | 6 | 930 |
| 35 | 20 81 6481 1035/013 | 35 | 21 | 25 | 39.8 | 82 | M 36x3 | 47 | 58 | 125 | 60 | 166 | 50 | 144 | 6 | 1300 |
| 40 | 20 81 6481 1040/013 | 40 | 23 | 28 | 45 | 92 | M 39x3 | 52 | 65 | 142 | 65 | 188 | 55 | 178 | 7 | 2000 |
| 45 | 20 81 6481 1045/013 | 45 | 27 | 32 | 50.8 | 102 | M 42x3 | 58 | 70 | 145 | 65 | 196 | 60 | 263 | 7 | 2500 |
| 50 | 20 81 6481 1050/013 | 50 | 30 | 35 | 56 | 112 | M 45x3 | 62 | 75 | 160 | 68 | 216 | 65 | 320 | 6 | 3500 |
| 60 | 20 81 6481 1060/013 | 60 | 38 | 44 | 66.8 | 135 | M 52x3 | 70 | 88 | 175 | 70 | 242.5 | 75 | 497 | 6 | 5550 |
| 70 | 22 81 6481 1070/013 | 70 | 42 | 49 | 77.9 | 160 | M 56x4 | 80 | 98 | 200 | 80 | 280 | 85 | 606 | 6 | 8600 |
| 80 | 22 81 6481 1080/013 | 80 | 47 | 55 | 89.4 | 180 | M 64x4 | 95 | 110 | 230 | 85 | 320 | 100 | 752 | 6 | 12000 |

1) see mbo catalogue page 17_02/page 77

Material:

Housing: up to size 10 undercut steel 1.0718 (11SMnPb30+C), lathe work, galvanised; from size 12 thermal treatment steel 1.0503 (C45), forged, galvanised

Bearing: maintenance-free steel/PTFE bearing (mbo standard 91, see mbo catalogue page 17_36/page 111); from size 20 with double face sealing (**mbo standard 81**, order number: .. **81** 6481 ...); from size 35 only with double face sealing (**mbo standard 81**)

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 6 - 12 | 0 - 0.030 |
| 15 - 20 | 0 - 0.040 |
| 25 - 35 | 0 - 0.050 |
| 40 - 60 | 0 - 0.055 |
| 70 - 80 | 0 - 0.060 |

Ball bore:

| Hole diameter d | Hole tolerance |
|-----------------|----------------|
| 5 - 18 mm | 0/ - 8μ |
| 20 - 30 mm | 0/ - 10μ |
| 35 - 50 mm | 0/ - 12μ |
| 60 - 80 mm | 0/ - 15μ |

Cetop connection dimensions:

see mbo catalogue page 17_19/page 94

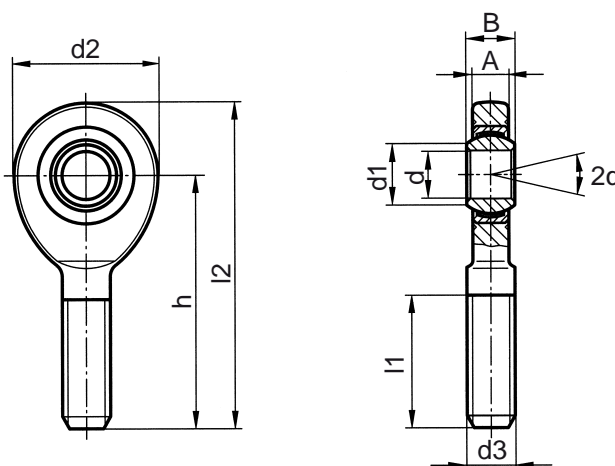
Lubrication:

no lubrication required; the ball slides on the PTFE fabric located in the bearing shell;
working range: -50 °C up to +150 °C;
or with sealing: -30 °C up to +130 °C

Special versions upon request

17_29
08/2011





mbo standard 80
mbo standard 81
maintenance-free
suitable for high
unidirectional loads

| Size | Order number | d | A | B | d1 | d2 | Thread d3 | h | l1 | l2 | Static basic load rating C ₀ ¹⁾ (kN) | Angle of misalignment α° | Weight per piece ≈ g |
|------|---------------------|----|-----|----|------|-----|-----------|-----|-----|-------|--|--------------------------|----------------------|
| 6 | 10 80 6481 2006/013 | 6 | 4.4 | 6 | 8 | 20 | M 6 | 36 | 18 | 46 | 6.9 | 13 | 16 |
| 8 | 10 80 6481 2008/013 | 8 | 6 | 8 | 10.2 | 24 | M 8 | 42 | 22 | 54 | 12.7 | 15 | 28 |
| 10 | 10 80 6481 2010/013 | 10 | 7 | 9 | 13.2 | 28 | M 10 | 48 | 26 | 62 | 19.9 | 12 | 50 |
| 12 | 10 80 6481 2012/013 | 12 | 8 | 10 | 14.9 | 34 | M 12 | 54 | 28 | 71 | 29 | 11 | 86 |
| 15 | 10 80 6481 2015/013 | 15 | 10 | 12 | 18.4 | 40 | M 14 | 63 | 34 | 83 | 39.5 | 8 | 140 |
| 16 | 10 80 6481 2016/013 | 16 | 11 | 14 | 20.7 | 46 | M 16 | 69 | 36 | 92 | 54 | 10 | 190 |
| 17 | 10 80 6481 2017/013 | 17 | 11 | 14 | 20.7 | 46 | M 16 | 69 | 36 | 92 | 54 | 10 | 190 |
| 20 | 16 80 6481 2020/013 | 20 | 13 | 16 | 24.2 | 53 | M 20x1.5 | 78 | 43 | 104.5 | 62.5 | 9 | 320 |
| 25 | 18 80 6481 2025/013 | 25 | 17 | 20 | 29.3 | 64 | M 24x2 | 94 | 53 | 126 | 92 | 7 | 560 |
| 30 | 18 80 6481 2030/013 | 30 | 19 | 22 | 34.2 | 73 | M 30x2 | 110 | 65 | 146.5 | 124 | 6 | 890 |
| 35 | 20 81 6481 2035/013 | 35 | 21 | 25 | 39.8 | 82 | M 36x3 | 140 | 82 | 181 | 144 | 6 | 1400 |
| 40 | 20 81 6481 2040/013 | 40 | 23 | 28 | 45 | 92 | M 39x3 | 150 | 86 | 196 | 178 | 7 | 1800 |
| 45 | 20 81 6481 2045/013 | 45 | 27 | 32 | 50.8 | 102 | M 42x3 | 163 | 94 | 214 | 263 | 7 | 2610 |
| 50 | 20 81 6481 2050/013 | 50 | 30 | 35 | 56 | 112 | M 45x3 | 185 | 107 | 241 | 320 | 6 | 3450 |
| 60 | 20 81 6481 2060/013 | 60 | 38 | 44 | 66.8 | 135 | M 52x3 | 210 | 115 | 277.5 | 497 | 6 | 5900 |
| 70 | 22 81 6481 2070/013 | 70 | 42 | 49 | 77.9 | 160 | M 56x4 | 235 | 125 | 315 | 566 | 6 | 8200 |
| 80 | 22 81 6481 2080/013 | 80 | 47 | 55 | 89.4 | 180 | M 64x4 | 270 | 140 | 360 | 752 | 6 | 12000 |

1) see mbo catalogue page 17_02/page 77

Material:

Housing: up to size 10 undercut steel 1.0718 (11SMnPb30+C), lathe work, galvanised; from size 12 thermal treatment steel 1.0503 (C45), forged, galvanised

Bearing: maintenance-free steel/PTFE bearing (mbo standard 91, see mbo catalogue page 17_36/page 111); from size 20 with double face sealing (**mbo standard 81**, order number: .. **81** 6481 ...); from size 35 only with double face sealing (**mbo standard 81**)

Ball bore:

| Hole diameter d | Hole tolerance |
|-----------------|----------------|
| 5 - 18 mm | 0/ - 8μ |
| 20 - 30 mm | 0/ - 10μ |
| 35 - 50 mm | 0/ - 12μ |
| 60 - 80 mm | 0/ - 15μ |

Lubrication:

no lubrication required; the ball slides on the PTFE fabric located in the bearing shell; working range: -50 °C up to +150 °C; or with sealing: -30 °C up to +130 °C

Bearing tolerance:

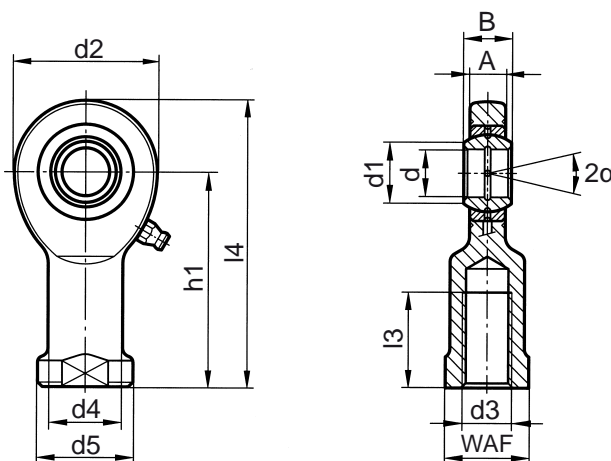
| Size: | Radial tolerance in mm |
|---------|------------------------|
| | min - max |
| 6 - 12 | 0 - 0.030 |
| 15 - 20 | 0 - 0.040 |
| 25 - 35 | 0 - 0.050 |
| 40 - 60 | 0 - 0.055 |
| 70 - 80 | 0 - 0.060 |

Special versions upon request

17_30
08/2011



mbo standard 82
mbo standard 83
needs maintenance
suitable for high
alternating loads



| Size | Order number | d | A | B | d1 | d2 | Thread d3 | d4 | d5 | h1 | l3 | l4 | WAF | Static basic load rating C ₀ ¹⁾ (kN) | Angle of misalignment α° | Weight per piece ≈ g |
|------|---------------------|----|-----|----|------|-----|-----------|------|-----|-----|----|-------|-----|--|--------------------------|----------------------|
| 6 | 10 82 6481 1006/013 | 6 | 4.4 | 6 | 8 | 20 | M 6 | 10 | 13 | 30 | 12 | 40 | 11 | 10.3 | 13 | 21 |
| 8 | 10 82 6481 1008/013 | 8 | 6 | 8 | 10.2 | 24 | M 8 | 12.5 | 16 | 36 | 16 | 48 | 14 | 15.8 | 15 | 38 |
| 10 | 10 82 6481 1010/013 | 10 | 7 | 9 | 13.2 | 28 | M 10 | 15 | 19 | 43 | 20 | 57 | 17 | 23.4 | 12 | 60 |
| 12 | 10 82 6481 1012/013 | 12 | 8 | 10 | 14.9 | 34 | M 12 | 17.5 | 22 | 50 | 23 | 67 | 19 | 31 | 11 | 96 |
| 15 | 10 82 6481 1015/013 | 15 | 10 | 12 | 18.4 | 40 | M 14 | 21 | 26 | 61 | 29 | 81 | 22 | 42.5 | 8 | 180 |
| 16 | 10 82 6481 1016/013 | 16 | 11 | 14 | 20.7 | 46 | M 16 | 24 | 30 | 67 | 33 | 90 | 27 | 54 | 10 | 220 |
| 17 | 10 82 6481 1017/013 | 17 | 11 | 14 | 20.7 | 46 | M 16 | 24 | 30 | 67 | 33 | 90 | 27 | 54.5 | 10 | 220 |
| 20 | 16 82 6481 1020/013 | 20 | 13 | 16 | 24.2 | 53 | M 20x1.5 | 27.5 | 35 | 77 | 40 | 103.5 | 32 | 62.5 | 9 | 350 |
| 25 | 18 82 6481 1025/013 | 25 | 17 | 20 | 29.3 | 64 | M 24x2 | 33.5 | 42 | 94 | 48 | 126 | 36 | 92 | 7 | 640 |
| 30 | 18 82 6481 1030/013 | 30 | 19 | 22 | 34.2 | 73 | M 30x2 | 40 | 50 | 110 | 56 | 146.5 | 41 | 124 | 6 | 930 |
| 35 | 20 82 6481 1035/013 | 35 | 21 | 25 | 39.8 | 82 | M 36x3 | 47 | 58 | 125 | 60 | 166 | 50 | 144 | 6 | 1300 |
| 40 | 20 82 6481 1040/013 | 40 | 23 | 28 | 45 | 92 | M 39x3 | 52 | 65 | 142 | 65 | 188 | 55 | 178 | 7 | 2000 |
| 45 | 20 82 6481 1045/013 | 45 | 27 | 32 | 50.8 | 102 | M 42x3 | 58 | 70 | 145 | 65 | 196 | 60 | 263 | 7 | 2500 |
| 50 | 20 82 6481 1050/013 | 50 | 30 | 35 | 56 | 112 | M 45x3 | 62 | 75 | 160 | 68 | 216 | 65 | 320 | 6 | 3500 |
| 60 | 20 82 6481 1060/013 | 60 | 38 | 44 | 66.8 | 135 | M 52x3 | 70 | 88 | 175 | 70 | 242.5 | 75 | 497 | 6 | 5550 |
| 70 | 22 82 6481 1070/013 | 70 | 42 | 49 | 77.9 | 160 | M 56x4 | 80 | 98 | 200 | 80 | 280 | 85 | 606 | 6 | 8600 |
| 80 | 22 82 6481 1080/013 | 80 | 47 | 55 | 89.4 | 180 | M 64x4 | 95 | 110 | 230 | 85 | 320 | 100 | 752 | 6 | 12000 |

1) see mbo catalogue page 17_02/page 77

Material:

Housing: up to size 10 undercut steel 1.0718 (11SMnPb30+C), lathe work, galvanised; from size 12 thermal treatment steel 1.0503 (C45), forged, galvanised

Bearing: maintenance-free steel/steel bearing (mbo standard 89/90, see mbo catalogue page 17_35/page 110); from size 20 deliverable with double face sealing (**mbo standard 83**, order number: .. **83** 6481 ...)

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 6 - 12 | 0.015 - 0.050 |
| 15 - 20 | 0.020 - 0.065 |
| 25 - 35 | 0.030 - 0.085 |
| 40 - 60 | 0.035 - 0.100 |
| 70 - 80 | 0.045 - 0.120 |

Ball bore:

| Hole diameter d | Hole tolerance |
|-----------------|----------------|
| 5 - 18 mm | 0/ - 8μ |
| 20 - 30 mm | 0/ - 10μ |
| 35 - 50 mm | 0/ - 12μ |
| 60 - 80 mm | 0/ - 15μ |

Cetop connection dimensions:

see mbo catalogue page 17_19/page 94

Lubrication:

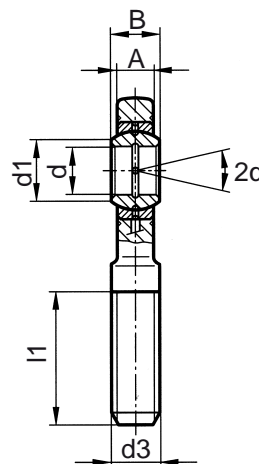
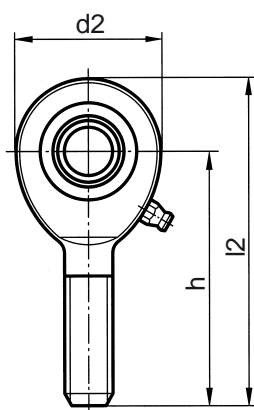
no lubrication required up to size 17; from size 20, via hydraulic lubricating nipple DIN 71412; working range: -50 °C up to +200 °C; or with sealing: -30 °C up to +130 °C; initial lubrication must be performed during initial operation

Special versions upon request

17_31
08/2011



mbo standard 82
mbo standard 83
needs maintenance
suitable for high
alternating loads



| Size | Order number | d | A | B | d1 | d2 | Thread d3 | h | l1 | l2 | Static basic load rating C ₀ ¹⁾ (kN) | Angle of misalignment α° | Weight per piece ≈ g |
|------|---------------------|----|-----|----|------|-----|-----------|-----|-----|-------|--|--------------------------|----------------------|
| 6 | 10 82 6481 2006/013 | 6 | 4.4 | 6 | 8 | 20 | M 6 | 36 | 18 | 46 | 6.9 | 13 | 16 |
| 8 | 10 82 6481 2008/013 | 8 | 6 | 8 | 10.2 | 24 | M 8 | 42 | 22 | 54 | 12.7 | 15 | 28 |
| 10 | 10 82 6481 2010/013 | 10 | 7 | 9 | 13.2 | 28 | M 10 | 48 | 26 | 62 | 19.9 | 12 | 50 |
| 12 | 10 82 6481 2012/013 | 12 | 8 | 10 | 14.9 | 34 | M 12 | 54 | 28 | 71 | 29 | 11 | 86 |
| 15 | 10 82 6481 2015/013 | 15 | 10 | 12 | 18.4 | 40 | M 14 | 63 | 34 | 83 | 39.5 | 8 | 140 |
| 16 | 10 82 6481 2016/013 | 16 | 11 | 14 | 20.7 | 46 | M 16 | 69 | 36 | 92 | 54 | 10 | 190 |
| 17 | 10 82 6481 2017/013 | 17 | 11 | 14 | 20.7 | 46 | M 16 | 69 | 36 | 92 | 54 | 10 | 190 |
| 20 | 16 82 6481 2020/013 | 20 | 13 | 16 | 24.2 | 53 | M 20x1.5 | 78 | 43 | 104.5 | 62.5 | 9 | 320 |
| 25 | 18 82 6481 2025/013 | 25 | 17 | 20 | 29.3 | 64 | M 24x2 | 94 | 53 | 126 | 92 | 7 | 560 |
| 30 | 18 82 6481 2030/013 | 30 | 19 | 22 | 34.2 | 73 | M 30x2 | 110 | 65 | 146.5 | 124 | 6 | 890 |
| 35 | 20 82 6481 2035/013 | 35 | 21 | 25 | 39.8 | 82 | M 36x3 | 140 | 82 | 181 | 144 | 6 | 1400 |
| 40 | 20 82 6481 2040/013 | 40 | 23 | 28 | 45 | 92 | M 39x3 | 150 | 86 | 196 | 178 | 7 | 1800 |
| 45 | 20 82 6481 2045/013 | 45 | 27 | 32 | 50.8 | 102 | M 42x3 | 163 | 94 | 214 | 263 | 7 | 2610 |
| 50 | 20 82 6481 2050/013 | 50 | 30 | 35 | 56 | 112 | M 45x3 | 185 | 107 | 241 | 320 | 6 | 3450 |
| 60 | 20 82 6481 2060/013 | 60 | 38 | 44 | 66.8 | 135 | M 52x3 | 210 | 115 | 277.5 | 497 | 6 | 5900 |
| 70 | 22 82 6481 2070/013 | 70 | 42 | 49 | 77.9 | 160 | M 56x4 | 235 | 125 | 315 | 566 | 6 | 8200 |
| 80 | 22 82 6481 2080/013 | 80 | 47 | 55 | 89.4 | 180 | M 64x4 | 270 | 140 | 360 | 752 | 6 | 12000 |

1) see mbo catalogue page 17_02/page 77

Material:

Housing: up to size 10 undercut steel 1.0718 (11SMnPb30+C), lathe work, galvanised; from size 12 thermal treatment steel 1.0503 (C45), forged, galvanised

Bearing: maintenance-free steel/steel bearing (mbo standard 89/90, see mbo catalogue page 17_35/page 110); from size 20 deliverable with double face sealing (**mbo standard 83**, order number: .. **83** 6481 ...)

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 6 - 12 | 0.015 - 0.050 |
| 15 - 20 | 0.020 - 0.065 |
| 25 - 35 | 0.030 - 0.085 |
| 40 - 60 | 0.035 - 0.100 |
| 70 - 80 | 0.045 - 0.120 |

Ball bore:

| Hole diameter d | Hole tolerance |
|-----------------|----------------|
| 5 - 18 mm | 0/ - 8μ |
| 20 - 30 mm | 0/ - 10μ |
| 35 - 50 mm | 0/ - 12μ |
| 60 - 80 mm | 0/ - 15μ |

Lubrication:

no lubrication required up to size 17; from size 20, via hydraulic lubricating nipple DIN 71412; working range: -50 °C up to +200 °C; or with sealing: -30 °C up to +130 °C; initial lubrication must be performed during initial operation

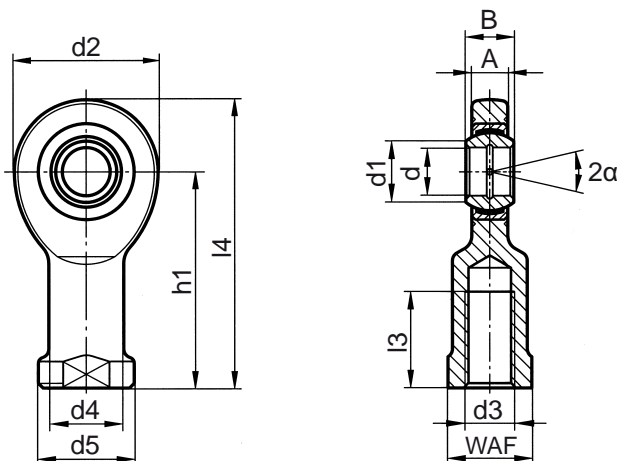
Special versions upon request

17_32
08/2011





mbo standard 84
stainless version
maintenance-free
suitable for high
unidirectional loads



| Size | Order number | d | A | B | d1 | d2 | Thread d3 | d4 | d5 | h1 | l3 | l4 | WAF | Static basic load rating C ₀ ¹⁾ (kN) | Angle of misalignment α° | Weight per piece ≈ g |
|------|---------------------|----|-----|----|------|-----|-----------|------|-----|-----|----|-------|-----|--|--------------------------|----------------------|
| 6 | 10 84 6481 1006/000 | 6 | 4.4 | 6 | 8 | 20 | M 6 | 10 | 13 | 30 | 12 | 40 | 11 | 6 | 13 | 21 |
| 8 | 10 84 6481 1008/000 | 8 | 6 | 8 | 10.2 | 24 | M 8 | 12.5 | 16 | 36 | 16 | 48 | 14 | 9.2 | 15 | 38 |
| 10 | 10 84 6481 1010/000 | 10 | 7 | 9 | 13.2 | 28 | M 10 | 15 | 19 | 43 | 20 | 57 | 17 | 13.6 | 12 | 60 |
| 12 | 10 84 6481 1012/000 | 12 | 8 | 10 | 14.9 | 34 | M 12 | 17.5 | 22 | 50 | 23 | 67 | 19 | 18 | 11 | 96 |
| 15 | 10 84 6481 1015/000 | 15 | 10 | 12 | 18.4 | 40 | M 14 | 21 | 26 | 61 | 29 | 81 | 22 | 26.5 | 8 | 180 |
| 16 | 10 84 6481 1016/000 | 16 | 11 | 14 | 20.7 | 46 | M 16 | 24 | 30 | 67 | 33 | 90 | 27 | 34 | 10 | 220 |
| 17 | 10 84 6481 1017/000 | 17 | 11 | 14 | 20.7 | 46 | M 16 | 24 | 30 | 67 | 33 | 90 | 27 | 34 | 10 | 220 |
| 20 | 16 84 6481 1020/000 | 20 | 13 | 16 | 24.2 | 53 | M 20x1.5 | 27.5 | 35 | 77 | 40 | 103.5 | 32 | 45 | 9 | 350 |
| 25 | 18 84 6481 1025/000 | 25 | 17 | 20 | 29.3 | 64 | M 24x2 | 33.5 | 42 | 94 | 48 | 126 | 36 | 73 | 7 | 640 |
| 30 | 18 84 6481 1030/000 | 30 | 19 | 22 | 34.2 | 73 | M 30x2 | 40 | 50 | 110 | 56 | 146.5 | 41 | 97 | 6 | 930 |
| 35 | 20 84 6481 1035/000 | 35 | 21 | 25 | 39.8 | 82 | M 36x3 | 47 | 58 | 125 | 60 | 166 | 50 | 111 | 6 | 1300 |
| 40 | 20 84 6481 1040/000 | 40 | 23 | 28 | 45 | 92 | M 39x3 | 52 | 65 | 142 | 65 | 188 | 55 | 135 | 7 | 2000 |
| 45 | 20 84 6481 1045/000 | 45 | 27 | 32 | 50.8 | 102 | M 42x3 | 58 | 70 | 145 | 65 | 196 | 60 | 178 | 7 | 2500 |
| 50 | 20 84 6481 1050/000 | 50 | 30 | 35 | 56 | 112 | M 45x3 | 62 | 75 | 160 | 68 | 216 | 65 | 216 | 6 | 3500 |
| 60 | 20 84 6481 1060/000 | 60 | 38 | 44 | 66.8 | 135 | M 52x3 | 70 | 88 | 175 | 70 | 242.5 | 75 | 336 | 6 | 5550 |
| 70 | 22 84 6481 1070/000 | 70 | 42 | 49 | 77.9 | 160 | M 56x4 | 80 | 98 | 200 | 80 | 280 | 85 | 459 | 6 | 8600 |
| 80 | 22 84 6481 1080/000 | 80 | 47 | 55 | 89.4 | 180 | M 64x4 | 95 | 110 | 230 | 85 | 320 | 100 | 570 | 6 | 12000 |

1) see mbo catalogue page 17_02/page 77

Material:

Housing: size 6-40 stainless steel 1.4301 (X5CrNi18-10), forged, polished;
from size 45 stainless steel 1.4301 (X5CrNi18-10), lathe work;
from size 50 stainless steel 1.4571 (X6CrNiMoTi17-12-2), lathe work

Bearing: maintenance-free pivoting bearing (mbo standard 93, see mbo catalogue page 17_37/page 112) made of stainless steel

Bearing tolerance:

| Size: | Radial tolerance in mm |
|---------|------------------------|
| | min - max |
| 6 - 12 | 0 - 0.030 |
| 15 - 20 | 0 - 0.040 |
| 25 - 35 | 0 - 0.050 |
| 40 - 60 | 0 - 0.055 |
| 70 - 80 | 0 - 0.060 |

Ball bore:

| Hole diameter d | Hole tolerance |
|-----------------|----------------|
| 5 - 18 mm | 0/ - 8μ |
| 20 - 30 mm | 0/ - 10μ |
| 35 - 50 mm | 0/ - 12μ |
| 60 - 80 mm | 0/ - 15μ |

Cetop connection dimensions:

see mbo catalogue page 17_19/page 94

Lubrication:

no lubrication required; the ball slides on the PTFE fabric located in the bearing shell;
working range: -50 °C up to +150 °C

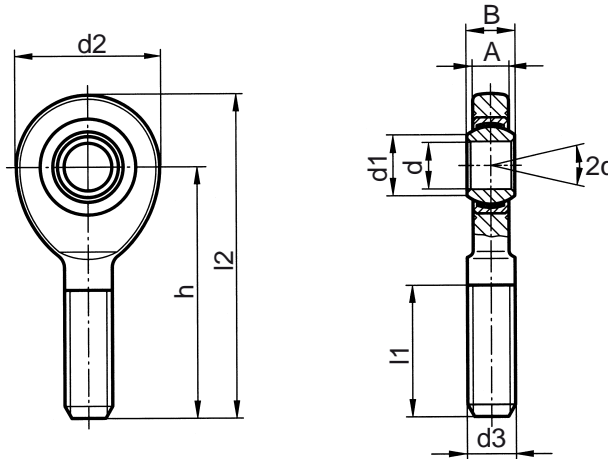
Special versions upon request

17_33
08/2011





mbo standard 84
stainless version
maintenance-free
suitable for high
unidirectional loads



| Size | Order number | d | A | B | d1 | d2 | Thread d3 | h | l1 | l2 | Static basic load rating C ₀ ¹⁾ (kN) | Angle of misalignment α° | Weight per piece ≈ g |
|------|---------------------|----|-----|----|------|-----|-----------|-----|-----|-------|--|--------------------------|----------------------|
| 6 | 10 84 6481 2006/000 | 6 | 4.4 | 6 | 8 | 20 | M 6 | 36 | 18 | 46 | 4 | 13 | 16 |
| 8 | 10 84 6481 2008/000 | 8 | 6 | 8 | 10.2 | 24 | M 8 | 42 | 22 | 54 | 7.4 | 15 | 28 |
| 10 | 10 84 6481 2010/000 | 10 | 7 | 9 | 13.2 | 28 | M 10 | 48 | 26 | 62 | 11.6 | 12 | 50 |
| 12 | 10 84 6481 2012/000 | 12 | 8 | 10 | 14.9 | 34 | M 12 | 54 | 28 | 71 | 17 | 11 | 86 |
| 15 | 10 84 6481 2015/000 | 15 | 10 | 12 | 18.4 | 40 | M 14 | 63 | 34 | 83 | 23 | 8 | 140 |
| 16 | 10 84 6481 2016/000 | 16 | 11 | 14 | 20.7 | 46 | M 16 | 69 | 36 | 92 | 31.5 | 10 | 190 |
| 17 | 10 84 6481 2017/000 | 17 | 11 | 14 | 20.7 | 46 | M 16 | 69 | 36 | 92 | 31.5 | 10 | 190 |
| 20 | 16 84 6481 2020/000 | 20 | 13 | 16 | 24.2 | 53 | M 20x1.5 | 78 | 43 | 104.5 | 45 | 9 | 320 |
| 25 | 18 84 6481 2025/000 | 25 | 17 | 20 | 29.3 | 64 | M 24x2 | 94 | 53 | 126 | 73 | 7 | 560 |
| 30 | 18 84 6481 2030/000 | 30 | 19 | 22 | 34.2 | 73 | M 30x2 | 110 | 65 | 146.5 | 97 | 6 | 890 |
| 35 | 20 84 6481 2035/000 | 35 | 21 | 25 | 39.8 | 82 | M 36x3 | 140 | 82 | 181 | 111 | 6 | 1400 |
| 40 | 20 84 6481 2040/000 | 40 | 23 | 28 | 45 | 92 | M 39x3 | 150 | 86 | 196 | 135 | 7 | 1800 |
| 45 | 20 84 6481 2045/000 | 45 | 27 | 32 | 50.8 | 102 | M 42x3 | 163 | 94 | 214 | 178 | 7 | 2610 |
| 50 | 20 84 6481 2050/000 | 50 | 30 | 35 | 56 | 112 | M 45x3 | 185 | 107 | 241 | 216 | 6 | 3450 |
| 60 | 20 84 6481 2060/000 | 60 | 38 | 44 | 66.8 | 135 | M 52x3 | 210 | 115 | 277.5 | 336 | 6 | 5900 |
| 70 | 22 84 6481 2070/000 | 70 | 42 | 49 | 77.9 | 160 | M 56x4 | 235 | 125 | 315 | 459 | 6 | 8200 |
| 80 | 22 84 6481 2080/000 | 80 | 47 | 55 | 89.4 | 180 | M 64x4 | 270 | 140 | 360 | 570 | 6 | 12000 |

1) see mbo catalogue page 17_02/page 77

Material:

Housing: size 6-40 stainless steel 1.4301 (X5CrNi18-10), forged, polished;
from size 45 stainless steel 1.4301 (X5CrNi18-10), lathe work;
from size 50 stainless steel 1.4571 (X6CrNiMoTi17-12-2), lathe work

Bearing: maintenance-free pivoting bearing (mbo standard 93, see mbo catalogue page 17_37/page 112) made of stainless steel

Ball bore:

| Hole diameter d | Hole tolerance |
|-----------------|----------------|
| 5 - 18 mm | 0/ - 8μ |
| 20 - 30 mm | 0/ - 10μ |
| 35 - 50 mm | 0/ - 12μ |
| 60 - 80 mm | 0/ - 15μ |

Lubrication:

no lubrication required; the ball slides on the PTFE fabric located in the bearing shell;
working range: -50 °C up to +150 °C

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 6 - 12 | 0 - 0.030 |
| 15 - 20 | 0 - 0.040 |
| 25 - 35 | 0 - 0.050 |
| 40 - 60 | 0 - 0.055 |
| 70 - 80 | 0 - 0.060 |

Special versions upon request

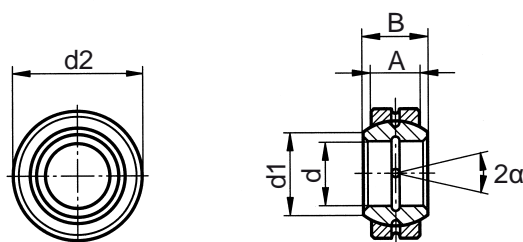
17_34
08/2011





Pivoting bearings DIN ISO 12240-1 (DIN 648)

E series



mbo standard 89
mbo standard 90
can be regreased
suitable for high
alternating loads

| Size | Order number | d | A | B | d1 | d2 | Static basic load rating $C_0^{(1)}$ (kN) | Angle of misalignment α° | Weight per piece \approx g |
|------------------|---------------------|--------------|-----|-----|-------|--------------|---|--------------------------------------|------------------------------|
| 4 ²⁾ | 10 89 0000 0004/001 | 4 0/-0.008 | 3 | 5 | 6 | 12 0/-0.008 | 10 | 16 | 3 |
| 5 ²⁾ | 10 89 0000 0005/001 | 5 0/-0.008 | 4 | 6 | 8 | 14 0/-0.008 | 17 | 13 | 4 |
| 6 ²⁾ | 10 89 0000 0006/001 | 6 0/-0.008 | 4 | 6 | 8 | 14 0/-0.008 | 17 | 13 | 4 |
| 8 ²⁾ | 10 89 0000 0008/001 | 8 0/-0.008 | 5 | 8 | 10.2 | 16 0/-0.008 | 27.5 | 15 | 7 |
| 10 ²⁾ | 10 89 0000 0010/001 | 10 0/-0.008 | 6 | 9 | 13.2 | 19 0/-0.008 | 40.5 | 12 | 11 |
| 12 ²⁾ | 10 89 0000 0012/001 | 12 0/-0.008 | 7 | 10 | 14.9 | 22 0/-0.009 | 54 | 11 | 17 |
| 15 | 10 89 0000 0015/001 | 15 0/-0.008 | 9 | 12 | 18.4 | 26 0/-0.009 | 85 | 8 | 26 |
| 16 ³⁾ | 10 89 0000 0016/001 | 16 0/-0.008 | 10 | 14 | 20.7 | 30 0/-0.009 | 106 | 10 | 40 |
| 17 | 10 89 0000 0017/001 | 17 0/-0.008 | 10 | 14 | 20.7 | 30 0/-0.009 | 106 | 10 | 40 |
| 20 | 10 89 0000 0020/001 | 20 0/-0.010 | 12 | 16 | 24.2 | 35 0/-0.011 | 146 | 9 | 64 |
| 25 | 10 89 0000 0025/001 | 25 0/-0.010 | 16 | 20 | 29.3 | 42 0/-0.011 | 240 | 7 | 115 |
| 30 | 10 89 0000 0030/001 | 30 0/-0.010 | 18 | 22 | 34.2 | 47 0/-0.011 | 310 | 6 | 149 |
| 35 | 10 89 0000 0035/001 | 35 0/-0.012 | 20 | 25 | 39.7 | 55 0/-0.013 | 400 | 6 | 228 |
| 40 | 10 89 0000 0040/001 | 40 0/-0.012 | 22 | 28 | 45 | 62 0/-0.013 | 500 | 7 | 318 |
| 45 | 10 89 0000 0045/001 | 45 0/-0.012 | 25 | 32 | 50.7 | 68 0/-0.013 | 640 | 7 | 421 |
| 50 | 10 89 0000 0050/001 | 50 0/-0.012 | 28 | 35 | 55.9 | 75 0/-0.013 | 780 | 6 | 562 |
| 55 | 10 89 0000 0055/001 | 55 0/-0.015 | 32 | 40 | 62.3 | 85 0/-0.015 | 1000 | 7 | 864 |
| 60 | 10 89 0000 0060/001 | 60 0/-0.015 | 36 | 44 | 66.8 | 90 0/-0.015 | 1220 | 6 | 1030 |
| 70 | 10 89 0000 0070/001 | 70 0/-0.015 | 40 | 49 | 77.8 | 105 0/-0.015 | 1560 | 6 | 1570 |
| 80 | 10 89 0000 0080/001 | 80 0/-0.015 | 45 | 55 | 89.4 | 120 0/-0.015 | 2000 | 6 | 2320 |
| 90 | 10 89 0000 0090/001 | 90 0/-0.020 | 50 | 60 | 98.1 | 130 0/-0.018 | 2450 | 5 | 2790 |
| 100 | 10 89 0000 0100/001 | 100 0/-0.020 | 55 | 70 | 109.5 | 150 0/-0.018 | 3050 | 7 | 4440 |
| 110 | 10 89 0000 0110/001 | 110 0/-0.020 | 55 | 70 | 121.2 | 160 0/-0.025 | 3250 | 6 | 4830 |
| 120 | 10 89 0000 0120/001 | 120 0/-0.020 | 70 | 85 | 135.5 | 180 0/-0.025 | 4750 | 6 | 8110 |
| 140 | 10 89 0000 0140/001 | 140 0/-0.025 | 70 | 90 | 155.8 | 210 0/-0.030 | 5400 | 7 | 11200 |
| 160 | 10 89 0000 0160/001 | 160 0/-0.025 | 80 | 105 | 170.2 | 230 0/-0.030 | 6800 | 8 | 14100 |
| 180 | 10 89 0000 0180/001 | 180 0/-0.025 | 80 | 105 | 198.9 | 260 0/-0.035 | 7650 | 6 | 18500 |
| 200 | 10 89 0000 0200/001 | 200 0/-0.030 | 100 | 130 | 213.5 | 290 0/-0.035 | 10600 | 7 | 28400 |
| 220 | 10 90 0000 0220/001 | 220 0/-0.030 | 100 | 135 | 239.5 | 320 0/-0.040 | 11600 | 8 | 35700 |
| 240 | 10 90 0000 0240/001 | 240 0/-0.030 | 100 | 140 | 265.3 | 340 0/-0.040 | 12700 | 8 | 39700 |
| 260 | 10 90 0000 0260/001 | 260 0/-0.035 | 110 | 150 | 288.3 | 370 0/-0.040 | 15300 | 7 | 51500 |
| 280 | 10 90 0000 0280/001 | 280 0/-0.035 | 120 | 155 | 313.8 | 400 0/-0.040 | 18000 | 6 | 64900 |
| 300 | 10 90 0000 0300/001 | 300 0/-0.035 | 120 | 165 | 336.7 | 430 0/-0.045 | 19000 | 7 | 77600 |

1) see mbo catalogue page 17_02/page 27

2) can not be regreased

3) alternative: d2 = 28 deliverable

Material:

Bearing shell: ball bearing steel 1.2067 (100Cr6), hardened, grinded, phosphorated, molybdenite disulphide treatment; from size 15 deliverable with double face sealing (**mbo standard 90**, order number: .. **90** 0000); from size 220 only deliverable with double face sealing (**mbo standard 90**)

Internal ring: ball bearing steel 1.2067 (100Cr6), hardened, grinded, phosphorated, molybdenite disulphide treatment

Recommended fits for housing bores for installing pivoting bearings:

| Load | Steel housing | Light-alloy housing |
|--------|---------------|---------------------|
| normal | K7 | M7 |
| high | M7 | N7 |

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|-----------|-------------------------------------|
| 4 - 12 | 0.032 - 0.068 |
| 15 - 20 | 0.040 - 0.082 |
| 25 - 35 | 0.050 - 0.100 |
| 40 - 60 | 0.060 - 0.120 |
| 70 - 90 | 0.072 - 0.142 |
| 100 - 140 | 0.085 - 0.165 |
| 160 - 240 | 0.100 - 0.214 |
| 260 - 300 | 0.110 - 0.214 |

Lubrication:

lubrication with a pressure-resistant lithium-soap-based grease with molybdenite disulphide additives; working range: -50 °C up to +200 °C; or with sealing: -30 °C up to +130 °C; initial lubrication must be performed during initial operation

Special versions upon request

17_35
08/2011

mbo Osswald GmbH & Co KG

Metal processing · Linking technology

www.mbo-osswald.com · info@mbo-osswald.de
Tel: + 49 (0) 9345-670-0 · Fax: + 49 (0) 9345-6255



General tolerances
DIN ISO 2768-medium

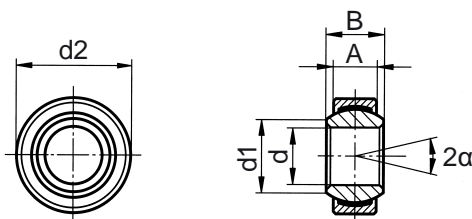
Subject to technical
alterations

We accept no responsibility for
incorrect or incomplete details or
information given



Pivoting bearings DIN ISO 12240-1 (DIN 648)

E series



mbo standard 91
mbo standard 92
maintenance-free
suitable for high
unidirectional loads

| Size | Order number | d | A | B | d1 | d2 | Static basic load rating $C_0^{(1)}$ (kN) | Angle of misalignment α° | Weight per piece \approx g |
|-------------------|---------------------|--------------|-----|-----|-------|--------------|---|--------------------------------------|------------------------------|
| 4 | 10 91 0000 0004/001 | 4 0/-0.008 | 3 | 5 | 6 | 12 0/-0.008 | 5.4 | 16 | 3 |
| 5 | 10 91 0000 0005/001 | 5 0/-0.008 | 4 | 6 | 8 | 14 0/-0.008 | 9.1 | 13 | 4 |
| 6 | 10 91 0000 0006/001 | 6 0/-0.008 | 4 | 6 | 8 | 14 0/-0.008 | 9.1 | 13 | 4 |
| 8 | 10 91 0000 0008/001 | 8 0/-0.008 | 5 | 8 | 10.2 | 16 0/-0.008 | 14 | 15 | 7 |
| 10 | 10 91 0000 0010/001 | 10 0/-0.008 | 6 | 9 | 13.2 | 19 0/-0.008 | 21 | 12 | 11 |
| 12 | 10 91 0000 0012/001 | 12 0/-0.008 | 7 | 10 | 14.9 | 22 0/-0.009 | 28 | 11 | 17 |
| 15 | 10 91 0000 0015/001 | 15 0/-0.008 | 9 | 12 | 18.4 | 26 0/-0.009 | 45 | 8 | 26 |
| 16 | 10 91 0000 0016/001 | 16 0/-0.008 | 10 | 14 | 20.7 | 30 0/-0.009 | 56 | 10 | 40 |
| 17 | 10 91 0000 0017/001 | 17 0/-0.008 | 10 | 14 | 20.7 | 30 0/-0.009 | 56 | 10 | 40 |
| 20 | 10 91 0000 0020/001 | 20 0/-0.010 | 12 | 16 | 24.2 | 35 0/-0.011 | 78 | 9 | 64 |
| 25 | 10 91 0000 0025/001 | 25 0/-0.010 | 16 | 20 | 29.3 | 42 0/-0.011 | 127 | 7 | 115 |
| 30 | 10 91 0000 0030/001 | 30 0/-0.010 | 18 | 22 | 34.2 | 47 0/-0.011 | 166 | 6 | 149 |
| 35 | 10 91 0000 0035/001 | 35 0/-0.012 | 20 | 25 | 39.7 | 55 0/-0.013 | 211 | 6 | 228 |
| 40 | 10 91 0000 0040/001 | 40 0/-0.012 | 22 | 28 | 45 | 62 0/-0.013 | 262 | 7 | 318 |
| 45 | 10 91 0000 0045/001 | 45 0/-0.012 | 25 | 32 | 50.7 | 68 0/-0.013 | 337 | 7 | 421 |
| 50 | 10 91 0000 0050/001 | 50 0/-0.012 | 28 | 35 | 55.9 | 75 0/-0.013 | 415 | 6 | 562 |
| 55 | 10 92 0000 0055/001 | 55 0/-0.015 | 32 | 40 | 62.3 | 85 0/-0.015 | 852 | 7 | 864 |
| 60 | 10 92 0000 0060/001 | 60 0/-0.015 | 36 | 44 | 66.8 | 90 0/-0.015 | 1030 | 6 | 1030 |
| 70 | 10 92 0000 0070/001 | 70 0/-0.015 | 40 | 49 | 77.8 | 105 0/-0.015 | 1320 | 6 | 1570 |
| 80 | 10 92 0000 0080/001 | 80 0/-0.015 | 45 | 55 | 89.4 | 120 0/-0.015 | 1700 | 6 | 2320 |
| 90 | 10 92 0000 0090/001 | 90 0/-0.020 | 50 | 60 | 98.1 | 130 0/-0.018 | 2070 | 5 | 2790 |
| 100 | 10 92 0000 0100/001 | 100 0/-0.020 | 55 | 70 | 109.5 | 150 0/-0.018 | 2570 | 7 | 4440 |
| 110 | 10 92 0000 0110/001 | 110 0/-0.020 | 55 | 70 | 121.2 | 160 0/-0.025 | 2770 | 6 | 4830 |
| 120 | 10 92 0000 0120/001 | 120 0/-0.020 | 70 | 85 | 135.5 | 180 0/-0.025 | 4030 | 6 | 8110 |
| 140 ²⁾ | 10 92 0000 0140/001 | 140 0/-0.025 | 70 | 90 | 155.8 | 210 0/-0.030 | 4530 | 7 | 11200 |
| 160 ²⁾ | 10 92 0000 0160/001 | 160 0/-0.025 | 80 | 105 | 170.2 | 230 0/-0.030 | 5760 | 8 | 14100 |
| 180 ²⁾ | 10 92 0000 0180/001 | 180 0/-0.025 | 80 | 105 | 198.9 | 260 0/-0.035 | 6480 | 6 | 18500 |
| 200 ²⁾ | 10 92 0000 0200/001 | 200 0/-0.030 | 100 | 130 | 213.5 | 290 0/-0.035 | 9000 | 7 | 28400 |
| 220 ²⁾ | 10 92 0000 0220/001 | 220 0/-0.030 | 100 | 135 | 239.5 | 320 0/-0.040 | 9900 | 8 | 35700 |
| 240 ²⁾ | 10 92 0000 0240/001 | 240 0/-0.030 | 100 | 140 | 265.3 | 340 0/-0.040 | 10800 | 8 | 39700 |
| 260 ²⁾ | 10 92 0000 0260/001 | 260 0/-0.035 | 110 | 150 | 288.3 | 370 0/-0.040 | 12870 | 7 | 51500 |
| 280 ²⁾ | 10 92 0000 0280/001 | 280 0/-0.035 | 120 | 155 | 313.8 | 400 0/-0.040 | 15120 | 6 | 64900 |
| 300 ²⁾ | 10 92 0000 0300/001 | 300 0/-0.035 | 120 | 165 | 336.7 | 430 0/-0.045 | 16200 | 7 | 77600 |

1) see mbo catalogue page 17_02/page 77

2) from size 140 onwards, the hardened bearing shells are split into two and secured by tension spring

Material:

Bearing shell: ball bearing steel 1.2067 (100Cr6) with PTFE lining; from size 15 deliverable with double face sealing (**mbo standard 92**, order number: .. **92 0000**); from size 55 only deliverable with double face sealing (**mbo standard 92**)

Internal ring: ball bearing steel 1.2067 (100Cr6), hardened, grinded, polished, hard chrome-plated

Recommended fits for housing bores for installing pivoting bearings:

| Load | Steel housing | Light-alloy housing |
|--------|---------------|---------------------|
| normal | K7 | M7 |
| high | M7 | N7 |

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|-----------|-------------------------------------|
| 4 - 20 | 0 - 0.040 |
| 25 - 35 | 0 - 0.050 |
| 40 - 60 | 0 - 0.060 |
| 70 - 90 | 0 - 0.072 |
| 100 - 140 | 0.05 - 0.13 |
| 160 - 180 | 0.05 - 0.14 |
| 200 - 300 | 0.08 - 0.19 |

Lubrication:

no lubrication required; the ball slides on the PTFE fabric located in the bearing shell;
working range: -50 °C up to +150 °C;
or with sealing: -30 °C up to +130 °C

Special versions upon request

17_36
08/2011

mbo Osswald GmbH & Co KG

Metal processing · Linking technology

www.mbo-osswald.com · info@mbo-osswald.de
Tel: + 49 (0) 9345-670-0 · Fax: + 49 (0) 9345-6255



General tolerances
DIN ISO 2768-medium

Subject to technical
alterations

We accept no responsibility for
incorrect or incomplete details or
information given

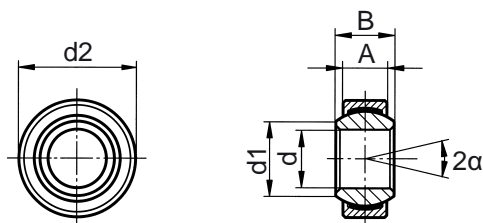


Pivoting bearings DIN ISO 12240-1 (DIN 648)

E series



mbo standard 93
stainless version
maintenance-free
suitable for high
unidirectional loads



| Size | Order number | d | A | B | d1 | d2 | Static basic load rating C_0^{11} (kN) | Angle of misalignment α° | Weight per piece \approx g |
|------|---------------------|--------------|----|----|-------|--------------|--|--------------------------------------|------------------------------|
| 6 | 10 93 0000 0006/000 | 6 0/-0.008 | 4 | 6 | 8 | 14 0/-0.008 | 9 | 13 | 4 |
| 8 | 10 93 0000 0008/000 | 8 0/-0.008 | 5 | 8 | 10.2 | 16 0/-0.008 | 15.6 | 15 | 7 |
| 10 | 10 93 0000 0010/000 | 10 0/-0.008 | 6 | 9 | 13.2 | 19 0/-0.008 | 23.4 | 12 | 11 |
| 12 | 10 93 0000 0012/000 | 12 0/-0.008 | 7 | 10 | 14.9 | 22 0/-0.009 | 32 | 11 | 16 |
| 15 | 10 93 0000 0015/000 | 15 0/-0.008 | 9 | 12 | 18.4 | 26 0/-0.009 | 50 | 8 | 26 |
| 16 | 10 93 0000 0016/000 | 16 0/-0.008 | 10 | 14 | 20.7 | 30 0/-0.009 | 65 | 10 | 49 |
| 17 | 10 93 0000 0017/000 | 17 0/-0.008 | 10 | 14 | 20.7 | 30 0/-0.009 | 65 | 10 | 38 |
| 20 | 10 93 0000 0020/000 | 20 0/-0.010 | 12 | 16 | 24.2 | 35 0/-0.011 | 90.5 | 9 | 61 |
| 25 | 10 93 0000 0025/000 | 25 0/-0.010 | 16 | 20 | 29.3 | 42 0/-0.011 | 159 | 7 | 110 |
| 30 | 10 93 0000 0030/000 | 30 0/-0.010 | 18 | 22 | 34.2 | 47 0/-0.011 | 197 | 6 | 140 |
| 35 | 10 93 0000 0035/000 | 35 0/-0.012 | 20 | 25 | 39.8 | 55 0/-0.013 | 298 | 6 | 220 |
| 40 | 10 93 0000 0040/000 | 40 0/-0.012 | 22 | 28 | 45 | 62 0/-0.013 | 370.6 | 7 | 300 |
| 45 | 10 93 0000 0045/000 | 45 0/-0.012 | 25 | 32 | 50.8 | 68 0/-0.013 | 481 | 7 | 400 |
| 50 | 10 93 0000 0050/000 | 50 0/-0.012 | 28 | 35 | 56 | 75 0/-0.013 | 598 | 6 | 540 |
| 60 | 10 93 0000 0060/000 | 60 0/-0.015 | 36 | 44 | 66.8 | 90 0/-0.015 | 935 | 6 | 1000 |
| 70 | 10 93 0000 0070/000 | 70 0/-0.015 | 40 | 49 | 77.9 | 105 0/-0.015 | 1204 | 6 | 1500 |
| 80 | 10 93 0000 0080/000 | 80 0/-0.015 | 45 | 55 | 89.4 | 120 0/-0.015 | 1540 | 6 | 2200 |
| 90 | 10 93 0000 0090/000 | 90 0/-0.020 | 50 | 60 | 98.1 | 130 0/-0.018 | 1892 | 5 | 2700 |
| 100 | 10 93 0000 0100/000 | 100 0/-0.020 | 55 | 70 | 109.5 | 150 0/-0.018 | 2366 | 7 | 4400 |
| 110 | 10 93 0000 0110/000 | 110 0/-0.020 | 55 | 70 | 121.2 | 160 0/-0.025 | 2548 | 6 | 4700 |
| 120 | 10 93 0000 0120/000 | 120 0/-0.020 | 70 | 85 | 135.5 | 180 0/-0.025 | 3752 | 6 | 8000 |

1) see mbo catalogue page 17_02/page 77

Material:

Bearing shell: stainless steel 1.4571 (X6CrNiMoTi17-12-2), with PTFE fabric; from size 90 with high performance-PTFE-compound

Internal ring: stainless steel 1.4125 (X105CrMo17), hardened, grinded, polished; from size 45, stainless steel 1.4112 (X90CrMoV18), hardened, grinded, polished

Bearing tolerance:

| Size: | Radial tolerance in mm min - max |
|---------|-------------------------------------|
| 6 - 12 | 0 - 0.032 |
| 15 - 20 | 0 - 0.040 |
| 25 - 35 | 0 - 0.050 |
| 40 - 60 | 0 - 0.060 |
| 70 - 90 | 0 - 0.072 |
| 100-120 | 0 - 0.085 |

Recommended fits for housing bores for installing pivoting bearings:

| Load | Steel housing | Light-alloy housing |
|--------|---------------|---------------------|
| normal | K7 | M7 |
| high | M7 | N7 |

Lubrication:

no lubrication required; the ball slides on the PTFE fabric located in the bearing shell;
working range: -150 °C bis +250 °C

Special versions upon request

17_37
08/2011

mbo Osswald GmbH & Co KG

Metal processing · Linking technology

www.mbo-osswald.com · info@mbo-osswald.de
Tel: + 49 (0) 9345-670-0 · Fax: + 49 (0) 9345-6255



General tolerances
DIN ISO 2768-medium

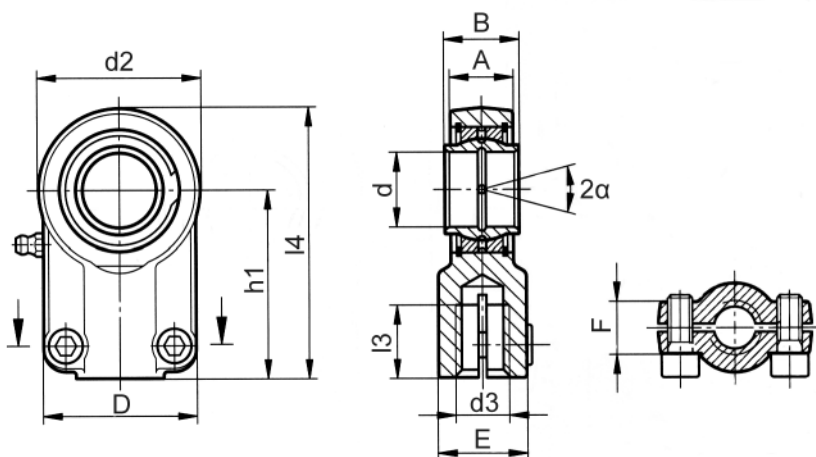
Subject to technical
alterations

We accept no responsibility for
incorrect or incomplete details or
information given



Rod ends hydraulic DIN 24338

complies in part with ISO 6982



mbo standard 94 rod end with wide bearing, able to jam with screws DIN 912-8.8, bearing can be regreased, bearing according CETOP recommendation RP 58 H for standard hydraulic cylinders

connection dimensions according to DIN 24333, 24336 and ISO 6020/1, ISO 6022

Important: size and thread are different; position and quantity of the screws are the responsibility of the manufacturer

| Size d | Order number | B | A | F | d2 | h1 | l4 | D | E | Thread d3 | l3 | Torque Nm ²⁾ | Static basic load rating C ₀ ¹⁾ (kN) | Dynamic load rating C (kN) | Angle of misalignment α° | Weight per piece ≈ g |
|------------------|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----------|-----|-------------------------|--|----------------------------|--------------------------|----------------------|
| 12 ³⁾ | 14 94 6982 1012/001 | 12 | 11 | 15 | 32 | 38 | 54 | 32 | 16 | M 12x1.25 | 17 | 6 | 24.5 | 10.8 | 4 | 100 |
| 16 | 16 94 6982 1014/001 | 16 | 13 | 15 | 40 | 44 | 64 | 40 | 21 | M 14x1.5 | 19 | 10 | 36.5 | 17.6 | 4 | 210 |
| 20 | 16 94 6982 1016/001 | 20 | 17 | 19 | 47 | 52 | 75 | 47 | 25 | M 16x1.5 | 23 | 25 | 48 | 30 | 4 | 350 |
| 25 | 16 94 6982 1020/001 | 25 | 22 | 19 | 58 | 65 | 96 | 54 | 30 | M 20x1.5 | 29 | 25 | 78 | 48 | 4 | 620 |
| 32 | 18 94 6982 1027/001 | 32 | 28 | 22 | 71 | 80 | 118 | 66 | 38 | M 27x2 | 37 | 49 | 114 | 67 | 4 | 1170 |
| 40 | 18 94 6982 1033/001 | 40 | 33 | 26 | 90 | 97 | 146 | 80 | 47 | M 33x2 | 46 | 49 | 204 | 100 | 4 | 2150 |
| 50 | 18 94 6982 1042/001 | 50 | 41 | 32 | 109 | 120 | 179 | 96 | 58 | M 42x2 | 57 | 86 | 310 | 156 | 4 | 4400 |
| 63 | 18 94 6982 1048/001 | 63 | 53 | 38 | 132 | 140 | 211 | 114 | 70 | M 48x2 | 64 | 210 | 430 | 255 | 4 | 7600 |
| 70 | 18 94 6982 1056/001 | 70 | 57 | 42 | 155 | 160 | 245 | 135 | 80 | M 56x2 | 76 | 210 | 540 | 315 | 4 | 10100 |
| 80 | 20 94 6982 1064/001 | 80 | 67 | 48 | 170 | 180 | 270 | 148 | 90 | M 64x3 | 86 | 410 | 695 | 400 | 4 | 14500 |
| 90 | 20 94 6982 1072/001 | 90 | 72 | 52 | 185 | 195 | 296 | 160 | 100 | M 72x3 | 91 | 410 | 750 | 490 | 4 | 17500 |
| 100 | 20 94 6982 1080/001 | 100 | 85 | 62 | 211 | 210 | 322 | 178 | 110 | M 80x3 | 96 | 710 | 1060 | 610 | 4 | 28000 |
| 110 | 20 94 6982 1090/001 | 110 | 88 | 62 | 235 | 235 | 364 | 190 | 125 | M 90x3 | 106 | 710 | 1200 | 655 | 4 | 32000 |
| 125 | 20 94 6982 1100/001 | 125 | 103 | 72 | 265 | 260 | 405 | 200 | 135 | M 100x3 | 113 | 710 | 1430 | 950 | 4 | 46400 |
| 160 | 22 94 6982 1125/001 | 160 | 130 | 82 | 326 | 310 | 488 | 250 | 165 | M 125x4 | 126 | 710 | 2200 | 1370 | 4 | 81000 |
| 200 | 22 94 6982 1160/001 | 200 | 162 | 102 | 418 | 390 | 620 | 320 | 215 | M 160x4 | 161 | 1500 | 3650 | 2120 | 4 | 174000 |

1) see mbo catalogue page 17_02/page 77

2) max. torque of the screw

3) lubrication groove only in the bearing shell

Material:

Housing: up to size 63 thermal treatment steel 1.0503 (C45), forged; from size 70 spherical cast iron GS400

Bearing shell: ball bearing steel 1.2067 (100Cr6), hardened, grinded, phosphorated, molybdenite disulphide treatment

Internal ring: ball bearing steel 1.2067 (100Cr6), hardened, grinded, phosphorated, molybdenite disulphide treatment

Lubrication:

size 12 not able to be regreased; from size 16 with hydraulic lubricating nipple DIN 71412

Special versions upon request

17_38
08/2011

mbo Osswald GmbH & Co KG

Metal processing · Linking technology

www.mbo-osswald.com · info@mbo-osswald.de
Tel: + 49 (0) 9345-670-0 · Fax: + 49 (0) 9345-6255



General tolerances
DIN ISO 2768-medium

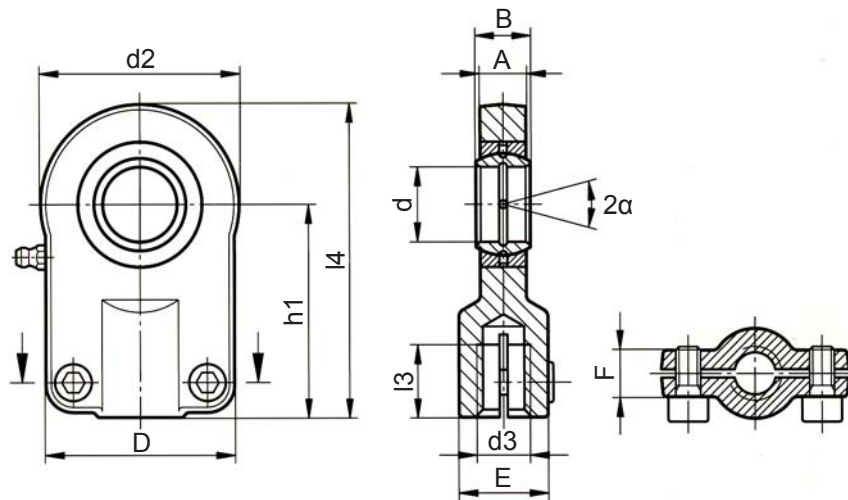
Subject to technical alterations

We accept no responsibility for incorrect or incomplete details or information given



mbo standard 95
rod end with small bearing,
able to jam with screws
DIN 912-8.8
bearing can be regreased,
locked by caulking
on both sides

able for standard
hydraulic cylinders
pressure 160 bar
acc. to ISO 6020/2



Important: size and thread are different

| Size d | Order number | B | A | F | d2 | h1 | l4 | D | E | Thread d3 | l3 | Torque Nm ²⁾ | Static basic load rating C ₀ ¹⁾ (kN) | Dynamic load rating C (kN) | Angle of misalignment α° | Weight per piece ≈ g |
|--------|---------------------|----|----|----|-----|-----|-------|-----|-----|-----------|----|-------------------------|--|----------------------------|--------------------------|----------------------|
| 12 | 14 95 8133 1010/001 | 10 | 8 | 13 | 35 | 42 | 59.5 | 40 | 17 | M 10x1.25 | 15 | 10 | 17 | 10.8 | 11 | 150 |
| 16 | 14 95 8133 1012/001 | 14 | 11 | 13 | 45 | 48 | 70.5 | 45 | 21 | M 12x1.25 | 17 | 10 | 28.5 | 21.1 | 10 | 250 |
| 20 | 16 95 8133 1014/001 | 16 | 13 | 17 | 55 | 58 | 85.5 | 55 | 25 | M 14x1.5 | 19 | 25 | 42.5 | 30 | 9 | 430 |
| 25 | 16 95 8133 1016/001 | 20 | 17 | 17 | 65 | 68 | 100.5 | 62 | 30 | M 16x1.5 | 23 | 25 | 67 | 48 | 7 | 730 |
| 30 | 16 95 8133 1020/001 | 22 | 19 | 19 | 80 | 85 | 125 | 77 | 36 | M 20x1.5 | 29 | 49 | 108 | 62 | 6 | 1300 |
| 40 | 18 95 8133 1027/001 | 28 | 23 | 23 | 100 | 105 | 155 | 90 | 45 | M 27x2 | 37 | 49 | 156 | 100 | 7 | 2300 |
| 50 | 18 95 8133 1033/001 | 35 | 30 | 30 | 120 | 130 | 190 | 105 | 55 | M 33x2 | 46 | 86 | 245 | 156 | 6 | 4400 |
| 60 | 18 95 8133 1042/001 | 44 | 38 | 38 | 160 | 150 | 230 | 134 | 68 | M 42x2 | 57 | 210 | 380 | 245 | 6 | 8400 |
| 80 | 18 95 8133 1048/001 | 55 | 47 | 47 | 205 | 185 | 287.5 | 156 | 90 | M 48x2 | 64 | 410 | 585 | 400 | 6 | 15600 |
| 100 | 20 95 8133 1064/001 | 70 | 57 | 57 | 240 | 240 | 360 | 190 | 110 | M 64x3 | 86 | 710 | 865 | 610 | 6 | 28000 |

1) see mbo catalogue page 17_02/page 77

2) max. torque of the screw

Material:

Housing: up to size 50 thermal treatment steel 1.0503 (C45), forged; from size 60 spherical cast iron GS400

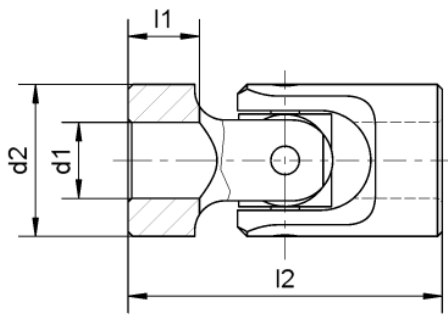
Bearing: maintenance-free steel/steel bearing pivoting bearings (mbo standard 89, see mbo catalogue page 17_35/page 110)

Lubrication:

size 12 not able to be regreased;
size 16-20 lubrication through a hole in the housing;
from size 25 with hydraulic lubricating nipple DIN 71412

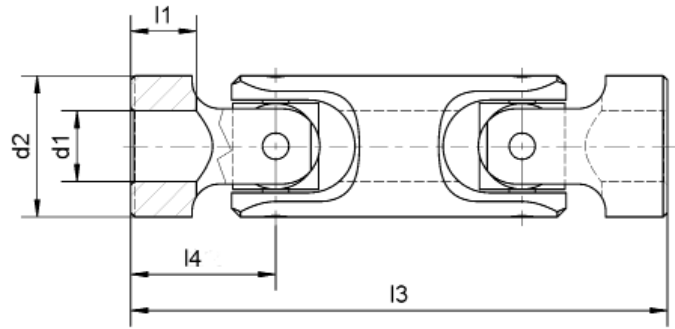
Special versions upon request





single

Form E



double

Form D

Example for ordering: Single cardan joint (E), d1 = 20 mm, d2 = 40 mm, with sliding fit, bright;
Cardan joint DIN 808 - E 20 x 40 - G bright
Order number: 10 00 9808 2040/001

| Size | Order number form E Standard version with cylindrical hole | Order number form D Standard version with cylindrical hole | d1 Ø H7 | d2 | l1 | l2 ± 1 | l3 ± 1 | l4 | Weight form E kg | Weight form D kg | Square s H11 | Spline acc. to DIN 6885 | |
|---------|---|---|------------|----|-----|-----------|-----------|------|---------------------|---------------------|--------------------|----------------------------|------|
| | | | | | | | | | | | | b P9 | t |
| 6 x 16 | 10 00 9808 0616/... | 10 00 9808 9616/... | 6 | 16 | 9 | 34 | 56 | 17 | 0.044 | 0.055 | - | - | - |
| 8 x 16 | 10 00 9808 0816/... | 10 00 9808 9816/... | 8 | 16 | 10* | 40 | 62 | 20 | 0.45 | 0.07 | 8 | 2 | 9 |
| 10 x 16 | 10 00 9808 1016/... | 10 00 9808 9101/... | 10 | 16 | 15 | 52 | 74 | 26 | 0.05 | 0.07 | 8 | 3 | 11.4 |
| 10 x 20 | 10 00 9808 1020/... | 10 00 9808 9102/... | 10 | 20 | 12* | 48 | 74 | 24 | 0.1 | 0.12 | 8 | 3 | 11.4 |
| 12 x 25 | 10 00 9808 1225/... | 10 00 9808 9122/... | 12 | 25 | 14* | 56 | 86 | 28 | 0.16 | 0.24 | 10 | 4 | 13.8 |
| 16 x 32 | 10 00 9808 1632/... | 10 00 9808 9163/... | 16 | 32 | 16* | 68 | 106* | 34 | 0.29 | 0.445 | 14 | 5 | 18.3 |
| 20 x 40 | 10 00 9808 2040/... | 10 00 9808 9204/... | 20 | 40 | 20* | 82 | 128 | 41 | 0.56 | 0.86 | 19 | 6 | 22.8 |
| 25 x 50 | 10 00 9808 2550/... | 10 00 9808 9250/... | 25 | 50 | 25* | 105 | 160 | 52.5 | 1.14 | 1.68 | 24 | 8 | 28.3 |
| 32 x 63 | 10 00 9808 3263/... | 10 00 9808 9326/... | 32 | 63 | 30* | 130 | 200* | 65 | 2.08 | 3.28 | 30 | 10 | 35.3 |

*not according to DIN 808

Material:

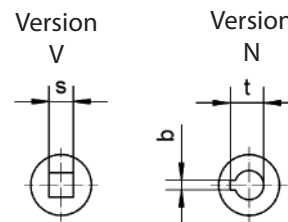
steel with a minimum tensile strength of 600 N/mm²;
sort of manufacturer's choice
alternative: stainless steel (supplement to order number .../000)



Surface protection:

| Identifier | Supplement to order number |
|--|----------------------------|
| bright | .../001 |
| electr. galvanised white (layer min. 5 µm) | .../013 |

alternative to the standard version with cylindrical hole:



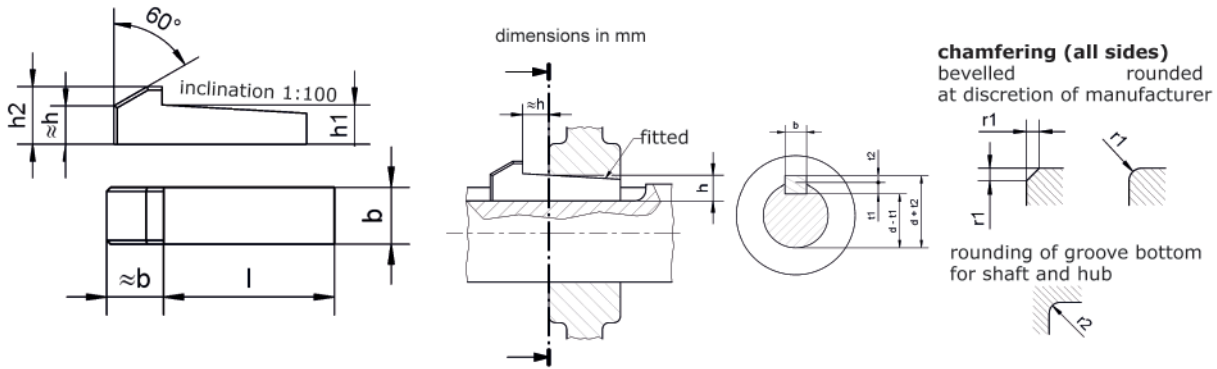
Please clearly indicate this!

Special versions upon request

Cardan joints can also be supplied in a cheaper standard version TU (unhardened, ungrinded and with wider tolerances). Please contact us.

19_01
12/2012





Example for ordering: Taper key according to DIN 6887, $b = 10$ mm, $h = 8$ mm, $l = 50$ mm, bright;
Order number: 10 30 1008 0500/001

| Order number ⁴⁾ | Key width b h9 | Key height h | For shaft diameter $d^{1)}$ | | Key height h_1 | Gip height h_2 | Groove width b D10 | Shaft groove depth | | Hub groove depth | | Bevelled/rounded r_1 | | Rounding of groove bottom r_2 | | Length mm $l^{3)}$ | | | | | |
|----------------------------|---------------------|----------------|-----------------------------|-------|------------------|------------------|-------------------------|--------------------|-------------|------------------|-------------|------------------------|------|---------------------------------|------|--------------------|-------|-------------|------|--|--|
| | | | above | up to | | | | t1 ²⁾ | perm. diff. | t2 ²⁾ | perm. diff. | min. | max. | max. | min. | from | up to | perm. diff. | | | |
| 10 30 0404 .../001 | 4 | 4 | 10 | 12 | 4.1 | -0.1 | 7 | 4 | 2.5 | +0.1 | 1.2 | +0.1 | 0.16 | 0.25 | 0.16 | 0.08 | 14 | 45 | -0.2 | | |
| 10 30 0505 .../001 | 5 | 5 | 12 | 17 | 5.1 | | 8 | 5 | 3 | | 1.7 | | 0.25 | 0.4 | 0.25 | 0.16 | 14 | 56 | -0.3 | | |
| 10 30 0606 .../001 | 6 | 6 | 17 | 22 | 6.1 | | 10 | 6 | 3.5 | | 2.2 | | 0.25 | 0.4 | 0.25 | 0.16 | 16 | 70 | | | |
| 10 30 0807 .../001 | 8 | 7 | 22 | 30 | 7.2 | -0.2 | 11 | 8 | 4 | +0.2 | 2.4 | +0.2 | 0.25 | 0.4 | 0.25 | 0.16 | 20 | 90 | -0.2 | | |
| 10 30 1008 .../001 | 10 | 8 | 30 | 38 | 8.2 | | 12 | 10 | 5 | | 2.4 | | 0.4 | 0.6 | 0.4 | 0.25 | 25 | 110 | -0.5 | | |
| 10 30 1208 .../001 | 12 | 8 | 38 | 44 | 8.2 | | 12 | 12 | 5 | | 2.4 | | 0.4 | 0.6 | 0.4 | 0.25 | 32 | 140 | | | |
| 10 30 1409 .../001 | 14 | 9 | 44 | 50 | 9.2 | | 14 | 14 | 5.5 | | 2.9 | | 0.4 | 0.6 | 0.4 | 0.25 | 40 | 160 | | | |
| 10 30 1610 .../001 | 16 | 10 | 50 | 58 | 10.2 | | 16 | 16 | 6 | | 3.4 | | 0.4 | 0.6 | 0.4 | 0.25 | 45 | 180 | | | |
| 10 30 1811 .../001 | 18 | 11 | 58 | 65 | 11.2 | | 18 | 18 | 7 | | 3.4 | | 0.4 | 0.6 | 0.4 | 0.25 | 50 | 200 | -0.3 | | |
| 10 30 2012 .../001 | 20 | 12 | 65 | 75 | 12.2 | | 20 | 20 | 7.5 | | 3.9 | | 0.6 | 0.8 | 0.6 | 0.4 | 56 | 220 | -0.5 | | |
| 10 30 2214 .../001 | 22 | 14 | 75 | 85 | 14.2 | | 22 | 22 | 9 | | 4.4 | | 0.6 | 0.8 | 0.6 | 0.4 | 63 | 250 | | | |
| 10 30 2514 .../001 | 25 | 14 | 85 | 95 | 14.2 | | 22 | 25 | 9 | | 4.4 | | 0.6 | 0.8 | 0.6 | 0.4 | 70 | 280 | | | |
| 10 30 2816 .../001 | 28 | 16 | 95 | 110 | 16.2 | | 25 | 28 | 10 | | 5.4 | | 0.6 | 0.8 | 0.6 | 0.4 | 80 | 320 | | | |
| 10 30 3218 .../001 | 32 | 18 | 110 | 130 | 18.3 | 28 | 32 | 11 | 6.4 | 0.6 | 0.8 | 0.6 | 0.4 | 90 | 360 | | | | | | |
| 10 30 3620 .../001 | 36 | 20 | 130 | 150 | 20.4 | -0.3 | 32 | 36 | 12 | +0.3 | 7.1 | +0.3 | 1 | 1.2 | 1 | 0.7 | 100 | 400 | -0.5 | | |
| 10 30 4022 .../001 | 40 | 22 | 150 | 170 | 22.4 | | 36 | 40 | 13 | | 8.1 | | 1 | 1.2 | 1 | 0.7 | 110 | 400 | | | |
| 10 30 4525 .../001 | 45 | 25 | 170 | 200 | 25.4 | | 40 | 45 | 15 | | 9.1 | | 1 | 1.2 | 1 | 0.7 | 125 | 400 | | | |
| 10 30 5028 .../001 | 50 | 28 | 200 | 230 | 28.4 | | 45 | 50 | 17 | | 10.1 | | 1 | 1.2 | 1 | 0.7 | 140 | 400 | | | |
| 10 30 5632 .../001 | 56 | 32 | 230 | 260 | 32.5 | | 50 | 56 | 20 | | 11.1 | | 1.6 | 2 | 1.6 | 1.2 | | | | | |
| 10 30 6332 .../001 | 63 | 32 | 260 | 290 | 32.5 | | 50 | 63 | 20 | | 11.1 | | 1.6 | 2 | 1.6 | 1.2 | | | | | |
| 10 30 7036 .../001 | 70 | 36 | 290 | 330 | 36.5 | | 56 | 70 | 22 | | 13.1 | | 1.6 | 2 | 1.6 | 1.2 | | | | | |
| 10 30 8040 .../001 | 80 | 40 | 330 | 380 | 40.5 | | 63 | 80 | 25 | | 14.1 | | 2.5 | 3 | 2.5 | 2 | | | | | |
| 10 30 9045 .../001 | 90 | 45 | 380 | 440 | 45.6 | | 70 | 90 | 28 | | 16.1 | | 2.5 | 3 | 2.5 | 2 | | | | | |
| 10 30 0050 .../001 | 100 | 50 | 440 | 500 | 50.6 | | 80 | 100 | 31 | | 18.1 | | 2.5 | 3 | 2.5 | 2 | | | | | |

1) For connection dimensions, in particular of shaft ends, the allocation of the key cross-section to the shaft diameters must be maintained without fail.
2) Please comply with the requirements of DIN 6887.

3) Intermediate lengths outside DIN 6887 must be selected according to DIN 3. Please comply with the requirements of DIN 6887.
4) The last 4 digits before the / (...) are intended to denote length l . Please clearly indicate l .

Material:
St 60 - 1, bright

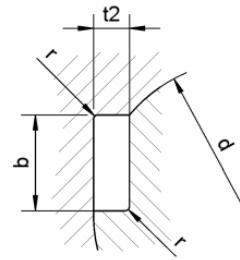
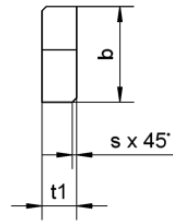
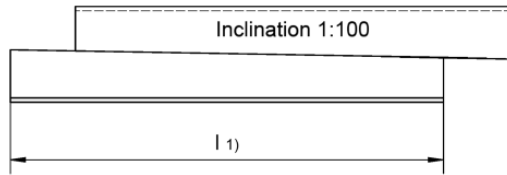
Special versions upon request

Special steels/stainless steel on request



20_01
12/2012





1) The length l depends on the design and must be quoted. It is recommended that a length of about 10 to 15% more than the hub length be selected.

Example for ordering: Tangential key according to DIN 268, $b = 60$ mm, $t_1 = 20$ mm, $l = 120$ mm, bright;
Order number: 10 31 0600 1200/001

| Order number ²⁾ - in pairs - | b Calculated | t ₁ h11 | Key | | Groove | | | | For shaft diameter d | | | | |
|--|-----------------|-----------------------|------|-----------|----------------|-------------|-----------|-----------|-------------------------|------|-----|---|-----|
| | | | min. | s max. | t ₂ | perm. diff. | max. | r min. | | | | | |
| 10 31 0300 /001 | 30 | 10 | 1 | 1.2 | 10.3 | +0.2 0 | 1 | 0.7 | 100 | | | | |
| 10 31 0330 /001 | 33 | 11 | | | 11.4 | | | | 110 | | | | |
| 10 31 0360 /001 | 36 | 12 | | | 12.4 | | | | 120 | | | | |
| 10 31 0375 /001 | 37.5 | 12.5 | | | 12.9 | | | | 125 | | | | |
| 10 31 0390 /001 | 39 | 13 | | | 13.4 | | | | 130 | | | | |
| 10 31 0420 /001 | 42 | 14 | | | 14.4 | | | | 140 | | | | |
| 10 31 0450 /001 | 45 | 15 | | | 15.4 | | | | 150 | | | | |
| 10 31 0480 /001 | 48 | 16 | | | 16.4 | | | | 160 | | | | |
| 10 31 0510 /001 | 51 | 17 | 1.6 | 2 | 17.4 | +0.3 0 | 1.6 | 1.2 | 170 | | | | |
| 10 31 0540 /001 | 54 | 18 | | | 18.4 | | | | 180 | | | | |
| 10 31 0570 /001 | 57 | 19 | | | 19.4 | | | | 190 | | | | |
| 10 31 0600 /001 | 60 | 20 | | | 20.4 | | | | 200 | | | | |
| 10 31 0660 /001 | 66 | 22 | | | 22.4 | | | | 220 | | | | |
| 10 31 0720 /001 | 72 | 24 | | | 2.5 | | | | 3 | 24.4 | 2.5 | 2 | 240 |
| 10 31 0750 /001 | 75 | 25 | | | | | | | | 25.4 | | | 250 |
| 10 31 0780 /001 | 78 | 26 | | | | | | | | 26.4 | | | 260 |
| 10 31 0840 /001 | 84 | 28 | 28.4 | 280 | | | | | | | | | |
| 10 31 0900 /001 | 90 | 30 | 30.4 | 300 | | | | | | | | | |
| 10 31 0960 /001 | 96 | 32 | 32.4 | 320 | | | | | | | | | |
| 10 31 1020 /001 | 102 | 34 | 3 | 4 | | 34.4 | +0.3 0 | 3 | | 2.5 | | | 340 |
| 10 31 1080 /001 | 108 | 36 | | | | 36.4 | | | | | | | 360 |
| 10 31 1140 /001 | 114 | 38 | | | 38.4 | 380 | | | | | | | |
| 10 31 1200 /001 | 120 | 40 | | | 40.4 | 400 | | | | | | | |
| 10 31 1260 /001 | 126 | 42 | | | 42.4 | 420 | | | | | | | |
| 10 31 1320 /001 | 132 | 44 | | | 44.4 | 440 | | | | | | | |
| 10 31 1350 /001 | 135 | 45 | | | 45.4 | 450 | | | | | | | |
| 10 31 1380 /001 | 138 | 46 | | | 46.4 | 460 | | | | | | | |
| 10 31 1440 /001 | 144 | 48 | 48.4 | 480 | | | | | | | | | |
| 10 31 1500 /001 | 150 | 50 | 50.5 | 500 | | | | | | | | | |
| 10 31 1590 /001 | 159 | 53 | 53.5 | 530 | | | | | | | | | |
| 10 31 1680 /001 | 168 | 56 | 56.5 | 560 | | | | | | | | | |
| 10 31 1800 /001 | 180 | 60 | 60.5 | 600 | | | | | | | | | |
| 10 31 1890 /001 | 189 | 63 | 63.5 | 630 | | | | | | | | | |

2) the last 4 digits before the / (...) are intended to denote length l

Material: E 335 (St 60-2), bright

With shaft diameters between those listed in the table, it is recommended that the wedge thickness t_1 of the next shaft diameter down be selected. The width b is calculated from: $b = \sqrt{t_1 \cdot (d - t_1)}$.

For shaft diameters of above 630 mm we recommend: $t_1 = 0.1 d$, $b = 0.3 d$.

Special steels/stainless steel on request
Special versions upon request

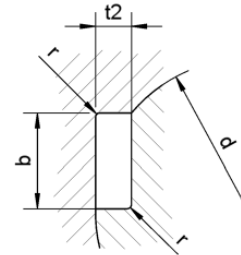
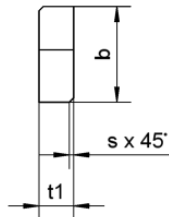
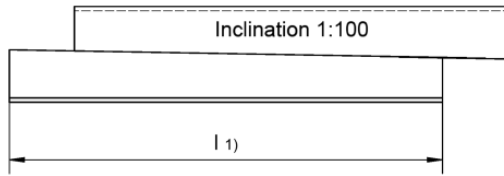


If no alternating shock loads occur, tangential keys to DIN 271 are recommended.

The 125 mm shaft diameter to the ISO recommendation R 775 and the planned ISO recommendation on tangential keys is not included in DIN 748 Sheet 1.

20_02
12/2012





1) The length l depends on the design and must be quoted. It is recommended that a length of about 10 to 15% more than the hub length be selected.

Example for ordering: Tangential key according to DIN 271, $b = 33.9$ mm, $t_1 = 10$ mm, $l = 100$ mm, bright;
Order number: 10 32 0339 1000/001

| Order number ²⁾ - in pairs - | b Calculated | t1 h11 | Key | | t2 | Groove | | | For shaft diameter d |
|--|-----------------|-----------|------|------|------|-------------|------|------|----------------------------|
| | | | min. | max. | | perm. diff. | max. | min. | |
| 10 32 0193001 | 19.3 | 7 | 0.6 | 0.8 | 7.3 | +0.2 0 | 0.6 | 0.4 | 60 |
| 10 32 0198001 | 19.8 | | | | | | | | 63 |
| 10 32 0202001 | 20.2 | | | | | | | | 65 |
| 10 32 0210001 | 21 | 8 | 0.6 | 0.8 | 8.3 | +0.2 0 | 0.6 | 0.4 | 70 |
| 10 32 0225001 | 22.5 | | | | | | | | 71 |
| 10 32 0232001 | 23.2 | | | | | | | | 75 |
| 10 32 0240001 | 24 | | | | | | | | 80 |
| 10 32 0248001 | 24.8 | | | | | | | | 85 |
| 10 32 0256001 | 25.6 | | | | | | | | 90 |
| 10 32 0278001 | 27.8 | 9 | 0.6 | 0.8 | 9.3 | +0.2 0 | 0.6 | 0.4 | 95 |
| 10 32 0286001 | 28.6 | | | | | | | | 100 |
| 10 32 0301001 | 30.1 | 10 | 1 | 1.2 | 10.3 | +0.2 0 | 1 | 0.7 | 110 |
| 10 32 0332001 | 33.2 | | | | | | | | 120 |
| 10 32 0339001 | 33.9 | | | | | | | | 125 |
| 10 32 0346001 | 34.6 | | | | | | | | 130 |
| 10 32 0377001 | 37.7 | 11 | 1 | 1.2 | 11.4 | +0.2 0 | 1 | 0.7 | 140 |
| 10 32 0391001 | 39.1 | | | | | | | | 150 |
| 10 32 0421001 | 42.1 | 12 | 1 | 1.2 | 12.4 | +0.2 0 | 1 | 0.7 | 160 |
| 10 32 0435001 | 43.5 | | | | | | | | 170 |
| 10 32 0449001 | 44.9 | | | | | | | | 180 |
| 10 32 0496001 | 49.6 | | | | | | | | 190 |
| 10 32 0510001 | 51 | 14 | 1.6 | 2 | 14.4 | +0.2 0 | 1.6 | 1.2 | 200 |
| 10 32 0571001 | 57.1 | | | | | | | | 220 |
| 10 32 0599001 | 59.9 | 16 | 1.6 | 2 | 16.4 | +0.2 0 | 1.6 | 1.2 | 240 |
| 10 32 0646001 | 64.6 | | | | | | | | 250 |
| 10 32 0660001 | 66 | 18 | 2.5 | 3 | 18.4 | +0.2 0 | 2.5 | 2 | 260 |
| 10 32 0721001 | 72.1 | | | | | | | | 280 |
| 10 32 0748001 | 74.8 | 20 | 2.5 | 3 | 20.4 | +0.2 0 | 2.5 | 2 | 300 |
| 10 32 0810001 | 81 | | | | | | | | 320 |
| 10 32 0836001 | 83.6 | 22 | 2.5 | 3 | 22.4 | +0.2 0 | 2.5 | 2 | 340 |
| 10 32 0932001 | 93.2 | | | | | | | | 360 |
| 10 32 0956001 | 95.9 | 26 | 2.5 | 3 | 26.4 | +0.2 0 | 2.5 | 2 | 380 |
| 10 32 0986001 | 98.6 | | | | | | | | 400 |
| 10 32 1082001 | 108.2 | 30 | 3 | 4 | 30.4 | +0.2 0 | 3 | 2.5 | 420 |
| 10 32 1109001 | 110.9 | | | | | | | | 440 |
| 10 32 1123001 | 112.3 | | | | | | | | 450 |
| 10 32 1136001 | 113.6 | | | | | | | | 460 |
| 10 32 1231001 | 123.1 | 34 | 3 | 4 | 34.4 | +0.2 0 | 3 | 2.5 | 480 |
| 10 32 1259001 | 125.9 | | | | | | | | 500 |
| 10 32 1367001 | 136.7 | 38 | 3 | 4 | 38.4 | +0.2 0 | 3 | 2.5 | 530 |
| 10 32 1408001 | 140.8 | | | | | | | | 560 |
| 10 32 1531001 | 153.1 | 42 | 3 | 4 | 42.4 | +0.2 0 | 3 | 2.5 | 600 |
| 10 32 1571001 | 157.1 | | | | | | | | 630 |

2) the last 4 digits before the / (...) are intended to denote length l

Material: E 335 (St 60-2), bright

With shaft diameters between those listed in the table, it is recommended that the wedge thickness t_1 of the next shaft diameter down be selected. The width b is calculated from: $b = \sqrt{t_1 \cdot (d - t_1)}$.

For shaft diameters of above 630 mm we recommend: $t_1 = 0.07 d$, $b = 0.25 d$.

Special steels/stainless steel on request
Special versions upon request



If alternating shock loads occur, tangential keys to DIN 268 are recommended for the 100 mm shaft diameters.

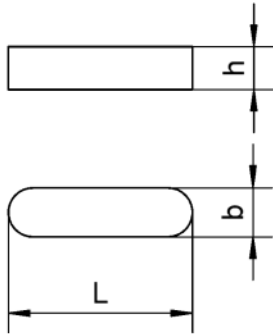
The 63, 71 and 125 shaft diameters to the ISO recommendation R 775 and the planned ISO recommendation on tangential keys are not included in DIN 748 Sheet 1.

20_03
12/2012

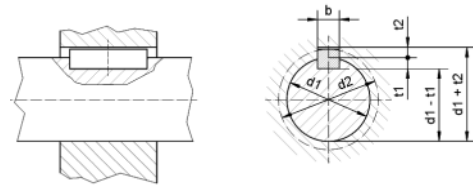
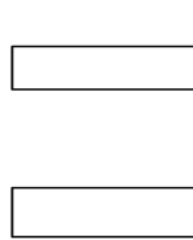




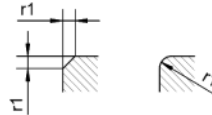
Form A: round-ended



Form B: straight-ended



chamfering (all sides)
bevelled rounded
of manufacturer's choice



rounding of groove bottom
for shaft and hub



Example for ordering: Parallel key according to DIN 6885 high-sized version, b = 10 mm, h = 8 mm, L = 70 mm, form A round-ended, bright;
Order number: 10 37 1008 0700/001

Form C up to form J upon request

| Order number ¹⁾²⁾ | Width b | Height h | For shaft diameter d1 | | Shaft groove | | Hub groove | | | | | d2 Minimum dimension d1 ¹⁾ | Bevelled/rounded r1 | | Rounding of groove bottom r2 | | Length L | | perm. diff. | | |
|------------------------------|---------|----------|-----------------------|-----|--------------|--|------------|---------------------|-------------|---------------|-------------|---------------------------------------|---------------------|------|------------------------------|------|----------|-----|-------------|--------|--------|
| | | | above | to | b | Depth t1 with back clearance or oversize perm. diff. | b | with back clearance | perm. diff. | with oversize | perm. diff. | | min. | max. | min. | max. | from | to | | Spring | Groove |
| .. 37 0202 /001 | 2 | 2 | 6 | 8 | 2 | 1.2 | | 2 | 1 | | 0.5 | | 2.5 | | | | 6 | 20 | -0.2 | +0.2 | |
| .. 37 0303 /001 | 3 | 3 | 8 | 10 | 3 | 1.8 | | 3 | 1.4 | | 0.9 | | 3.5 | 0.16 | 0.25 | 0.16 | 0.08 | 6 | 36 | | |
| .. 37 0404 /001 | 4 | 4 | 10 | 12 | 4 | 2.5 | +0.1 | 4 | 1.8 | +0.1 | 1.2 | +0.1 | 4 | | | | | 8 | 45 | -0.2 | +0.2 |
| .. 37 0505 /001 | 5 | 5 | 12 | 17 | 5 | 3 | | 5 | 2.3 | | 1.7 | | 5 | | | | | 10 | 56 | -0.3 | +0.3 |
| .. 37 0606 /001 | 6 | 6 | 17 | 22 | 6 | 3.5 | | 6 | 2.8 | | 2.2 | | 6 | 0.25 | 0.4 | 0.25 | 0.16 | 14 | 70 | | |
| .. 37 0807 /001 | 8 | 7 | 22 | 30 | 8 | 4 | | 8 | 3.3 | | 2.4 | | 8 | | | | | 18 | 90 | -0.2 | +0.2 |
| .. 37 1008 /001 | 10 | 8 | 30 | 38 | 10 | 5 | | 10 | 3.3 | | 2.4 | | 8 | | | | | 22 | 110 | -0.3 | +0.3 |
| .. 37 1208 /001 | 12 | 8 | 38 | 44 | 12 | 5 | | 12 | 3.3 | | 2.4 | | 8 | | | | | 28 | 140 | -0.5 | +0.5 |
| .. 37 1409 /001 | 14 | 9 | 44 | 50 | 14 | 5.5 | | 14 | 3.8 | | 2.9 | | 9 | 0.4 | 0.6 | 0.4 | 0.25 | 36 | 160 | | |
| .. 37 1610 /001 | 16 | 10 | 50 | 58 | 16 | 6 | | 16 | 4.3 | | 3.4 | | 11 | | | | | 45 | 180 | | |
| .. 37 1811 /001 | 18 | 11 | 58 | 65 | 18 | 7 | +0.2 | 18 | 4.4 | +0.2 | 3.4 | +0.2 | 11 | | | | | 50 | 200 | | |
| .. 37 2012 /001 | 20 | 12 | 65 | 75 | 20 | 7.5 | | 20 | 4.9 | | 3.9 | | 12 | | | | | 56 | 220 | -0.3 | +0.3 |
| .. 37 2214 /001 | 22 | 14 | 75 | 85 | 22 | 9 | | 22 | 5.4 | | 4.4 | | 14 | | | | | 63 | 250 | -0.5 | +0.5 |
| .. 37 2514 /001 | 25 | 14 | 85 | 95 | 25 | 9 | | 25 | 5.4 | | 4.4 | | 14 | 0.6 | 0.8 | 0.6 | 0.4 | 70 | 280 | | |
| .. 37 2816 /001 | 28 | 16 | 95 | 110 | 28 | 10 | | 28 | 6.4 | | 5.4 | | 16 | | | | | 80 | 320 | | |
| .. 37 3218 /001 | 32 | 18 | 110 | 130 | 32 | 11 | | 32 | 7.4 | | 6.4 | | 18 | | | | | 90 | 360 | | |
| .. 37 3620 /001 | 36 | 20 | 130 | 158 | 36 | 12 | | 36 | 8.4 | | 7.1 | | 21 | | | | | 100 | 400 | | |
| .. 37 4022 /001 | 40 | 22 | 150 | 170 | 40 | 13 | | 40 | 9.4 | | 8.1 | | 23 | 1 | 1.2 | 1 | 0.7 | 110 | 400 | | |
| .. 37 4525 /001 | 45 | 25 | 170 | 200 | 45 | 15 | | 45 | 10.4 | | 9.1 | | 26 | | | | | 125 | 400 | | |
| .. 37 5028 /001 | 50 | 28 | 200 | 230 | 50 | 17 | | 50 | 11.4 | | 10.1 | | 28 | | | | | 140 | 400 | | |
| .. 37 5632 /001 | 56 | 32 | 230 | 260 | 56 | 20 | | 56 | 12.4 | | 11.1 | | 32 | | | | | 160 | 400 | -0.5 | +0.5 |
| .. 37 6332 /001 | 63 | 32 | 260 | 290 | 63 | 20 | +0.3 | 63 | 12.4 | +0.3 | 11.1 | +0.3 | 32 | 1.6 | 2 | 1.6 | 1.2 | 180 | 400 | | |
| .. 37 7036 /001 | 70 | 36 | 290 | 330 | 70 | 22 | | 70 | 14.4 | | 13.1 | | 36 | | | | | 200 | 400 | | |
| .. 37 8040 /001 | 80 | 40 | 330 | 380 | 80 | 25 | | 80 | 15.4 | | 14.1 | | 40 | | | | | 220 | 400 | | |
| .. 37 9045 /001 | 90 | 45 | 380 | 440 | 90 | 28 | | 90 | 17.4 | | 16.1 | | 45 | 2.5 | 3 | 2.5 | 2 | 250 | 400 | | |
| .. 37 0050 /001 | 100 | 50 | 440 | 500 | 100 | 31 | | 100 | 19.5 | | 18.1 | | 50 | | | | | 280 | 400 | | |

1) The last 4 digits before the / (...) are intended to denote length L. Please clearly indicate L.

2) The two first digits (..) indicate: 10 = form A (round end) and 11 = form B (straight end). Please clearly indicate this.

Material:

for parallel key heights h up to 25 mm: St 50-1 K
for parallel key heights h above 25 mm: St 60-2
alternative: stainless steel
(supplement to order number .../000)



Surface protection:

| Identifier | Supplement to order number |
|--|----------------------------|
| bright | .../001 |
| electr. galvanised white (layer min. 5 µm) | .../013 |

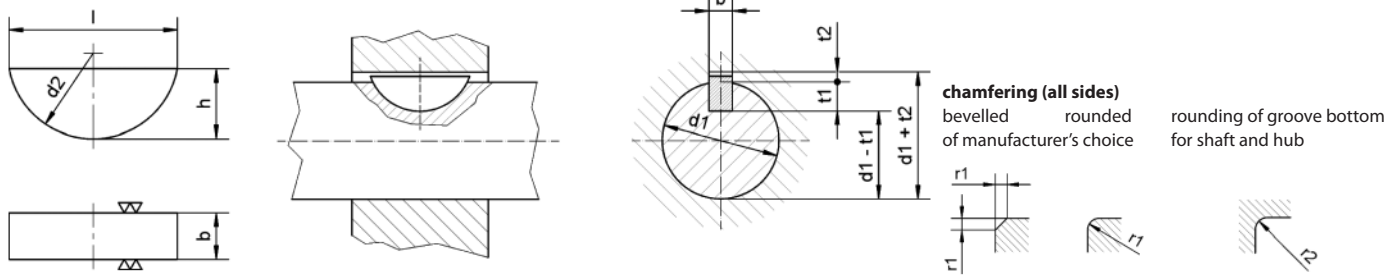
Special versions upon request

mbo Osswald GmbH & Co KG
Metal processing · Linking technology

www.mbo-osswald.com · info@mbo-osswald.de
Tel: + 49 (0) 9345-670-0 · Fax: + 49 (0) 9345-6255



General tolerances
DIN ISO 2768-medium
Subject to technical alterations
We accept no responsibility for incorrect or incomplete details or information given



Example for ordering: Woodruff key according to DIN 6888, b = 6 mm, h = 7.5 mm, bright;
Order number: 10 34 0060 0075/001

| Order number | Width b | | Height h | | For shaft diameter d1 ¹⁾ Allocation I | | For shaft diameter d1 ¹⁾ Allocation II | | Dia- meter d2 | Bevelled/ rounded r1 | | Length l ≈ | Shaft groove | | | | Hub groove | | | | Rounding of groove bottom r2 | |
|---------------------|---------|------|----------|-------|--|-------|---|-------------|---------------|--|-------|------------|--------------|------------------|-----------|--|---------------------|---------------------|-------------------|-------------------|------------------------------|-------------|
| | h9 | h12 | above | up to | above | up to | perm. diff. | perm. diff. | | Width firm seat P9 loose seat N9 b ²⁾ | Row A | | Row B | Diff. for A u. B | Ø d2 +0.5 | Width firm seat P9 loose seat J9 b ²⁾⁶⁾ | Row A ⁴⁾ | Row B ⁵⁾ | perm. diff. for A | perm. diff. for B | perm. diff. | |
| | | | | | | | | | | | | | | | | | | | | | | perm. diff. |
| 10 34 0010 0014/001 | 1 | 1.4 | 3 | 4 | 6 | 8 | 4 | 0.2 | | 3.82 | 1 | 1 | 1 | 4 | 1 | 0.6 | 0.6 | | | 0.2 | | |
| 10 34 0015 0026/001 | 1.5 | 2.6 | 4 | 6 | 8 | 10 | 7 | 0.2 | | 6.76 | 1.5 | 2 | 2 | 7 | 1.5 | 0.8 | 0.8 | | | 0.2 | | |
| 10 34 0020 0026/001 | 2 | 2.6 | 6 | 8 | 10 | 12 | 7 | 0.2 | | 6.76 | 2 | 1.8 | 1.8 | 7 | 2 | 1 | 1 | | | 0.2 | | |
| 10 34 0020 0037/001 | 2 | 3.7 | 6 | 8 | 10 | 12 | 10 | 0.2 | | 9.66 | 2 | 2.9 | 2.9 | 10 | 2 | 1 | 1 | | | 0.2 | | |
| 10 34 0025 0037/001 | 2.5* | 3.7 | 8 | 10 | 12 | 17 | 10 | 0.2 | | 9.66 | 2.5 | 2.9 | 2.9 | 10 | 2.5 | 1 | 1 | | | 0.2 | | |
| 10 34 0030 0037/001 | 3 | 3.7 | 8 | 10 | 12 | 17 | 10 | 0.2 | | 9.66 | 3 | 2.5 | 2.8 | 10 | 3 | 1.4 | 1.1 | | | 0.2 | | |
| 10 34 0030 0050/001 | 3 | 5 | 8 | 10 | 12 | 17 | 13 | 0.2 | | 12.65 | 3 | 3.8 | 4.1 | 13 | 3 | 1.4 | 1.1 | | | 0.2 | | |
| 10 34 0030 0065/001 | 3 | 6.5 | - | - | 12 | 17 | 16 | 0.2 | +0.1 | 15.72 | 3 | 5.3 | 5.6 | 16 | 3 | 1.4 | 1.1 | | | 0.2 | | |
| 10 34 0040 0050/001 | 4 | 5 | 10 | 12 | 17 | 22 | 13 | 0.2 | | 12.65 | 4 | 3.5 | 4.1 | 13 | 4 | 1.7 | 1.1 | | | 0.2 | | |
| 10 34 0040 0065/001 | 4 | 6.5 | 10 | 12 | 17 | 22 | 16 | 0.2 | | 15.72 | 4 | 5 | 5.6 | 16 | 4 | 1.7 | 1.1 | | | 0.2 | | |
| 10 34 0040 0075/001 | 4 | 7.5 | - | - | 17 | 22 | 19 | 0.2 | | 18.57 | 4 | 6 | 6.6 | 19 | 4 | 1.7 | 1.1 | +0.1 | | 0.2 | | |
| 10 34 0050 0065/001 | 5 | 6.5 | 12 | 17 | 22 | 30 | 16 | 0.2 | | 15.72 | 5 | 4.5 | 5.4 | 16 | 5 | 2.2 | 1.3 | | | 0.2 | | |
| 10 34 0050 0075/001 | 5 | 7.5 | 12 | 17 | 22 | 30 | 19 | 0.2 | | 18.57 | 5 | 5.5 | 6.4 | 19 | 5 | 2.2 | 1.3 | +0.1 | | 0.2 | | |
| 10 34 0050 0090/001 | 5 | 9 | - | - | 22 | 30 | 22 | 0.2 | | 21.63 | 5 | 7 | 7.9 | 22 | 5 | 2.2 | 1.3 | | | 0.2 | | |
| 10 34 0060 0075/001 | 6 | 7.5 | 17 | 22 | 30 | 38 | 19 | 0.4 | | 18.57 | 6 | 5.1 | 6 | 19 | 6 | 2.6 | 1.7 | | | 0.4 | | |
| 10 34 0060 0090/001 | 6 | 9 | 17 | 22 | 30 | 38 | 22 | 0.4 | | 21.63 | 6 | 6.6 | 7.5 | 22 | 6 | 2.6 | 1.7 | | | 0.4 | | |
| 10 34 0060 0100/001 | 6 | (10) | 17 | 22 | 30 | 38 | 25 | 0.4 | | 24.49 | 6 | 7.6 | 8.5 | 25 | 6 | 2.6 | 1.7 | | | 0.4 | | |
| 10 34 0060 0110/001 | 6 | 11 | - | - | 30 | 38 | 28 | 0.4 | -0.2 | 27.35 | 6 | 8.6 | 9.5 | 28 | 6 | 2.6 | 1.7 | | | 0.4 | | |
| 10 34 0080 0090/001 | 8 | 9 | 22 | 30 | 38 | - | 22 | 0.4 | -0.1 | 21.63 | 8 | 6.2 | 7.5 | 22 | 8 | 3 | 1.7 | | | 0.4 | | |
| 10 34 0080 0110/001 | 8 | 11 | 22 | 30 | 38 | - | 28 | 0.4 | | 27.35 | 8 | 8.2 | 9.5 | 28 | 8 | 3 | 1.7 | | | 0.4 | | |
| 10 34 0080 0130/001 | 8 | 13 | - | - | 38 | - | 32 | 0.4 | | 31.43 | 8 | 10.2 | 11.5 | 32 | 8 | 3 | 1.7 | | | 0.4 | | |
| 10 34 0100 0110/001 | 10 | 11 | 30 | 38 | 38 | - | 28 | 0.4 | -0.2 | 27.35 | 10 | 7.8 | 9.1 | 28 | 10 | 3.4 | 2.1 | | | 0.4 | | |
| 10 34 0100 0130/001 | 10 | 13 | 30 | 38 | 38 | - | 32 | 0.4 | | 31.43 | 10 | 9.8 | 11.1 | 32 | 10 | 3.4 | 2.1 | +0.2 | | 0.4 | | |
| 10 34 0100 0160/001 | 10 | 16 | - | - | 38 | - | 45 | 0.4 | | 43.08 | 10 | 12.8 | 14.1 | 45 | 10 | 3.4 | 2.1 | | | 0.4 | | |

* only for motor vehicle construction

1) For connection dimensions, in particular of shaft ends, the allocation of the woodruff key cross-sections to the shaft diameters must be maintained. Allocation I applies wherever the woodruff keys are used like parallel keys, i.e. to transmit the entire torque. Allocation II applies wherever the woodruff key is used only for fixing the position of the drive element and for transmitting the torque of other elements, e.g. cotter or taper.

2) The permissible differences for the groove widths apply only as a guideline. It is recommended to comply with ISA grade IT 8 instead of IT 9 for the widths of reamed grooves (i.e. P 8 instead of P 9. N 8 instead of N 9 and J 8 instead of J 9).

Material: St 60

alternative: stainless steel

(supplement to order number .../000)



Special versions upon request

3) In the shop drawings, the dimensions t1 and (d1 - t1) plus t2 and (d1 + t2) can be entered adjacently to one another, however in many cases the dimensions t1 and (d1 + t2) are sufficient. It may be necessary here to take into account the permissible differences and machining allowances of shaft and hub bore.

4) Use row A (high hub groove) for preference, conforms to DIN 6885 Sheet 1 (t2 with back clearance).

5) Row B (low hub groove) for machine tools, conforms to DIN 6885 Sheet 2.

6) With allocation II of the woodruff keys to the shaft diameters the tolerance field D 10 can also be selected.

Surface protection:

| Identifier | Supplement to order number | |
|--|----------------------------|---------|
| bright | .../001 | 20_05 |
| electr. galvanised white (layer min. 5 µm) | .../013 | 12/2012 |

mbo Osswald GmbH & Co KG

Metal processing · Linking technology

www.mbo-osswald.com · info@mbo-osswald.de
Tel: + 49 (0) 9345-670-0 · Fax: + 49 (0) 9345-6255



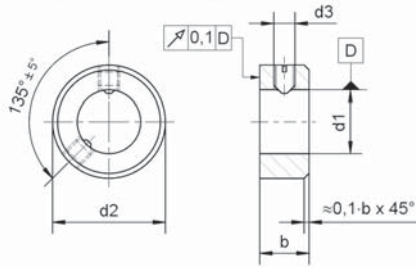
General tolerances
DIN ISO 2768-medium

Subject to technical alterations

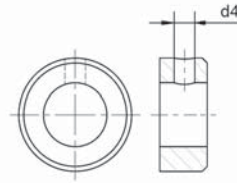
We accept no responsibility for incorrect or incomplete details or information given



Form A
up to d1 = 70 with 1 setscrew
above d1 = 70 with 2 setscrews

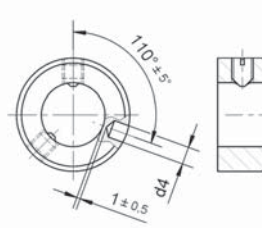


Form B
only up to d1 = 150



other dimensions and values as for Form A

Form C 1)
up to d1 = 70 with 1 setscrew
above d1 = 70 with 2 setscrews



other dimensions and values as for Form A

* Please specify the desired form A, B or C (e.g. ...0020A/...)

| d1 H8 ²⁾ | | Order number* | b js14 ²⁾ | d2 h13 ²⁾ | d3 | d4 H11 ²⁾ | Setscrew ⁵⁾ | Optional | | Weight kg/100 pcs. ≈ | |
|------------------------|---------------------|----------------------|-------------------------|-------------------------|-------|-------------------------|------------------------|--|---|-------------------------|------------------|
| Row 1 ³⁾ | Row 2 ⁴⁾ | | | | | | | Grooved pin DIN EN ISO 8744 ⁶⁾ | Taper pin DIN EN 22339 ⁷⁾ | Form A | Form B Form C |
| 2 | | 10 36 0000 0020*/... | 3.5 | 6 | M 2 | 0.6 | M 2 x 3 | - | 0.6 x 6 | 0.069 | 0.065 |
| 2.5 | | 10 36 0000 0025*/... | 4 | 7 | M 2 | 0.8 | M 2 x 3 | - | 0.8 x 6 | 0.105 | 0.096 |
| 3 | | 10 36 0000 0030*/... | 5 | 7 | M 2 | 0.8 | M 2 x 3 | - | 0.8 x 6 | 0.123 | 0.115 |
| | 3.5 | 10 36 0000 0035*/... | 5 | 8 | M 2.5 | 1 | M 2.5 x 3 | - | 1 x 8 | 0.162 | 0.155 |
| 4 | | 10 36 0000 0040*/... | 5 | 8 | M 2.5 | 1 | M 2.5 x 3 | - | 1 x 8 | 0.152 | 0.145 |
| | 4.5 | 10 36 0000 0045*/... | 6 | 10 | M 3 | 1.5 | M 3 x 4 | 1.5 x 10 | 1.5 x 10 | 0.296 | 0.289 |
| 5 | | 10 36 0000 0050*/... | 6 | 10 | M 3 | 1.5 | M 3 x 4 | 1.5 x 10 | 1.5 x 10 | 0.28 | 0.273 |
| | 5.5 | 10 36 0000 0055*/... | 6 | 12 | M 4 | 1.5 | M 4 x 5 | 1.5 x 12 | 1.5 x 12 | 0.432 | 0.414 |
| 6 | | 10 36 0000 0060*/... | 8 | 12 | M 4 | 1.5 | M 4 x 5 | 1.5 x 12 | 1.5 x 12 | 0.548 | 0.526 |
| | 7 | 10 36 0000 0070*/... | 8 | 12 | M 4 | 1.5 | M 4 x 5 | 1.5 x 12 | 1.5 x 12 | 0.488 | 0.464 |
| 8 | | 10 36 0000 0080*/... | 8 | 16 | M 4 | 2 | M 4 x 6 | 2 x 16 | 2 x 16 | 0.94 | 0.92 |
| 10 | | 10 36 0000 0100*/... | 10 | 20 | M 5 | 3 | M 5 x 8 | 3 x 20 | 3 x 20 | 1.85 | 1.8 |
| 12 | | 10 36 0000 0120*/... | 12 | 22 | M 6 | 4 | M 6 x 8 | 4 x 22 | 4 x 20 | 2.52 | 2.44 |
| 14 | | 10 36 0000 0140*/... | 12 | 25 | M 6 | 4 | M 6 x 8 | 4 x 24 | 4 x 25 | 3.17 | 3.09 |
| | 15 | 10 36 0000 0150*/... | 12 | 25 | M 6 | 4 | M 6 x 8 | 4 x 24 | 4 x 25 | 2.98 | 2.88 |
| 16 | | 10 36 0000 0160*/... | 12 | 28 | M 6 | 4 | M 6 x 8 | 4 x 28 | 4 x 25 | 3.84 | 3.76 |
| 18 | | 10 36 0000 0180*/... | 14 | 32 | M 6 | 5 | M 6 x 8 | 5 x 32 | 5 x 30 | 6 | 5.84 |
| 20 | | 10 36 0000 0200*/... | 14 | 32 | M 6 | 5 | M 6 x 8 | 5 x 32 | 5 x 30 | 5.3 | 5.2 |
| 22 | | 10 36 0000 0220*/... | 14 | 36 | M 6 | 5 | M 6 x 10 | 5 x 36 | 5 x 35 | 6.9 | 6.79 |
| | 24 | 10 36 0000 0240*/... | 16 | 40 | M 8 | 6 | M 8 x 12 | 6 x 40 | 6 x 40 | 10 | 9.8 |
| 25 | | 10 36 0000 0250*/... | 16 | 40 | M 8 | 6 | M 8 x 10 | 6 x 40 | 6 x 40 | 9.59 | 9.32 |
| | 26 | 10 36 0000 0260*/... | 16 | 40 | M 8 | 6 | M 8 x 10 | 6 x 40 | 6 x 40 | 9.05 | 8.83 |
| 28 | | 10 36 0000 0280*/... | 16 | 45 | M 8 | 6 | M 8 x 12 | 6 x 45 | 6 x 45 | 12.2 | 11.9 |
| | 30 | 10 36 0000 0300*/... | 16 | 45 | M 8 | 6 | M 8 x 10 | 6 x 45 | 6 x 45 | 11.1 | 10.8 |
| 32 | | 10 36 0000 0320*/... | 16 | 50 | M 8 | 8 | M 8 x 12 | 8 x 50 | 8 x 50 | 14.5 | 14 |
| | 35 | 10 36 0000 0350*/... | 16 | 56 | M 8 | 8 | M 8 x 12 | 8 x 55 | 8 x 55 | 18.7 | 18.2 |
| 36 | | 10 36 0000 0360*/... | 16 | 56 | M 8 | 8 | M 8 x 12 | 8 x 55 | 8 x 55 | 18 | 17.6 |
| 40 | | 10 36 0000 0400*/... | 18 | 63 | M 10 | 8 | M 10 x 16 | 8 x 60 | 8 x 60 | 26.1 | 25.6 |
| 45 | | 10 36 0000 0450*/... | 18 | 70 | M 10 | 8 | M 10 x 16 | 8 x 70 | 8 x 70 | 31.7 | 31 |
| 50 | | 10 36 0000 0500*/... | 18 | 80 | M 10 | 10 | M 10 x 16 | 10 x 80 | 10 x 80 | 42.9 | 42.1 |
| | 55 | 10 36 0000 0550*/... | 18 | 80 | M 10 | 10 | M 10 x 16 | 10 x 80 | 10 x 80 | 37.3 | 36.4 |
| 56 | | 10 36 0000 0560*/... | 18 | 80 | M 10 | 10 | M 10 x 16 | 10 x 80 | 10 x 80 | 36.1 | 35.2 |
| | 60 | 10 36 0000 0600*/... | 20 | 90 | M 10 | 10 | M 10 x 16 | 10 x 90 | 10 x 90 | 55.2 | 54.3 |
| 63 | | 10 36 0000 0630*/... | 20 | 90 | M 10 | 10 | M 10 x 16 | 10 x 90 | 10 x 90 | 50.8 | 49.8 |
| | 65 | 10 36 0000 0650*/... | 20 | 100 | M 10 | 10 | M 10 x 20 | 10 x 100 | 10 x 100 | 70.8 | 69.8 |
| 70 | | 10 36 0000 0700*/... | 20 | 100 | M 10 | 10 | M 10 x 20 | 10 x 100 | 10 x 100 | 62.6 | 61.6 |
| | 75 | 10 36 0000 0750*/... | 22 | 110 | M 12 | 10 | M 12 x 20 | 10 x 110 | 10 x 110 | 87.1 | 86 |
| 80 | | 10 36 0000 0800*/... | 22 | 110 | M 12 | 10 | M 12 x 20 | 10 x 110 | 10 x 110 | 76.8 | 75.5 |
| | 85 | 10 36 0000 0850*/... | 22 | 125 | M 12 | 12 | M 12 x 25 | 12 x 120 | 12 x 120 | 113 | 111 |
| 90 | | 10 36 0000 0900*/... | 22 | 125 | M 12 | 12 | M 12 x 20 | 12 x 120 | 12 x 120 | 101 | 99 |
| 100 | | 10 36 0000 1000*/... | 25 | 140 | M 12 | 12 | M 12 x 25 | - | 12 x 140 | 147 | 145 |
| 110 | | 10 36 0000 1100*/... | 25 | 160 | M 12 | 12 | M 12 x 30 | - | 12 x 160 | 206 | 204 |
| | 120 | 10 36 0000 1200*/... | 25 | 160 | M 12 | 12 | M 12 x 25 | - | 12 x 160 | 171 | 169 |
| 125 | | 10 36 0000 1250*/... | 28 | 180 | M 16 | 16 | M 16 x 35 | - | 16 x 180 | 285 | 282 |
| 140 | | 10 36 0000 1400*/... | 28 | 200 | M 16 | 16 | M 16 x 35 | - | 16 x 200 | 347 | 343 |
| | 150 | 10 36 0000 1500*/... | 28 | 200 | M 16 | 16 | M 16 x 30 | - | 16 x 200 | 298 | 294 |
| 160 | | 10 36 0000 1600*/... | 32 | 220 | M 20 | - | M 20 x 35 | - | - | 446 | - |
| 180 | | 10 36 0000 1800*/... | 32 | 250 | M 20 | - | M 20 x 40 | - | - | 590 | - |
| 200 | | 10 36 0000 2000*/... | 32 | 280 | M 20 | - | M 20 x 45 | - | - | 756 | - |

- 1) With form C the setscrew is used as an assembly aid for fixing the set collar during drilling of the pin hole.
- 2) The specified tolerances only apply to the "bright" version. Other tolerances must be specified when ordering.
- 3) The row 1 nominal diameters should preferably be used above all for new designs.
- 4) The nominal diameters of row 2 contain sizes that are currently still needed in practice, but should no longer be used in new structures.

- 5) Unlike grooved and taper pins, setscrews (up to M 10 with slot to DIN EN 27434 and above M 12 with internal hexagon to DIN EN ISO 4027) are an integral part of the set collar.
- 6) Instead of grooved pins to DIN EN ISO 8744, it is also possible to use dowel pins to DIN EN ISO 8752 or spiral dowel pins to DIN EN ISO 8750.
- 7) If taper pins to DIN EN 22339 are used, the hole must be reamed during assembly with a 1:50 taper.

Material:

11SMnPb30+C or equivalent material
alternative: stainless steel

(supplement to order number .../000)



Special versions upon request

Surface protection:

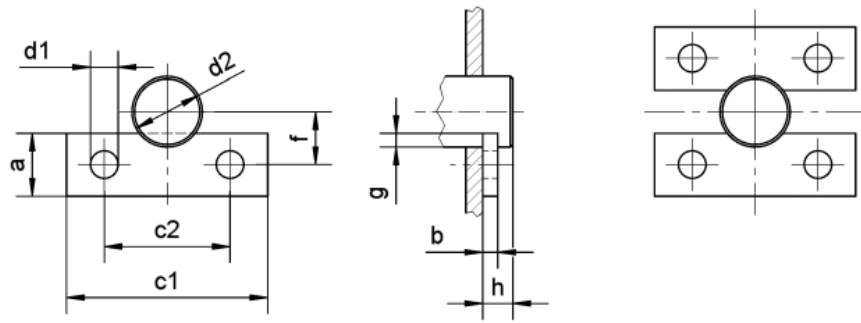
| Identifier | Supplement to order number |
|--|----------------------------|
| bright | .../001 20_06 |
| electr. galvanised white (layer min. 5 µm) | .../013 12/2012 |

mbo Osswald GmbH & Co KG
Metal processing · Linking technology

www.mbo-osswald.com · info@mbo-osswald.de
Tel: + 49 (0) 9345-670-0 · Fax: + 49 (0) 9345-6255



General tolerances
DIN ISO 2768-medium
Subject to technical alterations
We accept no responsibility for incorrect or incomplete details or information given



Example for ordering: Axle holders according to DIN 15058, a = 30 mm, b = 8 mm, bright;
Order number: 10 35 0000 0030/001

| For axle diameter d2 | | Order number | a | b ¹⁾ | c1 | c2 | d1 ²⁾ | f | g | h | Fastening screws thread according to DIN 13 | | Weight kg/pcs. ≈ | |
|------------------------|--------------------|---------------------|----|-----------------|-----|-----|------------------|-----|------|----|---|------------------------------------|---------------------|-----|
| Range | Preferred diameter | | | | | | | | | | Sheet 1 Regular thread | Sheet 5 and 6 Fine-pitch thread | | |
| above 16 up to 25 | 18 | 10 35 0000 0020/... | 20 | 5 | 60 | 36 | 9 | 16 | 3 | 10 | M 8 | M 8x1 | 0.042 | |
| | 20 | | | | | | | | 4 | | | | | |
| | 22 | | | | | | | | 17 | | | | | |
| | 25 | | | | | | | | 18 | | | | | 4.5 |
| above 25 up to 40 | 28 | 10 35 0000 0025/... | 25 | 6 | 80 | 50 | 11 | 22 | 4.5 | 12 | M 10 | M 10x1 | 0.085 | |
| | (30) | | | | | | | | 5.5 | | | | | |
| | 32 | | | | | | | | 23 | | | | | |
| | (35) | | | | | | | | 24 | | | | | 6 |
| | 36 | | | | | | | | 26 | | | | | 6.5 |
| above 40 up to 63 | 45 | 10 35 0000 0030/... | 30 | 8 | 100 | 70 | 13 | 31 | 6.5 | 16 | M 12 | M 12x1.5 | 0.19 | |
| | 50 | | | | | | | 33 | 7 | | | | | |
| | (55) | | | | | | | 35 | 7.5 | | | | | |
| | 56 | | | | | | | 36 | 8 | | | | | |
| | (60) | | | | | | | 37 | 9 | | | | | |
| | 63 | | | | | | | 45 | 10 | | | | | |
| above 63 up to 100 | 70 | 10 35 0000 0040/... | 40 | 10 | 140 | 100 | 17 | 47 | 10.5 | 20 | M 16 | M 16x1.5 | 0.4 | |
| | (75) | | | | | | | 48 | 12 | | | | | |
| | 80 | | | | | | | 52 | 13 | | | | | |
| | 90 | | | | | | | 56 | 14 | | | | | |
| | 100 | | | | | | | 65 | 15 | | | | | |
| above 100 up to 160 | 110 | 10 35 0000 0050/... | 50 | 12 | 190 | 140 | 21 | 71 | 16.5 | 25 | M 20 | M 20x1.5 | 0.9 | |
| | 125 | | | | | | | 77 | 18 | | | | | |
| | 140 | | | | | | | 85 | 20 | | | | | |
| | 160 | | | | | | | 98 | 22 | | | | | |
| above 160 up to 250 | 180 | 10 35 0000 0060/... | 60 | 16 | 250 | 200 | 25 | 105 | 25 | 32 | M 24 | M 24x1.5 | 1.75 | |
| | 200 | | | | | | | 112 | 28 | | | | | |
| | 220 | | | | | | | 125 | 30 | | | | | |
| | 250 | | | | | | | | | | | | | |

avoid sizes quoted in brackets wherever possible

2) state other hole diameters when ordering

1) the width of the groove in the axle depends on the operating conditions and the semi-finished product used for the axle holder

Material: St 37 - 1

alternative: stainless steel

(supplement to order number .../000)



Surface protection:

| Identifier | Supplement to order number | |
|--|----------------------------|---------|
| bright | .../001 | 20_07 |
| electr. galvanised white (layer min. 5 µm) | .../013 | 12/2012 |

Special versions upon request

mbo Osswald GmbH & Co KG

Metal processing · Linking technology

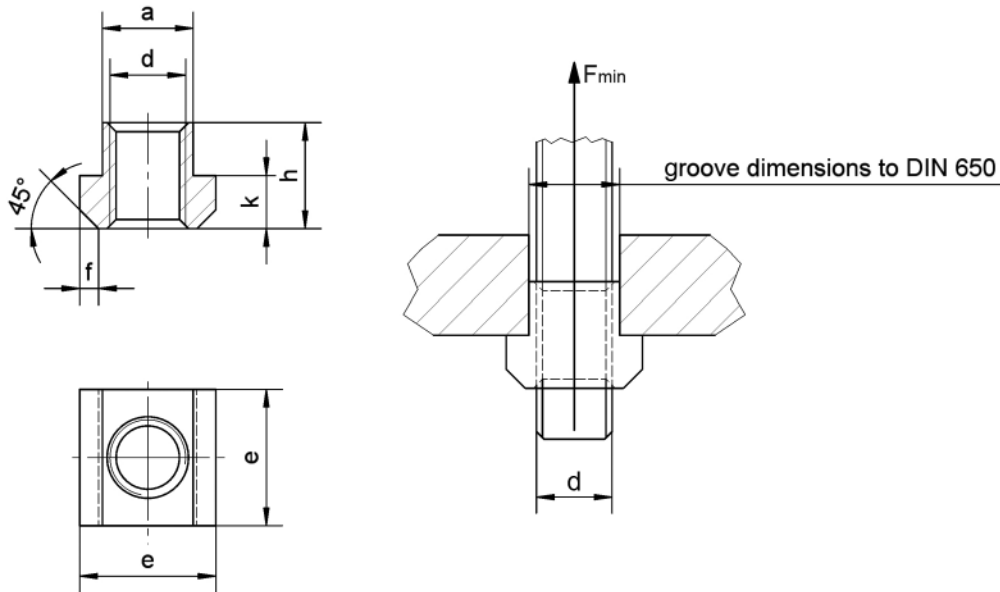
www.mbo-osswald.com · info@mbo-osswald.de
Tel: + 49 (0) 9345-670-0 · Fax: + 49 (0) 9345-6255



General tolerances
DIN ISO 2768-medium

Subject to technical alterations

We accept no responsibility for incorrect or incomplete details or information given



Example for ordering: Nut for T-slots according to DIN 508, d = M 12, a = 14 mm, bright;
Order number: 10 33 0508 0012/001

| Order number | d | a | | e | | f | h | k | | Weight g/pcs. ≈ | For T-slots acc. DIN 650 | Test force F_{min} N • 10 ³ |
|---------------------|------|----|-----------|----|-----------|-----|-----|----|-----------|--------------------|--------------------------|--|
| | | | Tolerance | | Tolerance | | | | Tolerance | | | |
| 10 33 0508 0004/... | M 4 | 5 | | 9 | 0 | 1 | 6.5 | 3 | 0/-0.3 | 2.5 | 5 | 7 |
| 10 33 0508 0005/... | M 5 | 6 | -0.3 | 10 | -0.5 | 1.6 | 8 | 4 | 0 | 4 | 6 | 11.4 |
| 10 33 0508 0006/... | M 6 | 8 | -0.5 | 13 | | | 10 | 6 | -0.5 | 10 | 8 | 16 |
| 10 33 0508 0008/... | M 8 | 10 | | 15 | 0 | 1.6 | 12 | 6 | 0 | 18 | 10 | 29 |
| 10 33 0508 0010/... | M 10 | 12 | | 18 | -0.5 | 2.5 | 14 | 7 | -0.5 | 24 | 12 | 46 |
| 10 33 0508 0012/... | M 12 | 14 | -0.3 | 22 | | | 16 | 8 | | 35 | 14 | 67 |
| 10 33 0508 0016/... | M 16 | 18 | -0.6 | 28 | 0 | 2.5 | 20 | 10 | 0 | 75 | 18 | 126 |
| 10 33 0508 0020/... | M 20 | 22 | | 35 | -0.5 | | 28 | 14 | -0.5 | 165 | 22 | 196 |
| 10 33 0508 0024/... | M 24 | 28 | | 44 | 0/-1 | 4 | 36 | 18 | 0/-1 | 345 | 28 | 282 |
| 10 33 0508 0030/... | M 30 | 36 | | 54 | 0 | | 44 | 22 | 0 | 770 | 36 | 448 |
| 10 33 0508 0036/... | M 36 | 42 | -0.4 | 65 | | 6 | 52 | 26 | | 1030 | 42 | 653 |
| 10 33 0508 0042/... | M 42 | 48 | -0.7 | 75 | -1 | | 60 | 30 | -1 | 1550 | 48 | 653 |
| 10 33 0508 0048/... | M 48 | 54 | -0.4/-0.8 | 85 | 0/-1 | 6 | 70 | 34 | 0/-1 | 2300 | 54 | 653 |

Material:
steel of manufacturer's choice

Special steels/stainless steel on request
Special versions upon request



Hardness:

| Thread d | Hardness |
|----------|----------|
| M4 | ≥ 170 HV |
| M5 - M36 | ≥ 188 HV |
| > M36 | ≥ 180 HV |

Surface protection:

| Identifier | Supplement to order number |
|--|----------------------------|
| bright | .../001 |
| electr. galvanised white (layer min. 5 µm) | .../013 |

20_08
12/2012

