

Specialist in Bearing Technology



www.elceegroup.com



**Future Engineering
Since 1923**

ELCEE HOLLAND BV

We are the specialists in the field of engineering, production and calculation of plain bearings for your application. We have the largest assortment Tribo Top® composite materials, bronze bearings and bearings of high alloy steel. Exclusive agent for the Netherlands for igus® plastic plain bearings, linear guides and spherical bearings. The keyword is 'self-lubricating'.

igus®

The igus® concept "plastics for longer life" stands for durable machine parts made of special plastic with low friction and little wear. Many of the programme lines can be delivered within 24 hours from stock.

Tribo Oiled® sinter bearings

These bearings are manufactured from powder metal and impregnated with oil after production. This procedure creates a self-lubricating bearing with good emergency running properties. The bearings are approximately 20-25% porous and for a lifetime supplied with oil.



Tribo Top® composite

Our extensive Tribo Top® technical composites programme consists of fibre-reinforced, laminated plastics, which are suitable for medium to very high load applications. They are available in tube and sheet form, as well as completely processed product drawings, such as bushings, bearings, etc. Tribo Top® is widely used in on- and offshore, dredging, shipping and heavy duty industry.



Tribo Ball® spherical bearings

The completely maintenance-free and highly corrosion resistant Tribo Ball® spherical bearings are designed by Elcee. Using a stainless steel ball and a composite housing is the right way for the load transfer of these spherical bearings.



Tribo Bronze®

Our programme includes, among others RG7, GBR10, GBR12 and aluminium bronze. Centrifugal or continuous casted rods and bushings. We also provide bearings with graphite or Teflon up to high temperatures.



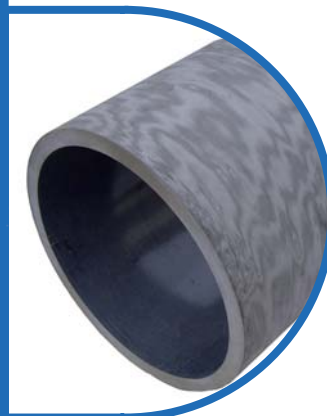
Tribo Steel®

For extreme loads specials are deployed, made from ball bearing steel, hardened and high temperature impregnated with molybdenum sulphide. The tread is equipped with cold-formed grooves in a grenade profile. These serve as a reservoir for lubricants. Applications: dredgers, excavators and agricultural machinery.



Engineering plastics

Our specialties are UHMPE, GNOS, PEEK, PA and POM. These materials are mainly processed supplied and used in e.g. the food, medical and bottle & canning industry.





CERTIFICATE OF APPROVAL

This is to certify that the Quality Management System of:

Elcee Group B.V.
Kamerlingh Onnesweg 28
3316 GL Dordrecht
The Netherlands

has been approved by Lloyd's Register Quality Assurance to the following Quality Management System Standard:

ISO 9001 : 2015

The Quality Management System is applicable to:

**Purchase, supply as well as design and
 development and assembly of components for
 automotive, industrial, maritime and utility applications.**

This certificate is valid only in association with the certificate schedule bearing the same number on which the locations applicable to this approval are listed.

Approval Certificate No:	Original Approval	:	22 April 2005
RQA659897	Current Certificate	:	1 May 2017
	Certificate Expiry	:	30 April 2020


 Issued by: Lloyd's Register Nederland B.V. for and on behalf of
 Lloyd's Register Quality Assurance Limited



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 For and on behalf of 1 Trinity Park, Bickenhill Lane, Birmingham, B37 7ES, United Kingdom
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 The use of the UKAS Accreditation Mark indicates Accreditation in respect of those activities covered by the Accreditation Certificate Number 001.

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Motion Plastics



plastics for longer life[®] ...



dry-tech[®] bearings

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Tel: +31(0)78-6544777
Fax: +31(0)78-6544733
Email: glijlagers@elcee.nl

iglidur® bearings

+++ High performance polymer bearings +++

Highly wear-resistant polymers improved by careful material development when adding re-enforcing fibres and solid lubricants, tested a thousand times and proved a million times: iglidur® plain bearings are lubricant-free, maintenance-free, low-cost and versatile.

► www.iglidur.eu

Top 5 most popular from stock



iglidur® G:
The all-rounder
The best-selling iglidur®
plain bearing world-wide.



iglidur® J:
Fast-and-Slow-Motion
Low coefficients of friction
and wear.



iglidur® M250:
Thick and robust
Excellent vibration
dampening.



iglidur® W300:
The marathon runner
Low coefficients of friction
with all shafts.



iglidur® X:
High-tech problem solver
High resistance to temperature
and chemicals.

All-rounder materials



- general use under normal conditions
- low-cost solutions for mass production (GLW, J4)
- reduced moisture absorption (K, P)

► www.iglidur.eu/allrounder

Specialists for continuous operation



- high wear resistance
- Low-cost material (R)
- ideal for plastic shafts (J260)

► www.iglidur.eu/runner

Specialists for high temperatures



- long term service temperature up to 250 °C
- extremely low wear rates under high loads (Z)
- Problem-solver in special situations (V400)

► www.iglidur.eu/hightemperature

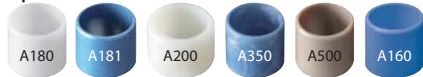
Specialists for high media resistance



- a broad range of uses for wet applications
- Specialist for underwater applications (H370)
- wear resistant under long-term operating conditions (H1)

► www.iglidur.eu/waterresistant

Specialists for food contact



- FDA compliant materials for the food industry
- EU 10/2011 EC-compliant (A181, A350, A500, A160)
- for various application conditions

► www.iglidur.eu/food

Specialists for more application areas



- iglidur® material for specialised applications
- electrically conductive (F, F2)
- for extremely high loads (Q, Q2)

► www.iglidur.eu/specialists



+++ Lubricant and maintenance-free solutions +++

iglidur® PRT

- Slewing ring bearing with iglidur® sliding elements
- ready to install
- 3 different designs
- extensive accessories
- corrosion-resistant

► www.igus.eu/PRT



iglidur® clips bearings

- solutions for sheet metal and punched holes
- easy assembly, by clipping in
- good abrasion resistance
- made of iglidur® M250
- positive location through double flange

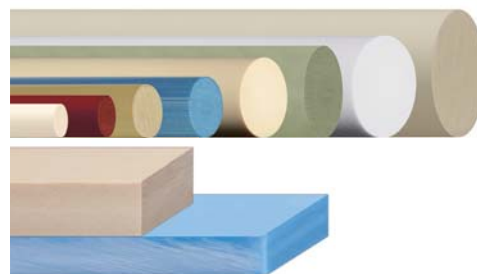
► www.igus.eu/clips



iglidur® stock bars

- unique design of plain bearings or elements made of iglidur® round bars or plates
- fast, low-priced as stock bar or a custom designed part
- for prototypes, test samples and mass production
- predictable service life
- fast machining with speedicut

► www.igus.eu/stockbar



xiros® polymer ball bearings

- maintenance-free, dry operation
- high corrosion resistance
- for temperatures up to +150°C
- high chemical resistance
- non-magnetic
- low weight

► www.igus.eu/xiros



xiros® special designs

- FDA-compliant
- conductive with ESD protection
- double row design
- optional with shield
- with spherical outer diameter

► www.igus.eu/xiros





+++ self-aligning spherical bearings +++

With the igubal® type series, a complete system of self-aligning bearing elements are available for the design engineer:
Rod ends, clevis joints, flange bearings, spherical bearings and pillow block bearings.

► www.igubal.eu

Rod ends

- with male/female thread
- corrosion-resistant
- temperatures -30 up to +80°C
- resistant to dirt and dust
- metal detectable

► www.igubal.eu/rodends



Clevis joints

- Individual components or combinations
- light-weight
- high tensile forces
- compatible with rod ends
- metal detectable

► www.igubal.eu/clevis



Pillow block bearings

- spherical feature for misalignment compensation
- high strength with varying loads
- light-weight

► www.igubal.eu/pillowblocks



Flange bearings

- for shaft and lead screw support
- maintenance-free, dry operation
- light-weight
- different types, high temperature option available

► www.igubal.eu/flange



Spherical bearings

- easy handling
- very light and robust
- high axial and radial loads
- easy installation
- small installation spaces
- low cost

► www.igubal.eu/sphericals



Spherical balls

- various materials
- maintenance-free dry operation
- corrosion-resistant
- high compressive strength
- flexible
- light-weight

► www.igubal.eu/balls





drylin® is a range of maintenance-free and lubricant-free linear bearings in six different options. In addition the range is complemented by complete linear units with lead screw drive or toothed belt.

► www.drylin.eu

drylin® T

- same dimensions as ball bearing systems
- adjustable bearing clearance
- high load capacity
- suitable for use in differing environments

► www.drylin.eu/T



drylin® N

- flat guide for cramped installation spaces
- numerous carriage options – also with pre-load
- rails in different widths
- low weight
- corrosion-resistant

► www.drylin.eu/N



drylin® W

- linear construction kit for almost unlimited design options
- single rail/single bearing housing
- double rail/preassembled carriage
- Easy installation

► www.drylin.eu/W



drylin® R

- dimensionally interchangeable with ball bearings
- Large variety of choice of housing dimensions
- extensive accessories
- replaceable liners

► www.drylin.eu/R



dryspin® & drylin® SD

- High-helix thread programme for high efficiency (dryspin®)
- system made of lead screw nuts and lead screws
- high efficiency

► www.drylin.eu/SD



drylin® Q

- torque resistant square linear guide
- individual housing options
- variable fixing options
- adjustable

► www.drylin.eu/Q



drylin® drive technology

- complete linear units with lead screw drive or tooth belt
- manual adjustments
- extensive accessories
- configuration online

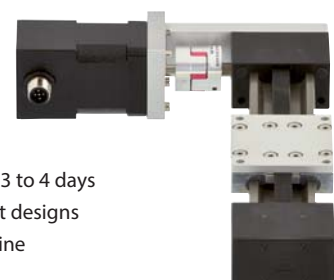
► www.drylin.eu/AT



drylin® E

- Linear axes with motor
- electrically driven
- ready to install in 3 to 4 days
- compact and light designs
- configuration online

► www.drylin.eu/E



Receive a complete igus® catalog?



- All igus® products in one catalogue
- 1.000 pages of technical information
- Many application examples and tips
- Free Ordering

YES! I am interested.
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The Netherlands

This form can also be faxed to: 0031-(0)78 654 47 33
 or you can send your personal data by e-mail to: glijlagers@elcee.nl

Tribo
Oiled



Self-Lubricating Sinter Bronze
& Iron Bronze Bearings





SELF-LUBRICATING SINTER BRONZE AND IRON BEARINGS

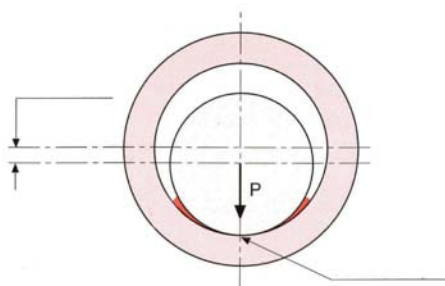
SELECTION & OPERATION

The choice for these plain bearings

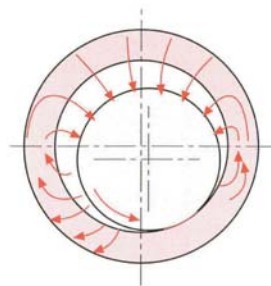
- Sintered self-lubricating bearings are affordable, universally applicable plain bearings, which usually require no additional lubrication.
- The bearings are practically maintenance-free, make low-level noise, require little installation space and are easy to assemble.
- The measurements of standard bearings are very accurate.
- The great variety in dimensions makes it almost always possible, to find an appropriate standard bearing between internal Ø 2 mm and Ø 125 mm.

Operation of a self-lubricating bearing

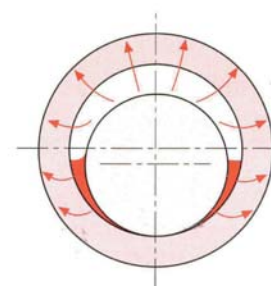
- 25% - 30% of the volume of the sintered material is porous and impregnated with oil.
- At the place where the shaft rests in the bearing, capillary action makes sure that an oil film is always available.
- When the shaft rotates, it creates a suction force on the oil film and there is more oil supplied from the pores.
- At a sufficient high speed of the shaft, it creates a complete hydrodynamic lubrication. After stopping the shaft, the porous spaces of the bearing reabsorb the oil.



Capillary porosity



Oil film



Reabsorbed oil



SELF-LUBRICATING SINTER BRONZE AND IRON BEARINGS

WITH SELF-LUBRICATING BEARINGS, THREE LUBRICATION PHASES CAN OCCUR:

1. **Hydrodynamic condition**

(high speed and low load)

During rotation the shaft is fully supported by the oil film, which is between the bearing and the shaft.

The occurring friction losses in plain bearings are not only dependent on the peripheral speed and load of the shaft on the bearing, but vary in size depending among other things on bearing clearance, material of the shaft, surface condition of the shaft and the lubricant.

2. **Boundary lubrication**

(low speed and high load)

Hereby, there is direct contact between the bearing and the shaft. A very thin oil film provides low friction. A special E.P. (extreme pressure) oil can reduce the wear on the bearing and the shaft.

The friction losses determine thereby the final wear and therefore the life span of the bearing. The use of sinter bearings as axial guidance has to be, in connection with the extraction of oil from the bearing by the axial movement, carefully studied. Additional lubrication or seals are recommended for this application.

3. **Mixed conditions**

This is a combination of the above conditions. The shaft power is partly intercepted by the hydrodynamic functioning and partly by direct contact of the shaft on the bearing. When the speed and / or load changes are modified, the relation between the hydrodynamic operation and boundary lubrication area changes. Due to the many influences on the self-lubricating bearings, such as the choice of the material of the shaft, oil and the installation of the bearing in the housing, we can't give general guidelines or formulas for the calculation of the life span of a bearing.

The life span of a sintered bearing of many thousands of hours can be realized if the bearing is optimally loaded and works under hydrodynamic conditions.

These conditions can only be maintained if enough lubrication is available. Loss of oil during operation of the bearing can occur due to, among other things, evaporation, axial leakage or if the oil from the shaft is tossed.

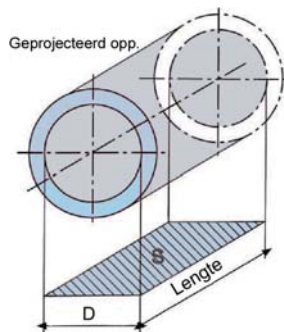
This way the loss of oil must be completed and / or the bearing must be built in, in a way that such losses will be prevented.



SELF-LUBRICATING SINTER BRONZE AND IRON BEARINGS

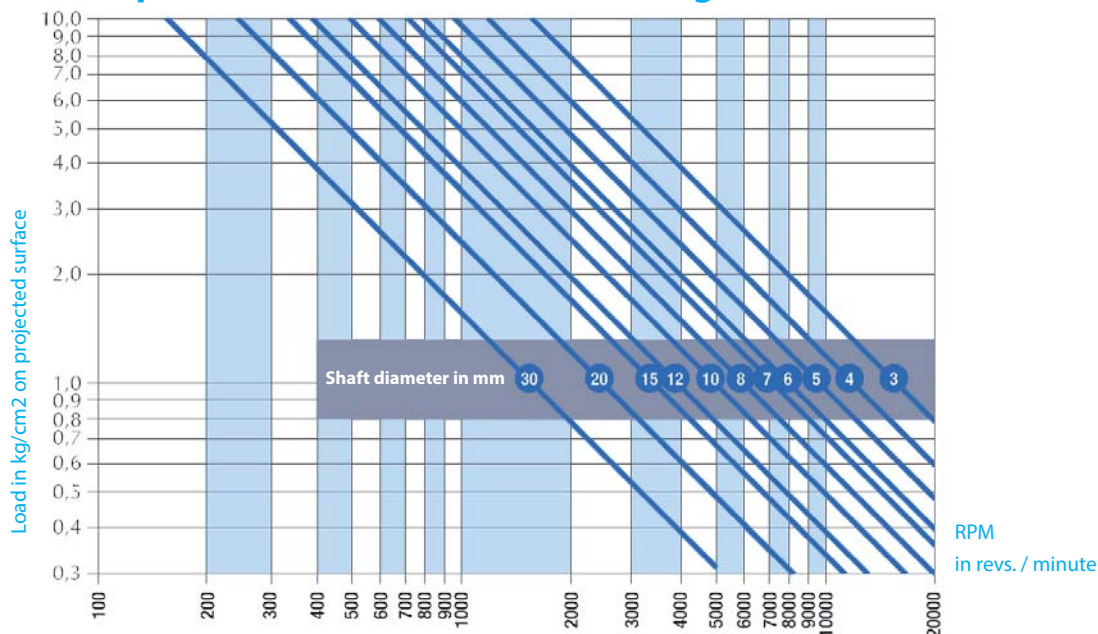
TECHNICAL DATA AND ADMISSIBLE LOAD

Type indication	Bronze	Iron
Composition	copper - tin	copper - tin - lead
Density	6,3 gr / cm ³	5,8 gr / cm ³
Max. static load	20 N/mm ²	45 N/mm ²
Max. peripheral speed of the shaft	6 m/sec	4 m/sec
Permitted temperature	-20 °C to 100 °C	-20 °C to 100 °C
Coefficient of expansion	19 x 10 ⁻⁶ mm/°C	12 x 10 ⁻⁶ mm/°C
Volume of oil in the bearing	25 - 30 %	15 - 20 %



$$\text{Surface pressure} = \frac{\text{bearing load}}{\text{projected surface area (D x L) in mm}}$$

Load / speed chart for Tribo Oiled® bearings

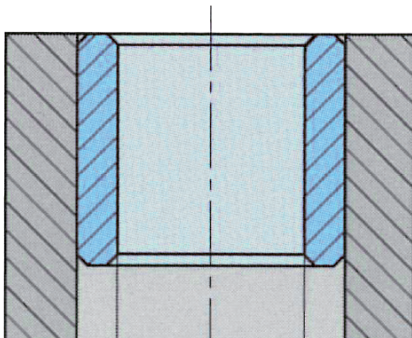




SELF-LUBRICATING SINTER BRONZE AND IRON BEARINGS

TOLERANCES OF STANDARD BEARINGS

Mounted bearing



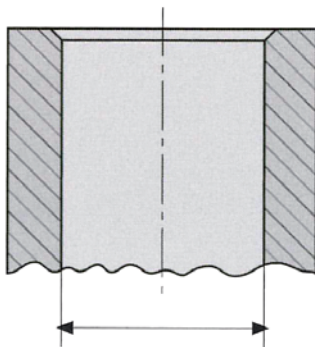
- Bearings after assembly
- Tolerance cylindrical bearing
 - < Ø 60 mm H7
 - > Ø 60 mm H8
- Tolerance Flange bearing: H8

Shaft



- Tolerance shaft: f7
- For the material of the shaft we advise to use a polished execution with a surface roughness of 0,25µ. Shafts made of hardened steel (HRC 60) are recommended, but the standard available trading grades can also be applied.

Housing



- The final tolerance of the internal diameter of the bearing is based on the use of a steel house with a tolerance of H7. This tolerance is of great importance, because it determines the securing of the bearing and the final bearing diameter.



SELF-LUBRICATING SINTER BRONZE AND IRON BEARINGS

STORAGE, ASSEMBLY AND MACHINING

Storage of sintered bearings

Put the bearings in a cool place for storage and place them in non-absorbent materials, such as, e.g. plastic bags.

Installation instructions

The bearing and the bearing housing must be stripped of chips and dust. Wash the bearings in oil, and impregnate them again, in case of a long-term storage. The bearing housing should be, at the side where the bearing is fitted, provided with a rounded or a skewed edge. To obtain the specified tolerances after assembly, you should always use a fitting mandrel, with an m6 tolerance, for embossing the bearings.

Also, it deserves recommendation to apply this when embossing multiple bearings after another to ensure good alignment. Never use a hammer, the sinter material is very brittle, causing particles to break out.

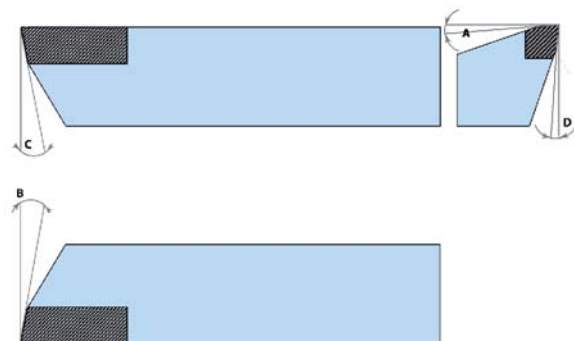
Machining

For the processing of self-lubricating bearings you should use a chisel with carbide inserts, such as K10 Tungsten Carbide or NbO Boron Nitride materials.

Reaming, grinding or honing is strongly discouraged. With these processes the pores will shut.

Operation Data

Angle	Bronze	Iron
A	0-3	3-7
B	5-7	5-7
C	5-7	4-6
D	5-7	4-6





SELF-LUBRICATING SINTER BRONZE AND IRON BEARINGS

MACHINING (CONTINUATION)

	Pre-machined	Machined
Cutting speed	180-200 m/min.	140-200 m/min.
Pitch	0.1-0.2 mm/rot.	0.1 mm/rot. max.
Start depth	1 mm	0.1-0.4 mm

After the operation the bearings have to be impregnated again. Also after long-term storage, it is recommended to impregnate the bearings again.

Impregnation

Heat the bearings for 1 hour in an oil bath with a temperature of 80 ° C. After this, let them cool in the oil. The used oil should be of a good quality mineral oil in accordance with ISO VG68 or ISO VG150 (SAE 30, SAE 40 or Turbo T100).

For the use of the sintered bearings at high or extremely low temperatures, advice on the oil should be gathered.





SINTER BRONZE CYLINDRICAL BEARINGS



Order example:
BR=Sinter bronze

BRC 002/005/002
C=Cylindrical

002=Internal diameter (mm)
005=External diameter (mm)
002=Overall length (mm)

Article no. Elcee Holland	Packa- ging
BRC 002/005/002	25
BRC 002/005/003	25
BRC 003/006/004	25
BRC 003/006/006	25
BRC 003/006/010	25
BRC 004/007/004	25
BRC 004/007/008	25
BRC 004/007/012	25
BRC 004/008/004	25
BRC 004/008/008	25
BRC 004/008/012	25
BRC 005/008/005	25
BRC 005/008/008	25
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BRC 005/008/016	25
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BRC 006/009/012	25
BRC 006/009/016	25
BRC 006/010/006	25
BRC 006/010/010	25
BRC 006/010/012	25
BRC 006/010/016	25
BRC 006/012/006	25
BRC 006/012/010	25
BRC 006/012/012	25

Article no. Elcee Holland	Packa- ging
BRC 006/012/016	25
BRC 007/010/005	25
BRC 007/010/008	25
BRC 007/010/010	25
BRC 008/011/008	25
BRC 008/011/012	25
BRC 008/011/016	25
BRC 008/011/020	25
BRC 008/012/008	25
BRC 008/012/012	25
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BRC 008/014/020	25
BRC 009/012/006	25
BRC 009/012/010	25
BRC 009/012/014	25
BRC 010/013/010	25
BRC 010/013/016	25
BRC 010/013/020	25
BRC 010/013/025	25
BRC 010/014/010	25
BRC 010/014/016	25
BRC 010/014/020	25
BRC 010/014/025	25
BRC 010/015/010	10
BRC 010/015/016	10
BRC 010/015/020	10

Article no. Elcee Holland	Packa- ging
BRC 010/015/025	10
BRC 010/016/010	10
BRC 010/016/016	10
BRC 010/016/020	10
BRC 010/016/025	10
BRC 012/015/012	10
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BRC 014/018/018	10
BRC 014/018/022	10
BRC 014/018/028	10
BRC 014/020/014	10
BRC 014/020/018	10
BRC 014/020/022	10
BRC 014/020/028	10



SINTER BRONZE CYLINDRICAL BEARINGS



Order example:
BR=Sinter bronze

BRC 002/005/003
C=Cylindrical

002=Internal diameter (mm)
005=External diameter (mm)
003=Overall length (mm)

Article no. Elcee Holland	Packa- ging
BRC 015/019/016	10
BRC 015/019/020	10
BRC 015/019/025	10
BRC 015/019/032	10
BRC 015/021/016	10
BRC 015/021/020	10
BRC 015/021/025	10
BRC 015/021/032	10
BRC 016/020/016	10
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BRC 016/022/016	10
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BRC 016/022/025	10
BRC 016/022/032	10
BRC 018/022/018	10
BRC 018/022/022	10
BRC 018/022/028	10
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BRC 018/024/028	10
BRC 018/024/036	10
BRC 018/025/018	10
BRC 018/025/022	10
BRC 018/025/028	10
BRC 018/025/036	10
BRC 020/024/016	10
BRC 020/024/020	10
BRC 020/024/025	10

Article no. Elcee Holland	Packa- ging
BRC 020/024/032	10
BRC 020/025/016	10
BRC 020/025/020	10
BRC 020/025/025	10
BRC 020/025/032	10
BRC 020/026/016	10
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BRC 022/028/022	10
BRC 022/028/028	10
BRC 022/028/036	10
BRC 022/029/018	10
BRC 022/029/022	10
BRC 022/029/028	10
BRC 022/029/036	10
BRC 025/030/020	10

Article no. Elcee Holland	Packa- ging
BRC 025/030/025	10
BRC 025/030/032	10
BRC 025/030/040	10
BRC 025/032/020	10
BRC 025/032/025	10
BRC 025/032/032	10
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BRC 028/032/028	5
BRC 028/032/036	5
BRC 028/032/045	5
BRC 028/033/022	5
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BRC 028/033/045	5
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BRC 028/036/028	5
BRC 028/036/036	5
BRC 028/036/045	5
BRC 030/038/024	5
BRC 030/038/030	5
BRC 030/038/038	5
BRC 032/038/020	5
BRC 032/038/025	5
BRC 032/038/032	5
BRC 032/038/040	5
BRC 032/038/050	5
BRC 032/040/020	5
BRC 032/040/025	5
BRC 032/040/032	5



SINTER BRONZE CYLINDRICAL BEARINGS



Order example:
BR=Sinter bronze

BRC 002/005/003
C=Cylindrical

002=Internal diameter (mm)
005=External diameter (mm)
003=Total length (mm)

Article no. Elcee Holland	Packa- ging
BRC 032/040/040	5
BRC 032/040/050	5
BRC 035/044/022	5
BRC 035/044/028	5
BRC 035/044/035	5
BRC 035/045/025	5
BRC 035/045/035	5
BRC 035/045/040	5
BRC 035/045/050	5
BRC 036/042/022	5
BRC 036/042/028	5
BRC 036/042/036	5
BRC 036/042/045	5
BRC 036/045/022	5
BRC 036/045/028	5
BRC 036/045/036	5
BRC 036/045/045	5
BRC 038/044/025	5
BRC 038/044/035	5
BRC 038/044/045	5
BRC 040/046/025	5
BRC 040/046/032	5
BRC 040/046/040	5
BRC 040/046/050	5
BRC 040/050/025	5
BRC 040/050/032	5
BRC 040/050/040	5
BRC 040/050/050	5
BRC 045/051/028	5
BRC 045/051/036	5

Article no. Elcee Holland	Packa- ging
BRC 045/051/045	5
BRC 045/051/056	5
BRC 045/055/035	5
BRC 045/055/045	5
BRC 045/055/055	5
BRC 045/056/028	5
BRC 045/056/036	5
BRC 045/056/045	5
BRC 045/056/056	5
BRC 050/056/032	2
BRC 050/056/040	2
BRC 050/056/050	2
BRC 050/056/063	2
BRC 050/060/032	2
BRC 050/060/040	2
BRC 050/060/050	2
BRC 050/060/063	2
BRC 055/065/040	2
BRC 055/065/055	2
BRC 055/065/070	2
BRC 060/070/050	2
BRC 060/070/060	2
BRC 060/070/090	2
BRC 060/070/120	2
BRC 060/072/050	1
BRC 060/072/060	1
BRC 060/072/070	1
BRC 060/080/090	1
BRC 060/080/120	1
BRC 063/070/040	1

Article no. Elcee Holland	Packa- ging
BRC 063/070/050	1
BRC 070/080/090	1
BRC 070/080/120	1
BRC 080/100/120	1
BRC 100/120/120	1
BRC 110/125/120	1
BRC 125/150/120	1

SINTER BRONZE FLANGE BEARINGS



Order example:
BR=Sinter bronze

BRK 003/006/004
K=Flange

003=Internal diameter (mm)
006=External diameter (mm)
004=Total length (mm)

Article no. Elcee Holland	Dim. Flange	Packa- ging
BRK 003/006/004	9 x 1,5 mm	25
BRK 003/006/006	9 x 1,5 mm	25
BRK 003/006/010	9 x 1,5 mm	25
BRK 004/008/004	12 x 2,0 mm	25
BRK 004/008/008	12 x 2,0 mm	25
BRK 004/008/012	12 x 2,0 mm	25
BRK 006/010/006	14 x 2,0 mm	25
BRK 006/010/010	14 x 2,0 mm	25
BRK 006/010/016	14 x 2,0 mm	25
BRK 008/012/008	16 x 2,0 mm	25
BRK 008/012/012	16 x 2,0 mm	25
BRK 008/012/016	16 x 2,0 mm	25
BRK 009/014/006	19 x 2,5 mm	10
BRK 009/014/010	19 x 2,5 mm	10
BRK 009/014/014	19 x 2,5 mm	10
BRK 010/013/010	16 x 1,5 mm	10
BRK 010/013/016	16 x 1,5 mm	10
BRK 010/013/020	16 x 1,5 mm	10
BRK 010/015/010	20 x 3,0 mm	10
BRK 010/015/010AK	20 x 2,5 mm	10
BRK 010/015/016	20 x 3,0 mm	10
BRK 010/015/016AK	20 x 2,5 mm	10
BRK 010/015/020	20 x 3,0 mm	10
BRK 010/015/020AK	20 x 2,5 mm	10
BRK 010/016/008	22 x 3,0 mm	10
BRK 010/016/010	22 x 3,0 mm	10
BRK 010/016/016	22 x 3,0 mm	10
BRK 012/015/012	18 x 1,5 mm	10
BRK 012/015/016	18 x 1,5 mm	10
BRK 012/015/020	18 x 1,5 mm	10

Article no. Elcee Holland	Dim. Flange	Packa- ging
BRK 012/017/012	22 x 3,0 mm	10
BRK 012/017/012AK	22 x 2,5 mm	10
BRK 012/017/016	22 x 3,0 mm	10
BRK 012/017/016AK	22 x 2,5 mm	10
BRK 012/017/020	22 x 3,0 mm	10
BRK 012/017/020AK	22 x 2,5 mm	10
BRK 012/017/025	22 x 3,0 mm	10
BRK 012/017/025AK	22 x 2,5 mm	10
BRK 012/018/008	24 x 3,0 mm	10
BRK 012/018/012	24 x 3,0 mm	10
BRK 012/018/020	24 x 3,0 mm	10
BRK 014/018/014	22 x 2,0 mm	10
BRK 014/018/018	22 x 2,0 mm	10
BRK 014/018/022	22 x 2,0 mm	10
BRK 014/020/014	25 x 3,0 mm	10
BRK 014/020/018	25 x 3,0 mm	10
BRK 014/020/022	25 x 3,0 mm	10
BRK 014/020/028	25 x 3,0 mm	10
BRK 015/019/016	23 x 2,0 mm	10
BRK 015/019/020	23 x 2,0 mm	10
BRK 015/019/025	23 x 2,0 mm	10
BRK 015/021/016	27 x 3,0 mm	10
BRK 015/021/020	27 x 3,0 mm	10
BRK 015/021/025	27 x 3,0 mm	10
BRK 015/021/032	27 x 3,0 mm	10
BRK 016/020/016	24 x 2,0 mm	10
BRK 016/020/020	24 x 2,0 mm	10
BRK 016/020/025	24 x 2,0 mm	10
BRK 016/022/016	28 x 3,0 mm	10
BRK 016/022/020	28 x 3,0 mm	10



SINTER BRONZE FLANGE BEARINGS



Order example:
BR=Sinter bronze

BRK 003/006/004
K=Flange

003=Internal diameter (mm)
006=External diameter (mm)
004=Total length (mm)

Article no. Elcee Holland	Dim. Flange	Packa- ging
BRK 016/022/025	28 x 3,0 mm	10
BRK 016/022/032	28 x 3,0 mm	10
BRK 018/022/018	26 x 2,0 mm	10
BRK 018/022/022	26 x 2,0 mm	10
BRK 018/022/028	26 x 2,0 mm	10
BRK 018/024/018	30 x 3,0 mm	10
BRK 018/024/022	30 x 3,0 mm	10
BRK 018/024/028	30 x 3,0 mm	10
BRK 020/024/016	28 x 2,0 mm	10
BRK 020/024/020	28 x 2,0 mm	10
BRK 020/024/025	28 x 2,0 mm	10
BRK 020/026/016	32 x 3,0 mm	10
BRK 020/026/020	32 x 3,0 mm	10
BRK 020/026/025	32 x 3,0 mm	10
BRK 020/026/032	32 x 3,0 mm	10
BRK 022/027/018	32 x 2,5 mm	10
BRK 022/027/022	32 x 2,5 mm	10
BRK 022/027/028	32 x 2,5 mm	10
BRK 022/028/015	33 x 4,0 mm	10
BRK 022/028/020	33 x 4,0 mm	10
BRK 022/028/025	33 x 4,0 mm	10
BRK 022/028/030	33 x 4,0 mm	10
BRK 022/029/018	36 x 3,5 mm	10
BRK 022/029/022	36 x 3,5 mm	10
BRK 022/029/028	36 x 3,5 mm	10
BRK 022/029/036	36 x 3,5 mm	10
BRK 025/030/020	35 x 2,5 mm	10
BRK 025/030/025	35 x 2,5 mm	10
BRK 025/030/032	35 x 2,5 mm	10
BRK 025/032/020	40 x 4,0 mm	10

Article no. Elcee Holland	Dim. Flange	Packa- ging
BRK 025/032/025	40 x 4,0 mm	10
BRK 025/032/032	40 x 4,0 mm	10
BRK 028/033/022	38 x 2,5 mm	10
BRK 028/033/028	38 x 2,5 mm	10
BRK 028/033/036	38 x 2,5 mm	10
BRK 028/036/022	44 x 4,0 mm	10
BRK 028/036/028	44 x 4,0 mm	10
BRK 028/036/036	44 x 4,0 mm	10
BRK 030/038/020	46 x 4,0 mm	10
BRK 030/038/025	46 x 4,0 mm	10
BRK 030/038/030	46 x 4,0 mm	10
BRK 032/038/020	44 x 3,0 mm	10
BRK 032/038/025	44 x 3,0 mm	10
BRK 032/038/032	44 x 3,0 mm	10
BRK 032/040/020	48 x 4,0 mm	10
BRK 032/040/025	48 x 4,0 mm	10
BRK 032/040/030	48 x 4,0 mm	10
BRK 032/040/032	48 x 4,0 mm	10
BRK 036/042/022	48 x 3,0 mm	10
BRK 036/042/028	48 x 3,0 mm	10
BRK 036/042/036	48 x 3,0 mm	10
BRK 036/045/022	54 x 4,5 mm	10
BRK 036/045/028	54 x 4,5 mm	10
BRK 036/045/036	54 x 4,5 mm	10
BRK 040/046/025	52 x 3,0 mm	5
BRK 040/046/032	52 x 3,0 mm	5
BRK 040/046/040	52 x 3,0 mm	5
BRK 040/050/025	60 x 5,0 mm	5
BRK 040/050/032	60 x 5,0 mm	5
BRK 040/050/040	60 x 5,0 mm	5



SINTER BRONZE FLANGE BEARINGS



Order example:
BR=Sinter bronze

BRK 003/006/004
K=Flange

003=Internal diameter (mm)
006=External diameter (mm)
004=Total length (mm)

Article no. Elcee Holland	Dim. Flange	Packa- ging
BRK 045/051/028	57 x 3,0 mm	5
BRK 045/051/036	57 x 3,0 mm	5
BRK 045/051/045	57 x 3,0 mm	5
BRK 045/056/028	67 x 5,5 mm	5
BRK 045/056/036	67 x 5,5 mm	5
BRK 045/056/045	67 x 5,5 mm	5
BRK 050/056/032	62 x 3,0 mm	5
BRK 050/056/040	62 x 3,0 mm	5
BRK 050/056/050	62 x 3,0 mm	5
BRK 050/060/032	70 x 5,0 mm	5
BRK 050/060/040	70 x 5,0 mm	5
BRK 050/060/050	70 x 5,0 mm	5
BRK 060/070/050	80 x 5,0 mm	5
BRK 060/070/060	80 x 5,0 mm	5



SINTER BRONZE BAR MATERIAL FULL

Order example: **BRSTAF 15/30**
BR=Sinter bronze STAF=Full bar

15=Diameter (mm)
30=Total length (mm)

Full bars	Packaging
BRSTAF 15/30	5
BRSTAF 20/25	5
BRSTAF 20/50	2
BRSTAF 25/25	2
BRSTAF 25/50	2
BRSTAF 32/40	2
BRSTAF 32/80	1
BRSTAF 42/50	1

Full bars	Packaging
BRSTAF 42/100	1
BRSTAF 45/90	1
BRSTAF 52/60	1
BRSTAF 52/120	1
BRSTAF 62/120	1
BRSTAF 70/120	1
BRSTAF 80/120	1
BRSTAF105/120	1



SINTER BRONZE BAR MATERIAL HOLLOW

Order example: **BRHOL 38/66/65**
BR=Sinter bronze HOL=Hollow bar

38=Internal diameter
66=External diameter
65=Total length (mm)

Hollow bars	Packaging
BRHOL 38/66/65	1
BRHOL 38/66/120	1
BRHOL 45/105/120	1
BRHOL 53/85/65	1
BRHOL 53/85/120	1
BRHOL 68/104/65	1
BRHOL 68/104/120	1
BRHOL 83/123/120	1
BRHOL 98/142/65	1
BRHOL 98/142/120	1



SINTER IRON CYLINDRICAL BEARINGS



Order example:
IJZ=Sinter iron

IJZC 004/008/008
C=Cylindrical

004=Internal diameter (mm)
008=External diameter (mm)
008=Total length (mm)

Article no. Elcee Holland	Packa- ging
IJZC 004/008/008	25
IJZC 006/009/006	25
IJZC 006/009/010	25
IJZC 006/009/012	25
IJZC 006/009/016	25
IJZC 006/010/006	25
IJZC 006/010/010	25
IJZC 006/010/016	25
IJZC 006/012/006	25
IJZC 008/011/008	25
IJZC 008/011/012	25
IJZC 008/011/016	25
IJZC 008/012/008	25
IJZC 008/012/012	25
IJZC 008/012/016	25
IJZC 008/012/020	25
IJZC 010/013/010	25
IJZC 010/013/020	25
IJZC 010/013/025	25
IJZC 010/014/010	25
IJZC 010/014/016	25
IJZC 010/014/020	25
IJZC 010/015/010	10
IJZC 012/015/012	10
IJZC 012/015/016	10
IJZC 012/015/020	10
IJZC 012/016/012	10
IJZC 012/016/016	10
IJZC 012/016/020	10
IJZC 012/016/025	10

Article no. Elcee Holland	Packa- ging
IJZC 012/017/012	10
IJZC 014/018/014	10
IJZC 014/018/022	10
IJZC 014/020/014	10
IJZC 014/020/028	10
IJZC 015/019/016	10
IJZC 015/019/020	10
IJZC 016/020/016	10
IJZC 016/020/020	10
IJZC 016/020/025	10
IJZC 016/020/032	10
IJZC 016/022/016	10
IJZC 016/022/020	10
IJZC 016/022/025	10
IJZC 018/022/018	10
IJZC 018/022/022	10
IJZC 018/024/022	10
IJZC 020/024/016	10
IJZC 020/024/020	10
IJZC 020/024/025	10
IJZC 020/024/032	10
IJZC 020/026/016	10
IJZC 020/026/020	10
IJZC 020/026/025	10
IJZC 020/026/032	10
IJZC 022/027/018	10
IJZC 022/027/022	10
IJZC 025/030/020	10
IJZC 025/030/025	10
IJZC 025/030/032	10

Article no. Elcee Holland	Packa- ging
IJZC 025/032/020	10
IJZC 025/032/025	10
IJZC 025/032/032	10
IJZC 030/038/024	5
IJZC 030/038/030	5
IJZC 030/038/038	5
IJZC 032/038/032	5
IJZC 035/044/022	5
IJZC 035/044/028	5
IJZC 035/044/035	5
IJZC 036/042/022	5
IJZC 040/046/025	5
IJZC 040/046/032	5
IJZC 040/046/040	5
IJZC 040/050/025	5
IJZC 040/050/032	5
IJZC 040/050/040	5
IJZC 040/050/050	5
IJZC 045/051/028	5
IJZC 045/051/045	5
IJZC 045/056/036	5
IJZC 050/056/032	2
IJZC 050/060/050	2
IJZC 060/070/060	2
IJZC 060/070/090	2
IJZC 070/080/120	1
IJZC 080/100/120	1
IJZC 100/120/120	1

SINTER IRON FLANGE BEARINGS



Order example:
IJZ=Sinter iron

IJK 006/010/006
K=Flange

006=Internal diameter (mm)
010=External diameter (mm)
006=Total length (mm)

Article no. Elcee Holland	Dim. Flange	Packa- ging
IJK 006/010/006	14 x 2,0 mm	25
IJK 006/010/010	14 x 2,0 mm	25
IJK 006/010/016	14 x 2,0 mm	25
IJK 008/012/008	16 x 2,0 mm	25
IJK 008/012/012	16 x 2,0 mm	25
IJK 008/012/016	16 x 2,0 mm	25
IJK 010/013/010	16 x 1,5 mm	10
IJK 010/013/016	16 x 1,5 mm	10
IJK 010/015/010	20 x 2,5 mm	10
IJK 010/015/016	20 x 2,5 mm	10
IJK 010/015/020	20 x 2,5 mm	10
IJK 012/015/012	18 x 1,5 mm	10
IJK 012/015/016	18 x 1,5 mm	10
IJK 012/015/020	18 x 1,5 mm	10
IJK 012/017/012	22 x 2,5 mm	10
IJK 012/017/016	22 x 2,5 mm	10
IJK 014/018/014	22 x 2,0 mm	10
IJK 014/018/018	22 x 2,0 mm	10
IJK 014/018/022	22 x 2,0 mm	10
IJK 016/020/016	24 x 2,0 mm	10
IJK 016/020/020	24 x 2,0 mm	10
IJK 016/022/016	28 x 3,0 mm	10
IJK 016/022/020	28 x 3,0 mm	10
IJK 016/022/025	28 x 3,0 mm	10
IJK 018/024/018	30 x 3,0 mm	10

Article no. Elcee Holland	Dim. Flange	Packa- ging
IJK 018/024/022	30 x 3,0 mm	10
IJK 020/024/016	28 x 2,0 mm	10
IJK 020/024/020	28 x 2,0 mm	10
IJK 020/024/025	28 x 2,0 mm	10
IJK 020/026/016	32 x 3,0 mm	10
IJK 020/026/020	32 x 3,0 mm	10
IJK 020/026/025	32 x 3,0 mm	10
IJK 022/029/018	36 x 3,5 mm	10
IJK 022/029/022	36 x 3,5 mm	10
IJK 022/029/028	36 x 3,5 mm	10
IJK 022/029/036	36 x 3,5 mm	10
IJK 025/030/020	35 x 2,5 mm	10
IJK 025/030/032	35 x 2,5 mm	10
IJK 025/032/025	39 x 3,5 mm	10
IJK 025/032/032	39 x 3,5 mm	10
IJK 030/038/030	46 x 4,0 mm	10
IJK 032/040/020	48 x 4,0 mm	10
IJK 032/040/032	48 x 4,0 mm	10
IJK 036/045/022	54 x 4,5 mm	10
IJK 036/045/036	54 x 4,5 mm	10
IJK 040/050/025	60 x 5,0 mm	5
IJK 040/050/032	60 x 5,0 mm	5
IJK 040/050/040	60 x 5,0 mm	5
IJK 050/060/050	70 x 5,0 mm	5
IJK 060/070/060	80 x 5,0 mm	5



SINTER IRON BAR MATERIAL FULL



Order example:
IJZ= Sinter iron

IJZSTAF 20/40
STAF=Full bar

20=Diameter (mm)
40=Total length (mm)

Full bars	Packaging
IJZSTAF 20/40	5
IJZSTAF 30/50	2
IJZSTAF 45/90	1
IJZSTAF 54/110	1
IJZSTAF 70/120	1
IJZSTAF 105/120	1
IJZSTAF 145/120	1

SINTER IRON BAR MATERIAL HOLLOW



Order example:
IJZ= Sinter iron

IJZHOL 38/70/120
HOL=Hollow bar

38=Internal diameter
70=External diameter
120=Total length (mm)

Hollow bars	Packaging
IJZHOL 38/70/120	1
IJZHOL 45/105/120	1
IJZHOL 80/145/120	1
IJZHOL 80/175/120	1
IJZHOL 80/105/120	1



Composite Materials





TRIBO TOP® COMPOSITE MATERIALS

Elcee Holland has been a leading manufacturer of all sorts of slide bearings for 50 years. Our extensive programme, with self-lubricating, sintered bearings, total injection moulded plastic bearings, sphericals and sliding strips, all sorts of cast bronze and stainless steel bearings, we have a solution for all your bearing applications.

Besides that, we also offer a programme of high quality composite materials, called Tribo Top®. These materials are reinforced, laminated plastics, which are excellent in use for middle to very high loaded applications in several conditions.

These materials can be supplied as tube- and sheet material, but also as finished machined parts to drawing, such as bearings, rings, sliding pads, spherical bearings and rollers.

Our Tribo Top® composite materials offer a high quality alternative to existing bearing materials, combined with important advantages.

All qualities are wound or laminated materials, made from a synthetic cord or cloth, impregnated with a thermoset resin with solid lubricants. Tribo Top® materials are non toxic and are also applicable for food-applications.





TRIBO TOP® COMPOSITE MATERIALS

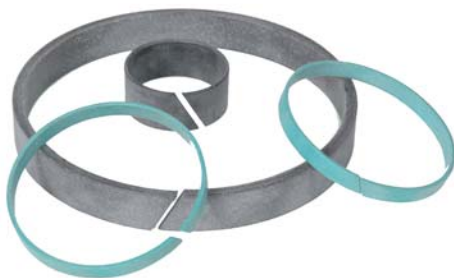
IMPORTANT PROPERTIES

Tribo Top® composite materials have been used for decades in all industrial areas and offer many advantages in compare to metallic sliding bearings.

There are a lot of different materials available, each with its own composition and mechanical properties, to meet the requirements for all kinds of special applications.

Please find below a number of advantages for our Tribo Top® materials in compare to other sliding bearing materials:

- Low friction
Tribo Top® materials have excellent dynamic friction. This low friction offers a combination of higher loads and higher surface speeds.
- High wear resistance
Tribo Top® composite materials a very good resistance against wear, that very often results in a longer life than bronze and other materials.
There is also much less effect in very dirty circumstances or poor lubrication.
- Very good elasticity
Suitable for absorbing high loads and shock loads.
- Little or no lubrication.
- Excellent with very high loads
Higher loaded than many other materials.
This high surface pressure is achieved by a certain orientation of the fibres and properties of the reinforcement.
- Compensation of misalignment
- Absolutely no fretting
- Good chemical resistance.
- Sound and vibration dampening.
- Reduced or no wear of the mating material.
- Light in weight
Tribo Top® composite materials are 5 to 6 times lighter than steel. Because of this, less energy is needed, which has an enlarging effect on the total weight, wear and cost on the entire bearing system.
- High dimensional stability.
- Freedom in design.





TRIBO TOP® COMPOSITE MATERIALS

DESIGN AND INSTALLATION

Surface pressure

The first step in the selection and choice of dimensions of a bearing is to determine the surface pressure in an application.

The surface pressure is defined as the load on the bearing divided by the projected surface area;

This results in the average surface pressure, in MPa, which works on the bearing. High temperatures reduce the permitted surface pressure. In general, low temperatures increase the permitted static surface pressure.

$$P = F / D \times L$$

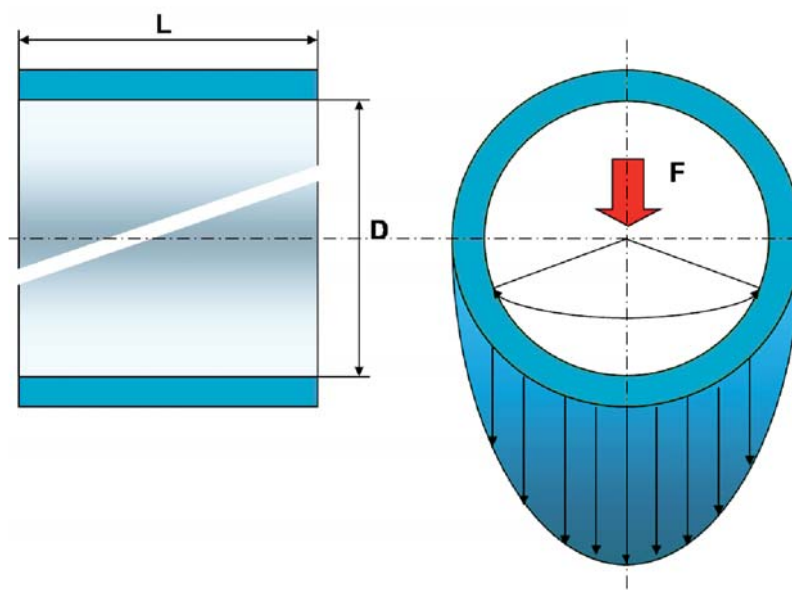
Whereby;

P = Load on bearing in MPa

F = Force in Newton

D = Internal diameter of the bearing

L = Length of the bearing





TRIBO TOP® COMPOSITE MATERIALS

DESIGN AND INSTALLATION

Bearing speed

The speed on the bearing is determined by first calculating the circumference of the shaft in meters, and then multiplying this with the RPM of the shaft.

$$V = \pi \times d \times n$$

Whereby;

V = Bearing speed in m/s

d = Diameter of the shaft

n = Number of rotations of the shaft per second

This results in the sliding speed of the bearing. Use of lubrication or cooling means could increase the boundaries significantly.

Bearing dimensions

Optimal operation of the bearing can be achieved by keeping a specific length - diameter (L / d) ratio varying from 0,5 to 0,2. Values with an (L / d) less than 1,0 result in more rapid drainage of dirt particles and the bearing is less sensitive to slanting of the shaft and misalignment.

If the (L / d) ratio is higher than 2,0, deformation or misalignment can cause areas of tension and thereby excessive local heating of the bearing. When a long bearing is required, we recommend the use of two bearings with a space between them, or to enlarge the diameter, and reconsider the geometry of the bearing.





TRIBO TOP® COMPOSITE MATERIALS

DESIGN AND INSTALLATION

PV values

In addition to the calculation of the surface pressure P , and the speed V , the result of multiplying these is called the PV value, an important parameter for the design of a bearing when boundary lubrication occurs. The PV value of a bearing material is the capacity to be able to catch a certain amount of generated friction energy in a bearing.

When reaching a maximum PV value, a bearing will not have a stable temperature

limit and the wear will increase very rapidly as a result of a thermal effect or tensions in the material by achieving the elastic limit. Frictional heat can be reduced by additions in the material or lubrication. Many of our materials include dry lubrication by, for example graphite, MoS₂, PTFE, or an oil impregnation. The operation of a bearing can of course also be improved by regular oil or grease lubrication, in order to reduce the friction and thus the temperature in the bearing.





TRIBO TOP® COMPOSITE MATERIALS

DESIGN AND INSTALLATION

Running material

In general, normal types of steel can be used as running material for our Tribo Top® qualities, if these are corrosion-resistant. Types of stainless steel are most suitable, especially Stainless Steel 316 and Stainless Steel 431 qualities. In general, the softer standard stainless steel types can have wear of the shaft as a result.

Even hard-chromed shafts can be applied. The application of hard, corrosion-resistant shafts certainly leads in very dirty conditions to good results.

The hardness of the shafts is of importance, the minimum hardness should be 180 HB (Brinell hardness) this corresponds to 10HRC (Rockwell hardness C). Softer steel materials can have wear of the shaft as a result.

The surface roughness of the running material has a direct influence on the operation of a bearing. The value of this should be between Ra 0,2 µm and Ra 1,2 µm. In practice, this corresponds with a grinded to turned quality. A smoother shaft shows increased wear as a result of the absence of tiny spaces at the surface of the shaft where no fixed lubricants can be deposited.



TRIBO TOP® COMPOSITE MATERIALS

L1/G BEARING MATERIAL

Properties	Units	L1/G
Density	g/cm ³	1.30
Ultimate flatwise compressive strength	MPa	345
Ultimate edgewise compressive strength	MPa	97
Normal working pressure	MPa	86
Swell in water @20°C	%	<0.15
Coefficient of friction (dry)	μ	0.15
Coefficient of thermal expansion	mm/°C	10-12 • 10 ⁻⁵
Max. Continuous Operating Temperature	°C	100
Hardness	Rockwell M	100



L1/G is a high load composite bearing material made from synthetic fabric (polyester) reinforcement, which is impregnated with a polyester thermosetting resin. Graphite solid lubricant is added to the resin to reduce the friction.

arduous conditions and withstands extremely high loads, including vibration and high impact applications.

When the material is used without additives it is suitable for use in direct contact with food or beverages.

L1/G is can be easily machined and can be manufactured to produce wear pads or bearing bushes. It can be used in extremely

The above values are nominal and intended to be used as a guide only. Material testing is carried out in accordance with the relevant standard. Friction testing is performed according to optimum conditions.

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TRIBO TOP® COMPOSITE MATERIALS

L2 MARINE BEARING MATERIAL

Properties	Units	L2MARINE
Density	g/cm ³	1.30
Minimum break strength	MPa	414
Ultimate flatwise compressive strength	MPa	375
Ultimate edgewise compressive strength	MPa	150
Normal working pressure	MPa	103
Shear Strength	MPa	137
Swell in water @20°C	%	<0.15
Coefficient of friction (dry)	μ	0.13
Coefficient of thermal expansion	mm/°C	10 • 10 ⁻⁵
Max. continuously operating temperature	°C	120
Hardness	Rockwell M	100



The material is a thermosetting resin with added solid lubricants, reinforced with a woven synthetic fibre. L2 Marine has very good bearing characteristics, excellent stability in water; very low 'stick-slip' characteristics and high compressive and impact strength. This makes L2 Marine an outstanding addition to our trusted range of bearing materials.

L2 Marine was developed to satisfy the exacting requirements of our new and existing customers as their never ending requirement for improved performance, durability and price competitiveness increases. Testing to both wet and dry running specification has shown that L2 Marine exhibits only one third of the wear of its nearest competitor.

Benefits of L2 Marine

- Short delivery time
- Excellent stability in water
- Very low 'stick-slip' for smooth operation
- Excellent dimensional stability
- High strength characteristics
- Low swell
- Low friction and wear characteristics
- Can operate under dry running conditions
- Available in tube and sheet



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TRIBO TOP® COMPOSITE MATERIALS

L4/G BEARING MATERIAL

Properties	Units	L4/G
Density	g/cm ³	1.30
Minimum break strength	MPa	414
Ultimate flatwise compressive strength	MPa	330
Ultimate edgewise compressive strength	MPa	100
Normal working pressure	MPa	103
Shear Strength	MPa	137
Swell in water @20°C	%	<0.15
Coefficient of friction (dry)	μ	0.13
Coefficient of thermal expansion	mm/°C	10 • 10 ⁻⁵
Max. continuously operating temperature	°C	140
Hardness	Rockwell M	100



L4/G is a high load composite bearing material made from synthetic fabric (polyester) reinforcement, which is impregnated with a polyester thermosetting resin. Graphite solid lubricant is added to the resin to reduce the friction.

L4/G can be easily machined and can be manufactured to produce wear pads or bearing bushes. It can be used in extremely arduous conditions and withstand extremely high loads, including vibration and high impact applications.

When the material is used without additives it is suitable for use in direct contact with food or beverages.



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TRIBO TOP® COMPOSITE MATERIALS

L7/G BEARING MATERIAL

Properties	Units	L7/G
Density	g/cm ³	1.30
Minimum break strength	MPa	442
Ultimate flatwise compressive strength	MPa	375
Ultimate edgewise compressive strength	MPa	150
Normal working pressure	MPa	110
Impact Strength (izod)	Kj/m ²	>20
Swell in water @20°C	%	<0.15
Coefficient of friction (dry)	μ	0.13
Coefficient of thermal expansion	mm/°C	10 • 10 ⁻⁵
Max. continuously operating temperature	°C	130
Hardness	Rockwell M	105



L7G is intended for use as bushings, bearings and wear rings within hydraulic cylinders and many other high load bearings applications.

reinforcement, which is impregnated with a thermosetting resin. This grade incorporates graphite powder solid lubricant filler. The product is grey in colour.

L7G is a high load composite bearing material made of synthetic fabric



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TRIBO TOP® **COMPOSITE MATERIALS**

L7/M BEARING MATERIAL

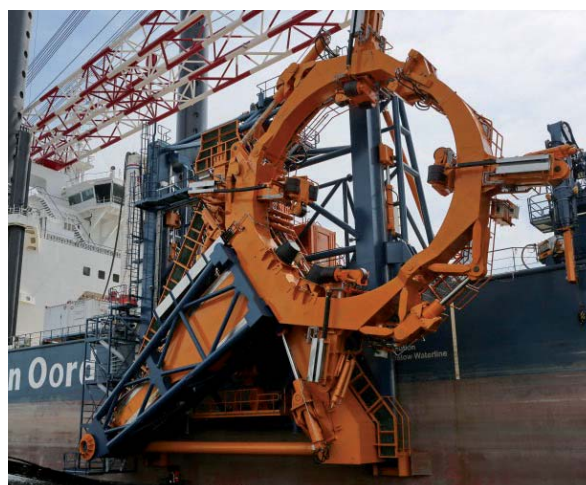
Properties	Units	L7/G
Density	g/cm ³	1.30
Minimum break strength	MPa	442
Ultimate flatwise compressive strength	MPa	375
Ultimate edgewise compressive strength	MPa	150
Normal working pressure	MPa	110
Impact Strength [Izod]	Kj/m ²	100
Swell in water @20°C	%	<0.15
Coefficient of friction (dry)	μ	0.15
Coefficient of thermal expansion	mm/°C	10 • 10 ⁻⁵
Max. continuously operating temperature	°C	130
Hardness	Rockwell M	105



L7/M is intended for use as bushings, bearings and wear rings within hydraulic cylinders and many other high load bearings applications.

a thermosetting resin. This grade incorporates graphite powder solid lubricant filler. The product is grey in colour.

L7/M is a high load composite bearing material made of synthetic fabric reinforcement, which is impregnated with



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TRIBO TOP® **COMPOSITE MATERIALS**

L10K/G BEARING MATERIAL

Properties	Units	L10K/G
Density	g/cm ³	1.30
Minimum break strength	MPa	537
Ultimate flatwise compressive strength	MPa	510
Ultimate edgewise compressive strength	MPa	200
Maximum working pressure	MPa	127
Impact Strength [Izod]	Kj/m ²	110
Swell in water @20°C	%	<0.5
Coefficient of friction (dry)	μ	0.18
Coefficient of thermal expansion	mm/°C	5 • 10 ⁻⁵
Max. continuously operating temperature	°C	150
Hardness	Rockwell M	100



L10K/G is a high load composite bearing material, made of a unique synthetic aramide fabric reinforcement, which is impregnated with a thermosetting resin. This grade incorporates graphite powder solid lubricant filler.

L10K/G can be easily machined and can be manufactured to produce wear pads or bearing bushes. It can be used in extremely arduous conditions and can withstand extremely high loads, including vibration and high impact applications.

It's maximum operating temperature is higher than other qualities.



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TRIBO TOP® COMPOSITE MATERIALS

L15/M BEARING MATERIAL

Properties	Units	L15M
Density	g/cm ³	1.30
Minimum break strength	MPa	414
Ultimate flatwise compressive strength	MPa	375
Ultimate edgewise compressive strength	MPa	150
Normal working pressure	MPa	107
Shear Strength	MPa	100
Impact Strength [Izod]	Kj/m ²	100
Swell in water @20°C	%	<0.15
Coefficient of friction (dry)	μ	0.04
Coefficient of thermal expansion	mm/°C	6 • 10 ⁻⁵
Max. continuously operating temperature	°C	130
Hardness	Rockwell M	100



L15M is a high load, composite bearing material made of a composite synthetic fabric reinforcements, which are impregnated by thermosetting resins and incorporates a molybdenum disulfide solid lubricant filler.

L15M is intended for use as low friction / dry running, bushings, wear pads and other bearing applications.

Benefits of L15/M

- Very low friction characteristics
- High load capacity
- Very low swell in fluids
- Good chemical resistance
- Easy to machine



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TRIBO TOP® COMPOSITE MATERIALS

L15/G BEARING MATERIAL

Properties	Units	L15/G
Density	g/cm ³	1.30
Minimum break strength	MPa	414
Ultimate flatwise compressive strength	MPa	375
Ultimate edgewise compressive strength	MPa	150
Normal working pressure	MPa	107
Shear Strength	MPa	100
Impact Strength [Izod]	Kj/m ²	100
Swell in water @20°C	%	<0.15
Coefficient of friction (dry)	μ	0.07-0.12
Coefficient of thermal expansion	mm/°C	6 • 10 ⁻⁵
Max. continuously operating temperature	°C	130
Hardness	Rockwell M	100



L15G is a high load, composite bearing material made of a composite synthetic fabric reinforcements, which are impregnated by thermosetting resins and incorporates graphite solid lubricant filler.

L15G is intended for use as low friction / dry running, bushings, wear pads and other bearing applications.

Benefits of L15/G

- Very low friction characteristics
- High load capacity
- Very low swell in fluids
- Good chemical resistance
- Easy to machine



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TRIBO TOP® COMPOSITE MATERIALS

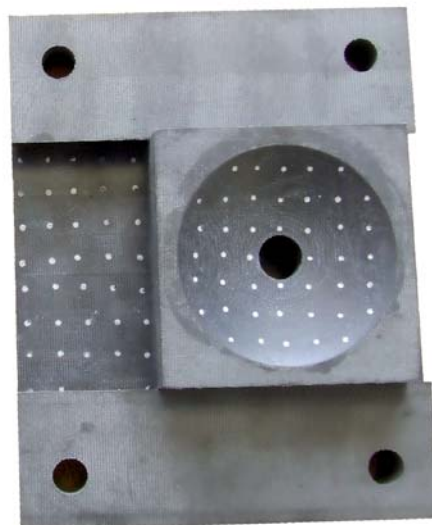
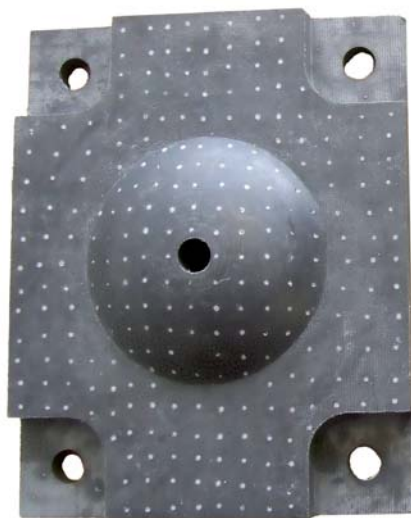
VE10: FRICTION MODIFIER

VE10 is a layer of PTFE dots which works as a high load friction modifier. These dots are pressed in pre-bored holes in the base-material.

Every high load composite material made from synthetic fabric reinforcement, which is impregnated with a polyester thermosetting resin can be used as base-material.

This combination with VE10 gives lower friction and can be used in extremely arduous conditions and withstand extremely high loads, including vibration and high impact applications. It can be manufactured to produce wear pads or strips.

Another big advantage is the possibility to have two equal composites running against each other. This will result in a fully corrosion-free, high loaded, light weight combination, which is also maintenance-free.





TRIBO TOP® COMPOSITE MATERIALS

OCS BEARING MATERIAL

Properties	Units	OCS
Density	g/cm ³	1.58
Ultimate compressive strength	MPa	117
Normal working pressure	MPa	34
Impact Strength [Izod]	Kj/m ²	40
Swell in water @20°C	%	<1
Coefficient of friction (dry)	μ	0.15-0.3
Coefficient of thermal expansion	mm/°C	2.6 • 10 ⁻⁵
Max. continuously operating temperature	°C	100
Max. intermittent operating temperature	°C	120
Hardness	Rockwell M	48



A high quality organic yarn impregnated with a special phenolic resin, formed into tubes by a filament winding technique and heat-treated. The manufacturing method enables a very wide range of tube sizes to be produced economically.

Suffix S is for a general purpose oil impregnated tubular material. Typical applications are ships' stern shaft and pump bearings where excellent dimensional stability is required under a wide range of operating conditions.





TRIBO TOP® COMPOSITE MATERIALS

H-LINER®M

Self-lubricating polymer bushings

Properties	Units	H-LINER®M
Dynamic contact pressure (Max)	MPa	80
Static contact pressure	MPa	350
Velocity (Max)	m/s	0.5
Friction coefficient	μ	0.05-0.1
Temperature (Max)	°C	- 40 tot +130
Linear expansion coefficient		4 E ⁻⁵
Water absorption (24h) 0.16 %	%	0.07

These bushings, manufactured from woven polymer material, have excellent friction properties and improved wear resistance without external lubrication even on high loads.

Tolerances:

Housing : H7-H8

Shaft: h7-h8

Mating pins:

Hardness ≥ 400 HB

Roughness : 0.2 μm ≤ Ra ≤ 0.6 μm

Applications :

- Off-shore
- Harbour handling
- Pipe valves
- Hydropower plant

This product is also available as flanged bushings, washers and slides.





TRIBO TOP® **COMPOSITET MATERIALEN**

H-LINER®S

Self-lubricating polymer bushings

Properties	Units	H-LINER®S
Dynamic contact pressure (Max)	MPa	140
Static contact pressure	MPa	400
Velocity (Max)	m/s	0.5
Friction coefficient	μ	0.05 tot 0.1
Temperature (Max)	°C	- 40 tot + 130
Linear expansion coefficient		7 E ⁻⁶
Water absorption (24h) 0.16 %	%	0.16

These bushings, manufactured from a friction liner applied on a glass fibre structure, have excellent friction properties and improved wear resistance without external lubrication even on high loads.

Tolerances:

Housing : H7-H8

Shaft: h7-h8

Mating pins:

Hardness ≥ 400 HB

Roughness : 0.2 μm ≤ Ra ≤ 0.6 μm

Applications :

- Conveyor rollers
- Power lift truck
- Telescopic handlers
- Aircraft handling system
-





TRIBO TOP® COMPOSITE MATERIALS

H-LINER®S1

Self-lubricating polymer bushings

Properties	Units	H-LINER®S1
Dynamic contact pressure (Max)	MPa	140
Static contact pressure	MPa	400
Velocity (Max)	m/s	0.5
Friction coefficient	μ	0.05 tot 0.1
Temperature (Max)	°C	- 40 tot + 160
Linear expansion coefficient		7 E ⁻⁶
Water absorption (24h) 0.16 %	%	0.16

These bushings, manufactured from a friction liner applied on a glass fibre structure, have excellent friction properties and improved wear resistance without external lubrication even on high loads.

Tolerances:

Housing : H7-H8

Shaft: h7-h8

Mating pins:

Hardness ≥ 400 HB

Roughness : 0.2 μm ≤ Ra ≤ 0.6 μm

Applications :

- Power lift truck
- Telescopic handlers
- Aircraft handling system





TRIBO TOP® COMPOSITE MATERIALS

HYDRAULIC GUIDE RINGS

Tribo Top® hydraulic guide rings and guide band of high-quality composite material are specifically developed and designed for the specific requirements demanded by our customers.

The purpose of the guide rings, and -straps is the conductance of the piston and the rod in a hydraulic cylinder. In addition they catch lateral loads and prevent metallic contact of the moving parts.

Features:

- Easy installation
- Low Coefficient of friction (dry)
- Vibration-absorbing effect
- Highly abrasion resistant
- Suitable for high temperatures
- Can catch high lateral loads
- High freedom in design



2 COMPONENT EPOXY PASTE ADHESIVE

ARALDITE 2014-1

Properties	Units	H-LINER®M
Density	g/cm ³	1.6
Shear strength	N/mm ²	19
Peel strength	N/mm ²	3
Permitted temperature	°C	-60 to 140



Araldite® 2014-1 is a two component thixotropic paste adhesive of high strength with good environmental and excellent chemical resistance. This adhesive is approved and registered by KIWA by number: K22770. Because of this approval, this adhesive can be deployed in applications in contact with potable water.

Suitable for bonding of:

- Ferrous metals, aluminium, copper, zinc, and galvanized products
- Fibre reinforced plastics and -epoxies
- Fibre reinforced Polyesters
- Thermoset composites
- Ceramic materials
- Wood

Key properties Araldite

- High temperature, water and chemical resistance
- Viscosity: thixotrope (gap filling, non sagging up to 5mm thickness)
- Minimal curing time before initial strength: 3.5 hours for 1 N/mm² in aluminium at 23°C.



TRIBO BALL® SPHERICAL BEARINGS

Full maintenance-free and corrosion-resistant bearings

SPHERICAL BEARINGS

Our Tribo Ball® spherical bearings, are a direct replacement for conventional steel spherical bearings and have many advantages. The complete standard range is available up to diameter 500 mm and even bigger diameters on request.

We design spherical bearings to your specification for special applications and/or extreme loads.

Besides the standard used SS 316 for the ball, we can supply several other combinations, as SS 433 together with many composite qualities.



The complete maintenance free and high corrosion resistance Tribo Ball® spherical bearings in these executions are designed by Elcee Holland. By using a stainless steel ball and a composite housing, this is the only right way for load transfer for these bearings. The use of the stainless steel and the composite bearing material, is a well tested combination, which has proven itself in heavy loaded hinges in cranes, rudders, locking gates, bridges and off-shore.



Elcee

bearing technology

**Tribo
Ball**



www.elcee.nl

TRIBO BALL® SPHERICAL BEARINGS

APPLICATIONS SPHERICAL BEARINGS



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**ESBS
Extreme**

**New Design!
Heavy Duty**

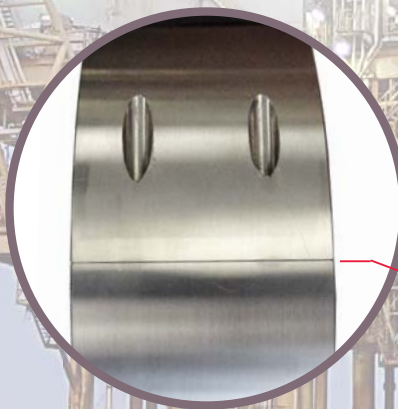


High loaded

Stable

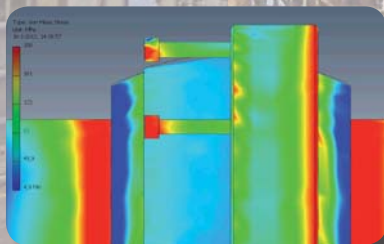
High PV value possible

**High corrosion resistant
(Stainless Steel)**

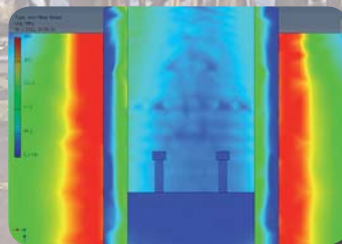


**New design with 'an axial
split' eliminates tension
on bolts**

**Stress on split
'Conventional bearing'**



**Stress on split
'New design bearing'**





TRIBO BALL® SPHERICAL BEARINGS

EXECUTIONS

ESB = Composite housing + SS316 ball



ESB spherical bearings have standard sizes and are being used in several applications in as hinges of excavators, shovels and hydraulic cylinders.

ESBE = Composite housing + SS 316 ball
Extreme load, wide execution



ESBE spherical bearings are wider for a bigger load absorption. These will be used in very high loaded applications, as cranes, locking gates, bridges and in off-shore industry.

ESB(E)L = Composite housing + SS 316 ball + liner
with composite Liner for easy dismounting of the pin.



This liner can be used for ESB as well as for ESBE series. A composite liner is pressed into the SS ball, for rotational movements in the liner. By this clearance, there is always an easy dismounting of the pin.

ESBC = Composite housing + composite ball



This execution with two different or the same composite materials offers a very good solution for applications with static and lower loads. They are excellent in compensating misalignment by a static load in water or chemicals. These composite bearings are only 1/6 of the weight of steel bearings.



TRIBO BALL® SPHERICAL BEARINGS

SPHERICAL BEARINGS

Load

By using high loaded composite materials we manufacture spherical bearings, that offers technical possibilities as well as commercial benefit.

Because the static load of the used composite material is higher than 400 MPa, these bearings offers sufficient safety to absorb higher shock loads. The dynamic maximal load of the spherical bearings is based on the dynamic surface-pressure of the bearing material and amounts 220 MPa. These values qualify these bearings most suitable for applications where many variable - and/or shock loads can occur.

Lubrications

Tribo Ball spherical bearings are maintenance free or require little lubrication by the chosen combinations of materials. Lubrication is always better to obtain a lower friction and this will result in a lower wear. In under water applications the bearings will use the water for lubrication. An initial lubrication provides a good running-in of the materials, that will result in an optimal performance.

Tolerances

General guidelines

The housings, in which these bearings will be mounted, have to be an H7 tolerance.

Our standard (ESB) execution has a stainless steel ball, with an H7 tolerance on the inside diameter, so the ball has to be pressed on the shaft or pin. The shaft or pin should have an m6 tolerance in this case.

For the special execution, with composite liner (L), the tolerance on the inside diameter of the liner have to be calculated as a sliding tolerance. The advice for the shaft is f7 or g6 tolerance.

Mounting

After mounting the spherical bearings will be locked in position, by a previously calculated press-fitting. Bearings have to be pressed in, not using a hammer. Only the outer ring of the spherical bearing can be used to press in the bearing in the housing. After pressing in, the optimum clearance between the outer ring and the stainless steel or composite ball will be reached.





TRIBO BALL® SPHERICAL BEARINGS

SPHERICAL BEARINGS

Temperature

These bearings work in heavy conditions, above as well as under water. That is why our spherical bearings are often being used in cranes and many offshore applications, like rudders and grippers. The standard ESB execution is suitable for temperatures from -40°C up to +50°C. At higher temperatures you have to be aware, that the surface pressure and thus also the maximum loads will be decline.

Also the PV-values will be lower. By using a higher temperature resistant quality composite material, higher temperatures can be reached.

As a leading supplier of composite materials, we offer a professional service and technical support through our professional team with technical advice, operation advice and possible assistance in assembling our bearings.

Advantages

- Good quality / price-level
- Short delivery-times
- No fretting on mating materials
- Very good corrosion resistant
- Good elasticity
- Very low swell
- Good size- and form-stability
- Low Coefficient of friction (dry)
- Long lifetime – low wear





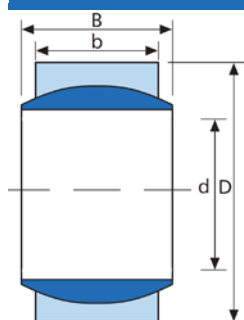
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bearing technology

**Tribo
Ball**



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TRIBO BALL® SPHERICAL BEARINGS, STANDARD (COMPOSITE HOUSE, SS BALL)

Art. no.	Dimension (mm)					Radial load ratings (x10 ³ N)	
	d	D	b	B	Swing angle	Dynamic	Static
ESB 30	30	47	18	22	6°	145	292
ESB 35	35	55	20	25	6°	193	387
ESB 40	40	62	22	28	7°	246	495
ESB 45	45	68	25	32	7°	317	636
ESB 50	50	75	28	35	6°	385	774
ESB 60	60	90	36	44	6°	581	1167
ESB 70	70	105	40	49	6°	755	1516
ESB 80	80	120	45	55	6°	968	1945
ESB 90	90	130	50	60	5°	1188	2387
ESB 100	100	150	55	70	7°	1540	3094
ESB 110	110	160	55	70	6°	1694	3403
ESB 120	120	180	70	85	6°	2244	4508
ESB 140	140	210	70	90	7°	2772	5569
ESB 160	160	230	80	105	8°	3696	7426
ESB 180	180	260	80	105	6°	4158	8354
ESB 200	200	290	100	130	7°	5720	11492
ESB 220	220	320	100	135	8°	6534	13127
ESB 240	240	340	100	140	8°	7392	14851
ESB 260	260	370	110	150	7°	8580	17238
ESB 280	280	400	120	155	6°	9548	19183
ESB 300	300	430	120	155	7°	10230	20553
ESB 320	320	440	135	160	4°	11264	22630
ESB 340	340	460	135	160	3°	11968	24045
ESB 360	360	480	135	160	3°	12672	25459
ESB 380	380	520	160	190	4°	15884	31912
ESB 400	400	540	160	190	3°	16720	33592
ESB 420	420	560	160	190	3°	17556	35272
ESB 440	440	600	185	218	3°	21102	42397
ESB 460	460	620	185	218	3°	22062	44324
ESB 480	480	650	195	230	3°	24288	48797
ESB 500	500	670	195	230	3°	25300	50830

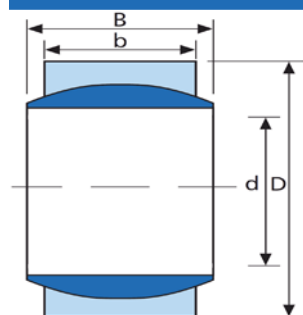
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**TRIBO BALL® SPHERICAL BEARINGS, EXTREME
(COMPOSITE HOUSE, SS BALL, WIDE EXECUTION)**

Art. no.	Dimension (mm)					Radial load ratings (x10 ³ N)	
	d	D	b	B	Swing angle	Dynamic	Static
ESBE 100	100	150	67	71	2°	1562	3138
ESBE 110	110	160	74	78	2°	1888	3792
ESBE 120	120	180	80	85	2°	2244	4508
ESBE 140	140	210	95	100	2°	3080	6188
ESBE 160	160	230	109	115	2°	4048	8133
ESBE 180	180	260	122	128	2°	5069	10184
ESBE 200	200	290	134	140	2°	6160	12376
ESBE 220	220	320	148	155	2°	7502	15072
ESBE 240	240	340	162	170	2°	8976	18034
ESBE 260	260	370	175	185	2°	10582	21260
ESBE 280	280	400	190	200	2°	12320	24752
ESBE 300	300	430	200	212	2°	13992	28111
ESBE 320	320	460	218	230	2°	16192	32531
ESBE 340	340	480	230	243	2°	18176	36518
ESBE 360	360	520	243	258	2°	20434	41053
ESBE 380	380	540	258	272	2°	22739	45685
ESBE 400	400	580	265	280	2°	24640	49504
ESBE 420	420	600	280	300	2°	27720	55692
ESBE 440	440	630	300	315	2°	30492	61261
ESBE 460	460	650	308	325	2°	32890	66079
ESBE 480	480	680	320	340	2°	35904	72134
ESBE 500	500	710	335	355	2°	39050	78455



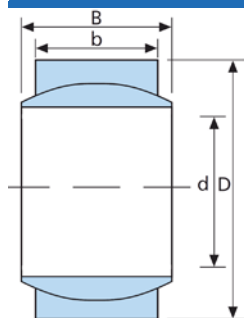
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bearing technology

**Tribo
Ball**



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TRIBO BALL® SPHERICAL BEARINGS (COMPOSITE-COMPOSITE)

Art. no.	Dimension (mm)					Radial load ratings (x10 ³ N)	
	d	D	b	B	Swing angle	Dynamic	Static
ESBC 30	30	47	18	22	6°	26	324
ESBC 35	35	55	20	25	6°	35	415
ESBC 40	40	62	22	28	7°	45	515
ESBC 45	45	68	25	32	7°	58	663
ESBC 50	50	75	28	35	6°	70	817
ESBC 60	60	90	36	44	6°	106	1273
ESBC 70	70	105	40	49	6°	137	1627
ESBC 80	80	120	45	55	6°	176	2088
ESBC 90	90	130	50	60	5°	216	2542
ESBC 100	100	150	55	70	7°	280	3160
ESBC 110	110	160	55	70	6°	308	3403
ESBC 120	120	180	70	85	6°	408	4950
ESBC 140	140	210	70	90	7°	504	5569
ESBC 160	160	230	80	105	8°	672	7072
ESBC 180	180	260	80	105	6°	756	7956
ESBC 200	200	290	100	130	7°	1040	11050
ESBC 220	220	320	100	135	8°	1188	12155
ESBC 240	240	340	100	140	8°	1344	13260
ESBC 260	260	370	110	150	7°	1560	15802
ESBC 280	280	400	120	155	6°	1736	18564

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Bronze and Stainless Steel





BRONZE AND STAINLESS STEEL

Since 1960 Elcee is supplier of bearings and sliding strips in all kinds of cast bronze and stainless steel materials. Through years of experience we can support you with an extensive advice on all of your bearing applications.

To control our high quality materials we are in the possession of high class spectra analyse apparatus, so we can check our materials on every moment.



Our production consists of centrifugal and continuously casted bronze and stainless steel.

We can also machine these materials until a final product or sliding strips, so we can react very quickly to meet your requirements.

We can supply centrifugally casted bronze bushes up to a diameter of 1023 mm and rings up to a maximal diameter of 1700 mm.



BRONZE AND STAINLESS STEEL

Stainless steel can be delivered up to a diameter of 980 mm. Other sizes on request. These stainless steel bushes are often used as a liner for propeller- and rudder shafts and will be standard supplied in SS316 and SS316L. Also these bushes can be delivered rough machined as well as fully machined.

Most frequent sliding bearings will be machined by us from RG7, this material, GC-CuSn7ZnPb, (Werkstoffnr. 2.1090.04 to DIN 1705) contains the following elements;

- Cu = 83 %
- Sn = 7 %
- Zn = 4 %
- Pb = 6 %



This semi-soft sliding bearing material has good dry-running capacities, is highly wear resistant and has reasonable resistance against edge pressure. Bearings made out of this material have a surface pressure of 45 N/mm² and can work with a surface speed of 1,5 m/s when a grease lubrication is being used.

Above this speed you will have to use a continuous oil lubrication. With the right grease, these bearings are usable to a maximum of 250° Celsius. Shaft material needs to have a minimal hardness of 180 HB and a roughness of 1 µm. We advise the use of shaft materials like St 52, 42CrMo4 or C45.



BRONZE AND STAINLESS STEEL

Alloy	W.St.No.	Casting Method	0.2 Yield point σ 0.2 N/mm ² min.	Tensile strength σ B N/mm ² min.	Elongation 5% min.	Hardness HB 10/1000 min.	Comments & applications
DIN 1705 - CASTING ALLOYS OF COPPER-TIN & COPPER-TIN-ZINC							
G-CuSn 7 Zn Pb GZ-CuSn 7 Zn Pb GC-CuSn 7 Zn Pb	2.1090.01 2.1090.03 2.1090.04	sand centrifugal constantly	120 120 130	240 270 270	15 13 16	65 75 70	Half-hard bearing material with good dry running properties; resistant to seawater. In centrifugal and continuous casting implementation uniform and improved wear resistance. 1)
G-CuSn 10 Zn GZ-CuSn 10 Zn	2.1050.01 2.1086.03	sand centrifugal	130 150	260 270	15 7	75 85	Hard material, resistant to seawater. 1)
G-CuSn 10 GZ-CuSn 10	2.1050.01 2.1050.03	sand centrifugal	130 150	270 300	18 15	70 80	Construction material with high elongation, resistant to corrosion and seawater. 1)
G-CuSn 12 GZ-CuSn 12 GC-CuSn 12	2.1052.01 2.1052.03 2.1052.04	sand centrifugal constantly	140 150 150	260 280 280	12 5 8	80 95 90	Good wear resistance; resistant to corrosion and seawater. 1)
G-CuSn 12 Pb GZ-CuSn 12 Pb	2.1061.01 2.1061.03	sand centrifugal	140 150	260 280	10 5	80 90	Bearing material with improved dry running properties and increased centrifugal wear resistance; resistant to corrosion and seawater. 1)
G-CuSn 12 Ni GZ-CuSn 12 Ni	2.1060.01 2.1060.03	sand centrifugal	160 180	280 300	14 8	90 100	Construction material with an increased tensile strength and very good resistance to wear; resistant to corrosion, cavitation and seawater. 1)
DIN 1709 - CASTING ALLOYS OF COPPER-ZINC							
G-CuZn 35 Al 1 GZ-CuZn 35 Al 1	2.0592.01 2.0592.03	sand centrifugal	170 200	450 500	20 18	110 120	Construction material with high static tensile strength and hardness. 1)
G-CuZn 34 Al 2 GZ-CuZn 34 Al 2	2.0596.01 2.0596.03	sand centrifugal	250 260	600 620	15 14	140 150	Construction material with high static tensile strength and hardness. 1)
G-CuZn 25 Al 5 GZ-CuZn 25 Al 5	2.0598.01 2.0598.03	sand centrifugal	450 480	750 750	8 5	180 190	Construction material with very high static load capacity. 1)

- 1) By centrifugal & continuous casting the composition is more steady and its elongation, tensile strength and hardness are higher.



BRONZE AND STAINLESS STEEL

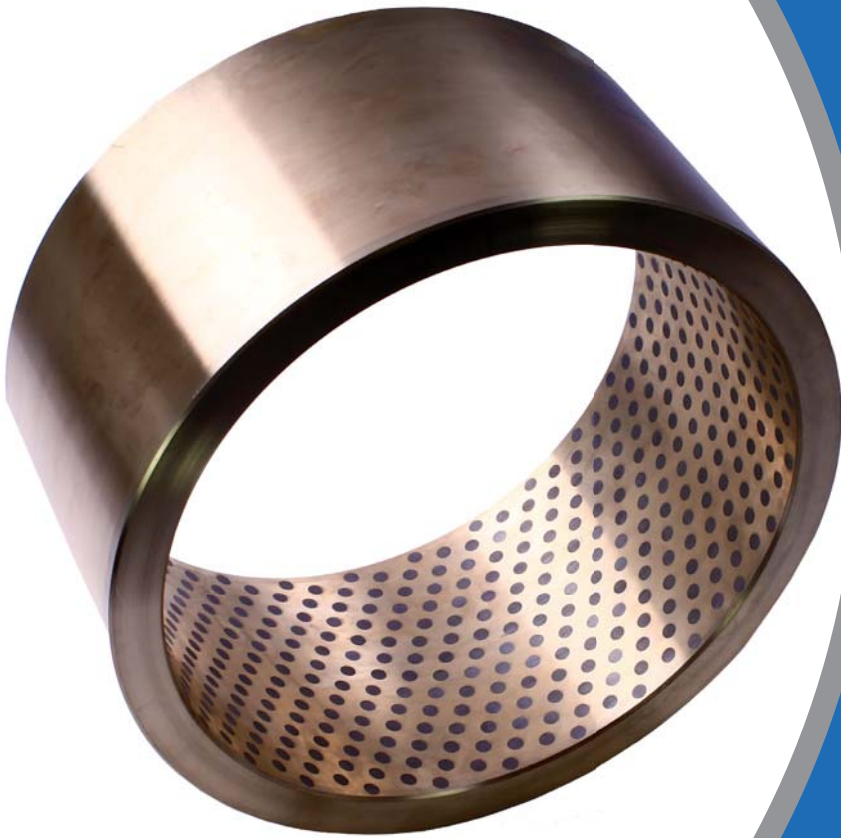
Alloy	W.St.No.	Casting Method	0.2 Yield point σ 0.2 N/mm ² min.	Tensile strength σ B N/mm ² min.	Elongation 5% min.	Hardness HB 10/1000 min.	Comments & applications
DIN 1714 - CASTING ALLOYS OF CUPRO-ALUMINIUM							
G-CuAl 10 Fe GZ-CuAl 10 Fe	2.0940.01 2.0940.03	sand centrifugal	180 200	500 600	15 15	115 130	Construction material. Only very slight temperature sensitivity between - + 200° and 200° C. 1)
G-CuAl10 Ni GZ-CuAl 10 Ni	2.0975.01 2.0975.03	sand centrifugal	270 300	600 700	12 13	140 160	Construction material with even more improved strength properties; resistant to cold and warm seawater and metal fatigue. 1)
G-CuAl11 Ni GZ-CuAl 11 Ni	2.0980.01 2.0980.03	sand centrifugal	320 400	680 750	5 5	170 185	Construction material, high strength properties; resistant to cold and warm seawater; highly resistant to metal fatigue in air and seawater; resistance to cavitation, highly loadable with high wear resistance (sufficient lubrication required). 1)
DIN 1716 - CASTING ALLOYS OF COPPER-LEAD-TIN							
G-CuPb 5 Sn GZ-CuPb 5 Sn	2.1170.01 2.1170.03	sand centrifugal	130 140	240 260	15 13	70 80	Construction material; corrosion resistant, especially against diluted sulfur and salt acid as well as against fat acids. 1)
G-CuPb 10 Sn GZ-CuPb 10 Sn	2.1176.01 2.1176.03	sand centrifugal	80 110	180 220	8 8	65 70	Bearing material with good sliding properties, wear and corrosion resistant. 1)
G-CuPb 15 Sn GZ-CuPb 15 Sn GC-CuPb 15 Sn	2.1182.01 2.1182.03 2.1182.04	sand centrifugal constantly	90 110 110	180 220 220	8 7 8	60 65 65	Bearing material with good dry running properties during a temporary absence of lubrication or with water lubrication, high resistance against sulphuric acids. 1)

- 1) By centrifugal & continuous casting the composition is more uniform and its elongation, tensile strength and hardness higher.



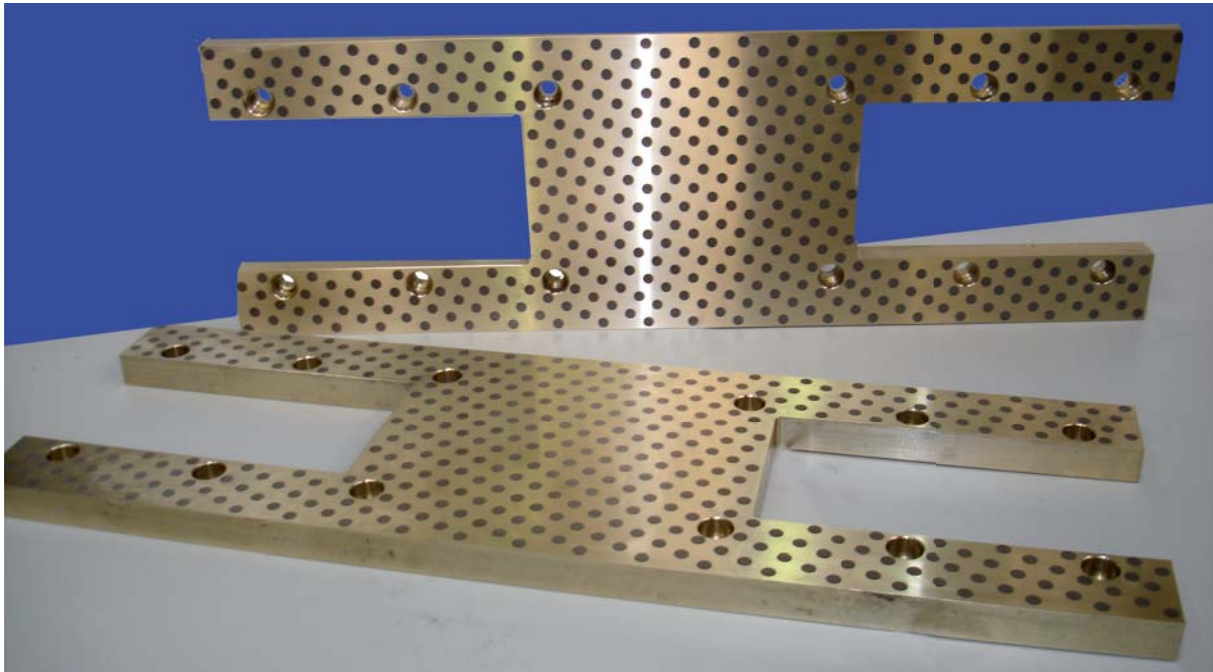


Bronze with solid lubricants





BRONZE WITH GRAPHITE (EBG)



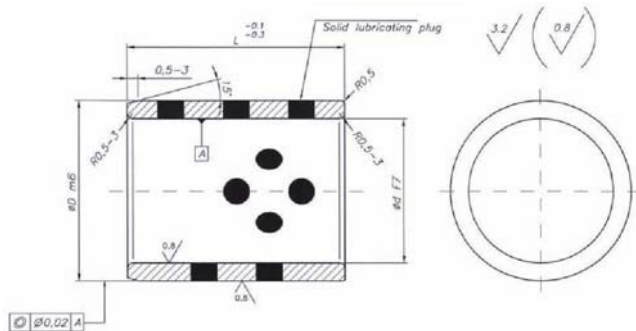
The base material is a type of bronze with a high tensile strength, filled with graphite dots. The graphite dots, which are glued, cover 20% to 30% of the sliding surface. These lubricating dots are geometrically positioned so that they always overlap in the sliding direction. A final 20 micron thick, long lasting lubricant film will occur, which will positively affect the run-in phase and the "stick-slip" will be avoided.

The combination of a high quality type of bronze and the lubricating effect of the graphite dots results in a qualitative high plain bearing, which can be used in a broad range of applications. Through the use of different bronze materials you can also adjust the properties according to your wishes.





PLAIN BEARINGS, TYPE EBG



Material:
CuZn25Al5Mn4Fe3

All dimensions
without tolerance:
According to EN22768

Edges without
tolerance: R=0,5



Article	Dimensions				
	d	F7	D	m6	L -0,1 / -0,3
EBG081208	8		12		8
EBG081210	8		12		10
EBG081212	8		12		12
EBG081215	8		12		15
EBG101408	10		14		8
EBG101410	10	+0,028	14		10
EBG101412	10	+0,013	14		12
EBG101415	10		14	+0,018	15
EBG101420	10		14	+0,007	20
EBG121810	12		18		10
EBG121812	12		18		12
EBG121816	12		18		16
EBG121820	12		18		20
EBG121825	12		18		25
EBG121830	12		18		30
EBG131916	13		19		16
EBG131920	13	+0,034	19		20
EBG162216	16	+0,016	22		16
EBG162220	16		22		20
EBG162225	16		22	+0,021	25
EBG162230	16		22	+0,008	30
EBG162235	16		22		35
EBG162240	16		22		40
EBG182415	18		24		15
EBG182416	18		24		16



PLAIN BEARINGS, TYPE EBG



Article	Dimensions				
	d	F7	D	m6	L -0,1 / -0,3
EBG182420	18		24		20
EBG182425	18		24		25
EBG182430	18	+0,034	24		30
EBG182435	18	+0,016	24		35
EBG182440	18		24	+0,021	40
EBG202816	20		28	+0,008	16
EBG202820	20		28		20
EBG202825	20		28		25
EBG202830	20		28		30
EBG202835	20		28		35
EBG202840	20		28		40
EBG203016	20		30		16
EBG203020	20		30		20
EBG203025	20		30		25
EBG203030	20		30		30
EBG203035	20		30		35
EBG203040	20		30		40
EBG253316	25		33		16
EBG253320	25	+0,041	33		20
EBG253325	25	+0,020	33		25
EBG253330	25		33		30
EBG253335	25		33	+0,025	35
EBG253340	25		33	+0,009	40
EBG253350	25		33		50
EBG253516	25		35		16
EBG253520	25		35		20
EBG253525	25		35		25
EBG253530	25		35		30
EBG253535	25		35		35
EBG253540	25		35		40
EBG253550	25		35		50
EBG303820	30		38		20
EBG303825	30		38		25
EBG303830	30		38		30
EBG303835	30		38		35



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PLAIN BEARINGS, TYPE EBG



Article	Dimensions				
	d	F7	D	m6	L -0,1 / -0,3
EBG303840	30		38		40
EBG303850	30		38		50
EBG303860	30		38		60
EBG304020	30		40		20
EBG304025	30	+0,041	40		25
EBG304030	30	+0,020	40		30
EBG304035	30		40		35
EBG304040	30		40		40
EBG304050	30		40		50
EBG304060	30		40		60
EBG354435	35		44		35
EBG354440	35		44		40
EBG354450	35		44	+0,025	50
EBG354460	35		44	+0,009	60
EBG354525	35		45		25
EBG354530	35		45		30
EBG354535	35		45		35
EBG354540	35		45		40
EBG354550	35		45		50
EBG354560	35		45		60
EBG405025	40		50		25
EBG405030	40		50		30
EBG405035	40	+0,050	50		35
EBG405040	40	+0,025	50		40
EBG405050	40		50		50
EBG405060	40		50		60
EBG405540	40		55		40
EBG405550	40		55		50
EBG405560	40		55		60
EBG455540	45		55		40
EBG455550	45		55		50
EBG455560	45		55		60
EBG456040	45		60	+0,030	40
EBG456050	45		60	+0,011	50
EBG456060	45		60		60

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PLAIN BEARINGS, TYPE EBG



Article	Dimensions				
	d	F7	D	m6	L -0,1 / -0,3
EBG506030	50		60		30
EBG506035	50		60		35
EBG506040	50		60		40
EBG506050	50		60		50
EBG506060	50		60		60
EBG506070	50		60		70
EBG506240	50		62		40
EBG506250	50	+0,050	62		50
EBG506260	50	+0,025	62		60
EBG506270	50		62		70
EBG506550	50		65		50
EBG506560	50		65		60
EBG506570	50		65		70
EBG557050	55		70		50
EBG557060	55		70	+0,030	60
EBG557070	55		70	+0,011	70
EBG607440	60		74		40
EBG607450	60		74		50
EBG607540	60		75		40
EBG607550	60		75		50
EBG607560	60		75		60
EBG607570	60		75		70
EBG607580	60		75		80
EBG637560	63		75		60
EBG637570	63	+0,060	75		70
EBG708535	70	+0,030	85		35
EBG708540	70		85		40
EBG708550	70		85		50
EBG708560	70		85		60
EBG708570	70		85		70
EBG708580	70		85		80
EBG070100	70		85		100
EBG709070	70		90	+0,035	70
EBG709080	70		90	+0,013	80
EBG809660	80		96		60



PLAIN BEARINGS, TYPE EBG



Article	Dimensions				
	d	F7	D	m6	L -0,1 / -0,3
EBG809610	80		96		100
EBG080060	80		100		60
EBG080080	80		100		80
EBG080100	80		100		100
EBG080120	80		100		120
EBG090080	90		110		80
EBG090120	90		110	+0,035	120
EBG100100	100		120	+0,013	100
EBG100120	100	+0,071	120		120
EBG110080	110	+0,036	130		80
EBG110120	110		130		120
EBG120080	120		140	+0,040	80
EBG120120	120		140	+0,015	120
EBG130100	130	+0,083	150		100
		+0,043			

Other dimensions on request



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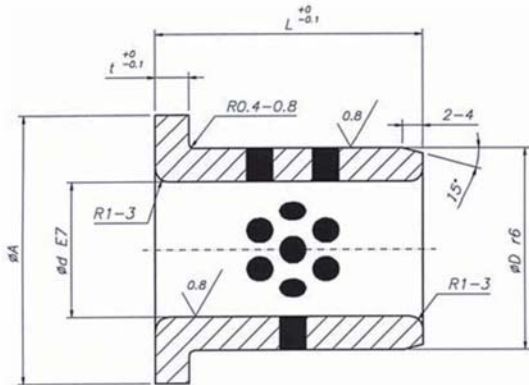
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PLAIN BEARINGS WITH FLANGE, TYPE EBGK



Material:
CuZn25Al5Mn4Fe3

All dimensions without
tolerance:
According to EN22768

Edges without
tolerance: R=0,5



Article	Dimensions				A	t 0 / -0,1	L -0,1 / -0,3
	d	E7	D	R6			
EBGK010015	10	+0,040	14		22	2	15
EBGK010020	10	+0,025	14	+0,034	22	2	20
EBGK012015	12		18	+0,023	25	3	15
EBGK012020	12		18		25	3	20
EBGK013015	13		19		26	3	15
EBGK013020	13		19		27	3	20
EBGK014015	14	+0,050	20		27	3	15
EBGK014020	14	+0,032	20		28	3	20
EBGK015015	15		21		28	3	15
EBGK015020	15		21	+0,041	28	3	20
EBGK015025	15		21	+0,028	28	3	25
EBGK016015	16		22		29	3	15
EBGK016020	16		22		29	3	20
EBGK016025	16		22		29	3	25
EBGK020015	20		30		40	5	15
EBGK020020	20		30		40	5	20
EBGK020030	20		30		40	5	30
EBGK020040	20		30		40	5	40
EBGK025020	25	+0,061	35		45	5	20
EBGK025025	25	+0,040	35		45	5	25
EBGK025030	25		35		45	5	30
EBGK025040	25		35	+0,050	45	5	40
EBGK030030	30		40	+0,034	50	5	30
EBGK030035	30		40		50	5	35
EBGK030040	30		40		50	5	40



PLAIN BEARINGS, TYPE EBGK

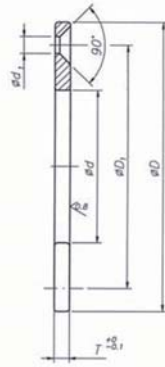
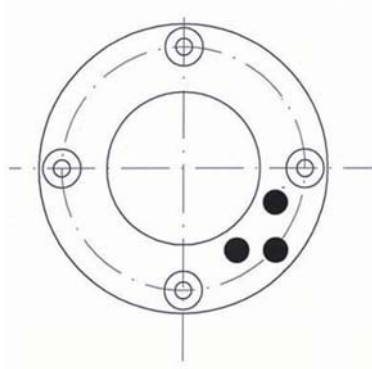


Article	Dimensions				A	t 0 / -0.1	L -0,1 / -0,3
	d	E7	D	R6			
EBGK030050	30		40		50	5	50
EBGK035030	35		45		60	5	30
EBGK035040	35		45		60	5	40
EBGK035050	35		45	+0,050	60	5	50
EBGK040030	40		50	+0,034	65	5	30
EBGK040040	40		50		65	5	40
EBGK040050	40	+0,075	50		65	5	50
EBGK045030	45	+0,050	55		70	5	30
EBGK045040	45		55		70	5	40
EBGK045060	45		55		70	5	60
EBGK050030	50		60	+0,060	75	5	30
EBGK050040	50		60	+0,041	75	5	40
EBGK050060	50		60		75	5	60
EBGK055040	55		65		80	5	40
EBGK055060	55		65		80	5	60
EBGK060040	60		75		90	7.5	40
EBGK060050	60		75	+0,062	90	7.5	50
EBGK060080	60	+0,090	75	+0,043	90	7.5	80
EBGK070050	70	+0,060	85		105	7.5	50
EBGK070080	70		85		105	7.5	80
EBGK075060	75		90	+0,073	110	7.5	60
EBGK080060	80		100	+0,051	120	10	60
EBGK080080	80		100		120	10	80
EBGK080100	80		100		120	10	100
EBGK090060	90		110		130	10	60
EBGK090080	90		110	+0,076	130	10	80
EBGK100080	100	+0,107	120	+0,054	150	10	80
EBGK100100	100	+0,072	120		150	10	100
EBGK120080	120		140	+0,088	170	10	80
EBGK120100	120		140	+0,063	170	10	100





PIVOT BEARINGS, TYPE EBGT



Material:
CuZn25Al5Mn4Fe3

All dimensions
without tolerance:
According to EN22768

Edges without
tolerance: R=0,5



Article	Dimensions			Dimension holes			
	d	D	T 0 / -0.1	d1	Number	Screw	d1
EBGT010	10.2	30	3	-	-	-	-
EBGT012	12.2	40	3	-	-	-	-
EBGT013	13.2	40	3	28	2	M3	3.5
EBGT016	16.2	50	3	35	2	M3	3.5
EBGT018	18.2	50	3	35	2	M3	3.5
EBGT020	20.2	50	5	35	2	M5	6
EBGT025	25.2	55	5	40	2	M5	6
EBGT030	30.2	60	5	45	2	M5	6
EBGT035	35.2	70	5	50	2	M5	6
EBGT040	40.2	80	7	60	2	M6	7
EBGT045	45.3	90	7	67.5	2	M6	7
EBGT050	50.3	100	8	75	4	M6	7
EBGT055	55.3	110	8	85	4	M6	7
EBGT060	60.3	120	8	90	4	M8	9
EBGT070	70.3	130	10	100	4	M8	9
EBGT080	80.3	150	10	120	4	M8	9
EBGT090	90.5	170	10	140	4	M10	11
EBGT100	100.5	190	10	160	4	M10	11
EBGT120	120.5	200	10	175	4	M10	11



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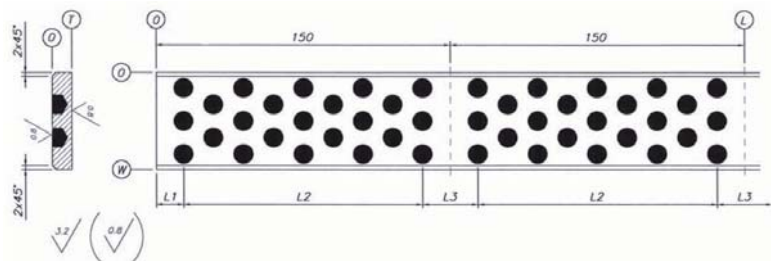
bearing technology

**Tribo
Bronze**



www.elcee.nl

STRIP MATERIAL, TYPE EBGs



Material:
CuZn25Al5Mn4Fe3

Sharp edges broken

All dimensions
without tolerance:
According to EN22768

Strips are available in lengths from 150 mm or multiples of 150 mm.
Lubricating surface covers 20% to 30% of the total sliding surface.

T	L1	L2	L3	SCHROEF
10	11	128	22	M6
20	14	122	28	M10

Delivery without mounting holes. Use a graphite dot for the size of the mounting holes.

	T = 10			
Length	W = 50	W = 80	W = 100	W = 150
300	501030	801030	101030	151030
600	501060	801060	101060	151060
1050	501011	801011	101011	151011
1200	501012	801012	101012	151012
1500	501015	801015	101015	151015

	T = 20			
Length	W = 50	W = 80	W = 100	W = 150
300	502030	802030	102030	152030
600	502060	802060	102060	152060
1050	502011	802011	102011	152011
1200	502012	802012	102012	152012
1500	502015	802115	102015	152015



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TECHNICAL DATA

BRONZE BEARINGS WITH GRAPHITE DOTS

Properties	Units	EBG
Dynamic contact pressure	N/mm ²	50*
Static contact pressure	N/mm ²	140*
Temperature	°C	-10...+250+
Friction coefficient	μ	0.04..0.20
Velocity (Max)	m/min	18*
Tolerance of the shaft		e7 - e8
Roughness of the shaft	Ra	0.8...1.6
Tolerance of the housing		H7
Hardness of the housing	HB	180 - 400*

* Afhankelijk van de toepassing kunnen bovenstaande waarden afwijken

Design

The length of a bearing in relation to the internal diameter is 1 : 0,5 until 1 : 2. For high load or high speed the ratio has to be adjusted to less than 1 : 1 (L / ID). This prevents high temperatures, wear and side load.

Recommended wall thickness is $0,05 \times ID + (2 \text{ until } 6 \text{ mm})$.

To simplify the embossing of the bearings, the bearings are supplied with skewed edges.



Mating material

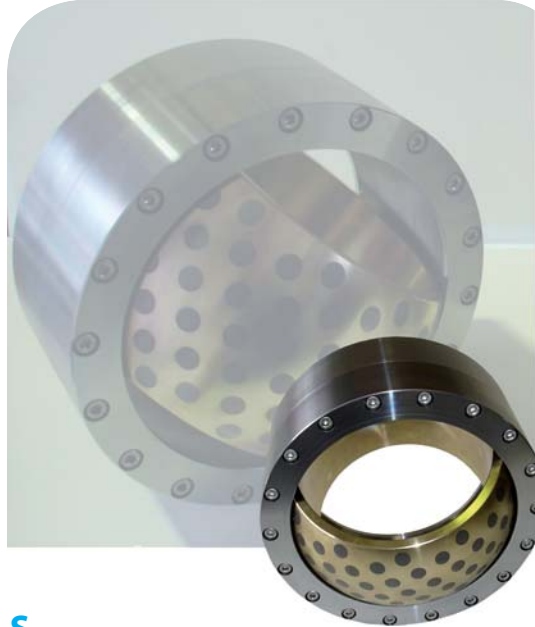
The operation of a self-lubrication plain bearing is dependent on the roughness and the hardness of the mating material.

Basically the mating material has to be at least 100 HB harder than the bearing. When a plain bearing is exposed to abrasive parts, the mating material has to be even harder.

To prevent corrosion and increased wear, we advise to use a hard-chromed shaft.

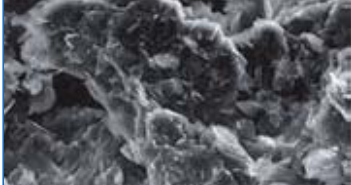
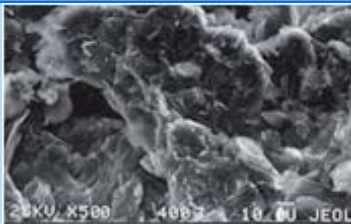
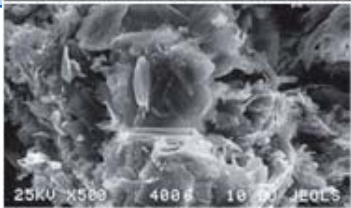


BRONZE WITH GRAPHITE



SPECIAL MATERIALS

Besides our standard programme, we can also supply bearings for applications with high temperatures or suitable for sea water. In the table below you will find the diverse possibilities.

Type	Description	Details recording
L2	Standard graphite lubrication Suitable until 250 °C	
LHT	Graphite suitable for temperatures up to 500 °C	
E1	Lubricants with low electrical conductivity for, for example applications in sea water.	



Elcee

bearing technology

**Tribo
Bronze**



www.elcee.nl

TRIBO BRONZE® BEARING MATERIAL

Tribo Bronze® is a high-performance dry-running plain bearing material, filled with finely distributed graphite as a solid lubricant.

Properties

- maintenance free
- high static and dynamic load capacity
- good sliding properties and negligible stick-slip
- can be used in a dusty environment
- depending on the alloy, suitably from -200 ° C to + 650 ° C
- can be used in corrosive environments.
- no waterabsorption => dimensionally stable



General applications

- steel- and civil engineering
- mould construction
- vending machines
- fans
- metal and ore processing plants



Applications at high temperature

- ovens
- metal and ore processing plants
- kiln trolleys
- mixers
- pressure vessels
- reactors



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TRIBO BRONZE® BEARING MATERIAL

ALLOY: TRIBO BRONZE® 180

Mechanical properties	Units	TB 180
Density	g/cm ³	6.7
Tensile strength	N/mm ²	80
Compressive strength	N/mm ²	360
Lubricant		C
Hardness	HB 2,5/62,5/15	60
Maximum static load	MPa	250
Maximum dynamic load	MPa	130
Maximum speed (dry)	m/s	0.5
Maximum PV value (dry)	N/mm ² x m/s	1.5
Coefficient of friction (dry)	μ	0.2
Coefficient of friction (water)	μ	0.18
Operating temperature (minimum / maximum)	°C	-50 / 350
Minimal hardness mating material	HB	180
Recommended roughness mating material	μm	0.2 - 0.8



General applications

- steel- and civil engineering
- mould construction
- vending machines
- fans
- metal and ore processing plants





TRIBO BRONZE® BEARING MATERIAL

ALLOY: TRIBO BRONZE® 101

Mechanical properties	Units	TB 101
Density	g/cm ³	6.30
Tensile strength	N/mm ²	57
Compressive strength	N/mm ²	250
Lubricant		C
Hardness	HB 2,5/62,5/15	45
Maximum static load	MPa	200
Maximum dynamic load	MPa	100
Maximum speed (dry)	m/s	0.5
Maximum PV value (dry)	N/mm ² x m/s	1.5
Coefficient of friction (dry)	μ	0.18
Coefficient of friction (water)	μ	0.16
Operating temperature (minimum / maximum)	°C	-50 / 350
Minimal hardness mating material	HB	180
Recommended roughness mating material	μm	0.2 - 0.8



Standard alloy for most applications

- steel- and civil engineering
- mould construction
- vending machines
- fans
- metal and ore processing plants



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TRIBO BRONZE® BEARING MATERIAL

ALLOY: TRIBO BRONZE® 115

Mechanical properties	Units	TB 115
Density	g/cm ³	7.00
Tensile strength	N/mm ²	80
Compressive strength	N/mm ²	360
Lubricant		C
Hardness	HB 2,5/62,5/15	65
Maximum static load	MPa	260
Maximum dynamic load	MPa	130
Maximum speed (dry)	m/s	0.5
Maximum PV value (dry)	N/mm ² x m/s	1.5
Coefficient of friction (dry)	μ	0.2
Coefficient of friction (water)	μ	0.08
Operating temperature (minimum / maximum)	°C	-50 / 200
Minimal hardness mating material	HB	200
Recommended roughness mating material	μm	0.2 - 0.8



Highly durable, corrosion resistant, seawater resistant

- civil engineering





TRIBO BRONZE® BEARING MATERIAL

ALLOY: TRIBO BRONZE® 116

Mechanical properties	Units	TB 116
Density	g/cm ³	6.40
Tensile strength	N/mm ²	50
Compressive strength	N/mm ²	230
Lubricant		C
Hardness	HB 2,5/62,5/15	50
Maximum static load	MPa	160
Maximum dynamic load	MPa	80
Maximum speed (dry)	m/s	0.5
Maximum PV value (dry)	N/mm ² x m/s	1.5
Coefficient of friction (dry)	μ	0.15
Coefficient of friction (water)	μ	0.08
Operating temperature (minimum / maximum)	°C	-50 / 200
Minimal hardness mating material	HB	200
Recommended roughness mating material	μm	0.2 - 0.8



Application at high speed

- purification- and filling machines





TRIBO BRONZE® BEARING MATERIAL

ALLOY: TRIBO BRONZE® 118

Mechanical properties	Units	TB 118
Density	g/cm ³	6.10
Tensile strength	N/mm ²	90
Compressive strength	N/mm ²	640
Lubricant		C + MoS ₂
Hardness	HB 2,5/62,5/15	80
Maximum static load	MPa	150
Maximum dynamic load	MPa	60
Maximum speed (dry)	m/s	0.2
Maximum PV value (dry)	N/mm ² x m/s	0.5
Coefficient of friction (dry)	μ	0.25-0.45
Coefficient of friction (water)	μ	-
Operating temperature (minimum / maximum)	°C	-50 / 650
Minimal hardness mating material	HRC	>45
Recommended roughness mating material	μm	0.2 - 0.8



Application at high temperature

- oven, metal and ore processing plants
- kiln trolleys
- mixers
- pressure vessels
- reactors





TRIBO BRONZE® BEARING MATERIAL

ALLOY: TRIBO BRONZE® 127

Mechanical properties	Units	TB 127
Density	g/cm ³	6.00
Tensile strength	N/mm ²	75
Compressive strength	N/mm ²	320
Lubricant		C + MoS ₂
Hardness	HB 2,5/62,5/15	50
Maximum static load	MPa	100
Maximum dynamic load	MPa	50
Maximum speed (dry)	m/s	0.2
Maximum PV value (dry)	N/mm ² x m/s	1.0
Coefficient of friction (dry)	μ	0.30 - 0.45
Coefficient of friction (water)	μ	
Operating temperature (minimum / maximum)	°C	280 / 500
Minimal hardness mating material	HRC	>45
Recommended roughness mating material	μm	0.2 - 0.8



Application at high temperature

- oven, metal and ore processing plants
- kiln trolleys
- mixers
- pressure vessels
- reactors





TRIBO BRONZE® BEARING MATERIAL

ALLOY: TRIBO BRONZE® 125

Mechanical properties	Units	TB 125
Density	g/cm ³	6.20
Tensile strength	N/mm ²	70
Compressive strength	N/mm ²	385
Lubricant		C + MoS ₂
Hardness	HB 2,5/62,5/15	40
Maximum static load	MPa	110
Maximum dynamic load	MPa	55
Maximum speed (dry)	m/s	0.2
Maximum PV value (dry)	N/mm ² x m/s	0.8
Coefficient of friction (dry)	μ	0.28 - 0.50
Coefficient of friction (water)	μ	-
Operating temperature (minimum / maximum)	°C	-200 / 450
Minimal hardness mating material	HRC	>45
Recommended roughness mating material	μm	0.2 - 0.8

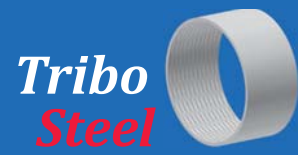


Tribo Bronze® 125 is a high-performance dry-running plain bearing material of nickel-copper-matrix with embedded graphite as a solid lubricant.

Tribo Bronze® 125

- maintenance free
- high static and dynamic load capacity
- good sliding properties and negligible stick-slip
- can be used in a dusty environment
- depending on the alloy, suitably from -200 °C to + 450 °C
- can be used in corrosive environments.
- no waterabsorption => dimensionally stable

For more information please contact our technical department.



Alloy Steel Bearings



ALLOY STEEL BEARINGS

PEL® BUSHINGS

Characteristics

High resistant to wear and seizure in severe working conditions: high pressure, abrasion, shocks and corrosion.

PEL® bushings are machined bearings with excellent resistance to wear and seizure due to the combination of a duplex surface treatment and special grease cavities / reservoirs.

Surface properties

This cross hatching topography provides large grease reservoirs in the loaded area and enables removal of abrasive particles.

The duplex treatment provides high surface hardness and excellent resistance to abrasive wear, seizure and corrosion.

Thanks to the surface topography there is an excellent distribution of the grease on all the friction surface, this guarantees:

- Excellent resistance to seizure
- Relatively low coefficient of friction
- Excellent resistance to abrasive wear



Conditions of use

Dynamic pressure max.	100 MPa
Static pressure max.	300 MPa
Maximum speed	1.5 m/s
Maximum temperature	250 °C
Lubrication	greased
Greasing intervals	Up to 50 hours

Standard Tolerances

Housing	H7
Bushing ID	H9
Bushing OD	p6
Shaft	f7
Shaft roughness	Ra < 0.8
Shaft hardness	> 56 HRC



ALLOY STEEL BEARINGS

PEL® BUSHINGS

Mating shafts

Advised materials for the shaft could be chrome hardened shafts (DIN no. 1.7220) or hard-chromed steel shafts.

Assembly instructions

PEL® bearings are best assembled by press fitting or by nitrogen mounting.

Toepassingen

Steel industry:

- Joints of telescopic arms
- Guiding slides for pistons
- Joints of reel clamps
- Joints of casting ladle
- Slide bearings for ore cars

Transportation:

- Bearings in braking systems for trains
- Hinges for spring suspensions
- Pivoting front axles of trucks

Construction equipments:

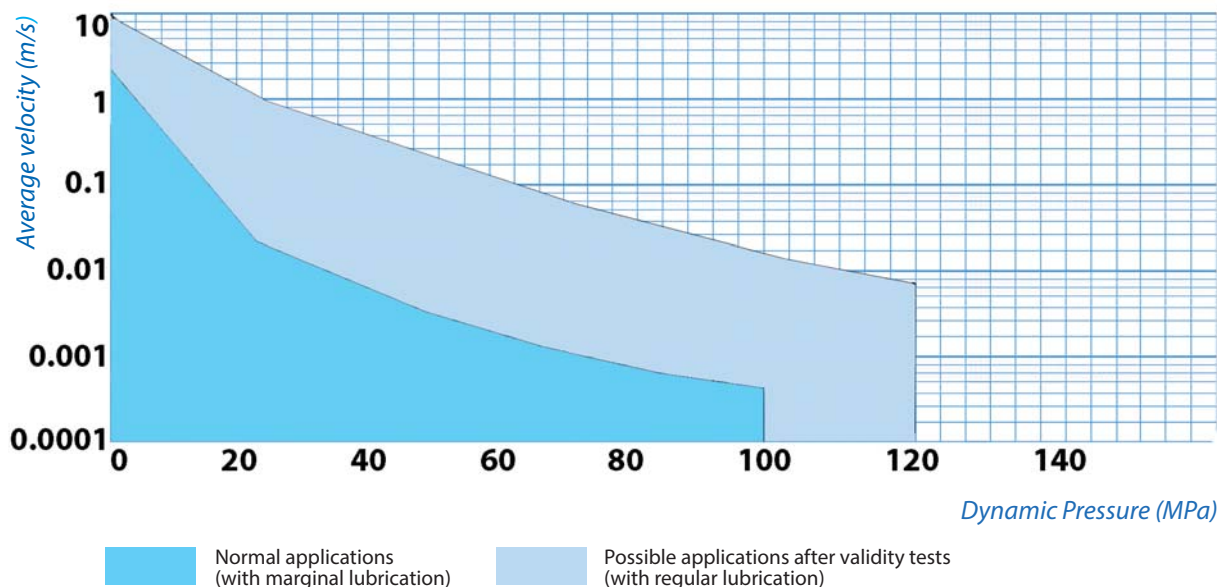
- Joints of excavators
- Joints of wheel loaders
- Joints of crushers
- Slide bushings for hydraulic breakers

Agriculture and horticulture:

- Hinges axle tractor
- Link rear loader
- Hinges cutting installations trees

PEL®: PV FACTOR CURVE

NB: This curve is obtained from bench test results



ALLOY STEEL BEARINGS

PEL®BH BEARINGS

High resistance to wear and seizure under high load and abrasion environment - low maintenance application.

The PEL®BH bushings are machined bearings with excellent resistance to wear and seizure due to the combination of a duplex surface treatment and special grease reservoirs.



Characteristics

They are extremely used in harsh working conditions: high load, corrosion, abrasion, shocks. With these bearings the intervals of lubrication are considerably increased.

Due to recent developments PEL®BH2 bushings offer improved wear resistance. PEL®BH technology is also available on spherical plain bearing in case of angular misalignment or flexion in the joint.

Conditions of use

Dynamic pressure max.	200 MPa
Static pressure max.	450 MPa
Maximum speed	1.5 m/s
Maximum temperature	250 °C
Lubrication	Greased
Greasing intervals	Up to 500 hours

Standard Tolerances

Housing	H7
Bushing ID	H9
Bushing OD	p6
Shaft	f7
Shaft roughness	Ra < 0.8
Shaft hardness	> 56 HRC



ALLOY STEEL BEARINGS

PEL® BH BEARINGS

Mating shafts

For optimal performance of the joint, the surface roughness should be below 0.8 $\mu\text{m Ra}$. Under severe conditions, shafts hardened to 56-60 HRC are recommended.

Assembly instructions

PEL BH bushings are best assembled by press fitting or by nitrogen mounting.

Applications

Steel industry:

- Bushing support of slabs
- Rollers of decarbonizers

Garbage collection trucks:

- Handling systems
- Waste compression devices

Earth moving equipment:

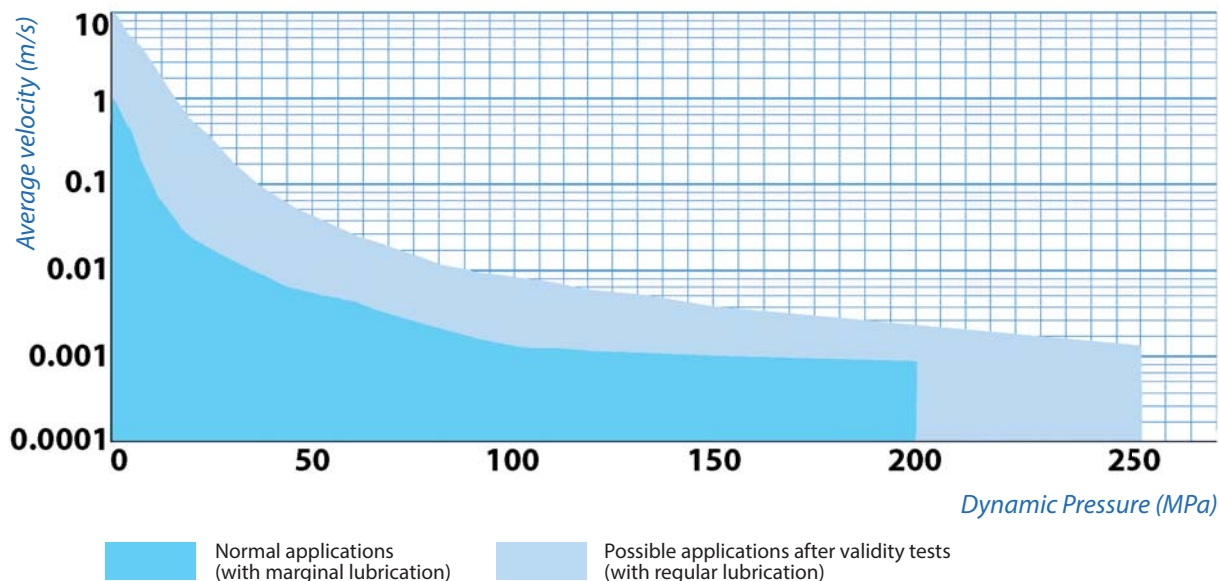
- Excavators
- Wheel loaders
- Backhoe loaders

Agricultural equipment:

- Tractors
- Ploughs
- Handlers
- Bush-cutter pillar arms

PEL® BH : PV FACTOR CURVE

NB: This curve is obtained from bench test results



ALLOY STEEL BEARINGS

PEL®BH SPHERICAL BEARINGS

High resistance to wear and seizure under high load and abrasion environment - low maintenance application.

The PEL T bushing has excellent resistance to wear and seizure and is suitable for high contact pressure and abrasive surroundings, in alternative or continuous rotation. With these bushings the intervals of lubrication are considerably increased.



Characteristics

These grease reservoirs can be designed between the inner and the outer ring of the bushing and/or between the inner ring and the pin. This provides longer useful life of HEF bearing compared to standard spherical bearings.



The use of spherical bushings are particularly recommended in case of:

- Poor alignment or angular misalignment
- Deformation of components during operation such as bending axes
- Use of wide tolerances (no problem of coaxiality, parallelism)

Applications

Earth moving equipment:

- Excavators
- Articulated vehicles
- Shredders

Garbage collection trucks:

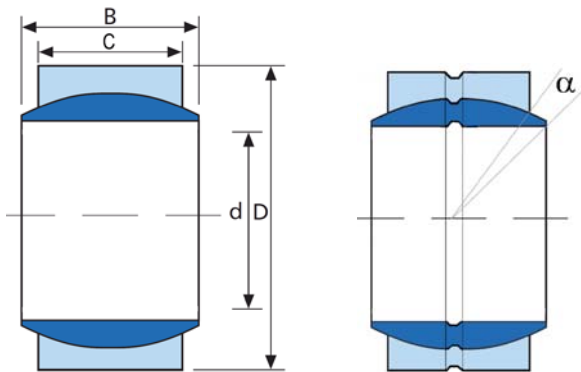
- Waste pressing installations

Agricultural equipment:

- Tractors
- Trailers

ALLOY STEEL BEARINGS

PEL®BH SPHERICAL BEARINGS



Standard dimensions					Load ratings (kN)	
d	D	B	C	Tilt angle	C ₀	C
20	35	16	12	9°	38	220
30	47	22	18	6°	74	430
40	62	28	22	7°	115	700
50	75	35	28	6°	180	1100
60	90	44	36	6°	290	1700
70	105	49	40	6°	360	2200
80	120	55	45	6°	470	2800
90	130	60	50	5°	575	3400
100	150	70	55	7°	650	3800
110	160	70	55	6°	720	4200
120	180	85	70	6°	960	5300

Tolerances of the housing	
Low loads (axial movement of outer ring possible)	H7
High loads	M7
Use of an aluminium housing	N7

Tolerances of the shaft	
Shaft pressed in the inner ring	m6
Shaft sliding in the inner ring (the shaft should be hardened in this case)	f7/g6



ALLOY STEEL BEARINGS

PEL®HP

Properties	
Dynamic pressure (max)	100 MPa
Static pressure (max)	300 MPa
Maximum speed	1.5 m/s
Maximum temperature	- 40 to +250 °C
Lubrication	Greased
Greasing intervals	Up to 500 hours
Shaft roughness	Ra < 0.8
Shaft hardness	> 56 HRC



PEL HP bushings have excellent resistance to wear and seizure thanks to the combination of a duplex surface treatment and optimized surface topography.

Standard tolerances:

OD: p6
ID: H9

Mating shaft

Hardness $\geq$ 56 HRC
Surface roughness: Ra $\leq$ 1.6 μ m

Applications:

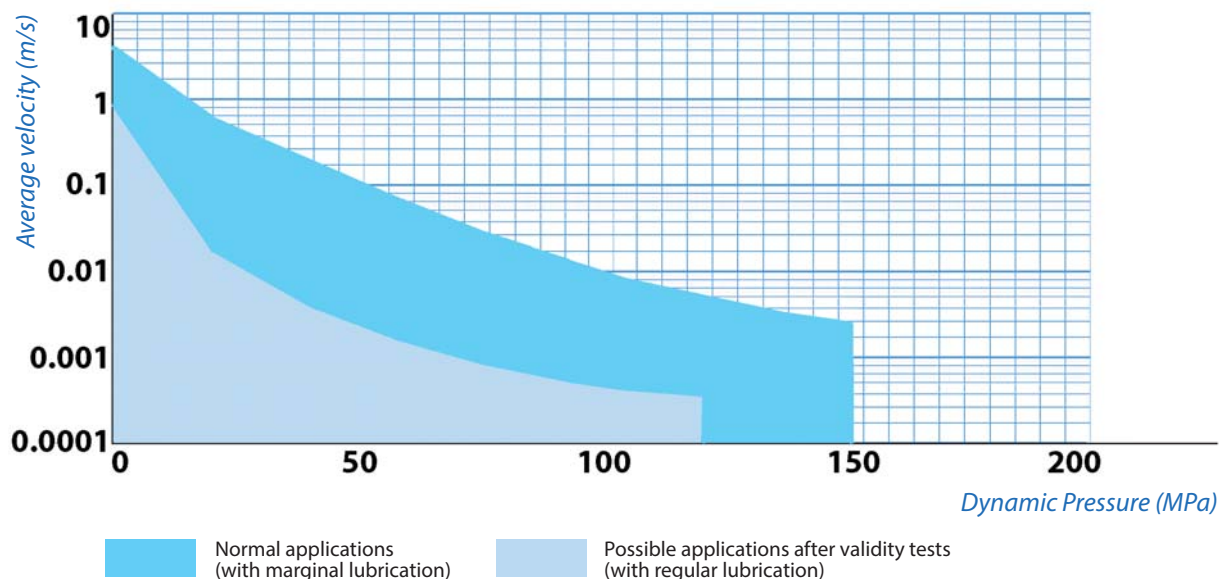
- Crane grab
- Telescopic handlers
- Agriculture (ploughs)

PEL HP benefits:

- Long interval of lubrication (up to 250 hours)
- High wear and seizure resistance
- Appropriate for linear applications

PEL®HP : PV FACTOR CURVE

NB: This curve is obtained from bench test results



ALLOY STEEL BEARINGS

FAM® MANGANESE STEEL BEARINGS

Excellent resistance to abrasive wear thanks to a mechanical work hardening of the contact area. Only an initial greasing is required.

They are mainly used for their high resistance to abrasion and high contact pressure in shock working conditions, with no maintenance.

Surface characteristics

FAM® bushings have internal cross hatched topography making the surface harder and helping removing abrasive particles.

FAM® technology benefits

- Maintenance free
- High abrasion resistance
- High load and high shock resistance



Properties

Dynamic pressure (max)	50 MPa
Static pressure (max)	300 MPa
Maximum speed	0.5 m/s
Maximum temperature	380 °C
Lubrication	Initial greasing
Shaft roughness	Ra < 0.8
Shaft hardness	> 56 HRC

Lubrication

FAM® bushings require only initial greasing. This type of bushing can be used without any lubrication in very dirty conditions.



ALLOY STEEL BEARINGS

FAM® MANGANESE STEEL BEARINGS

Mating shafts

Shafts hardened for 56 to 60 HRC are recommended.

Assembly instructions

FAM® bushings are best assembled by press fitting or by nitrogen mounting.

Clearance

Bushing ID	Bushing ID tolerance	Shaft tolerance
25 mm <ID<50 mm	+ 50 µm	-100 µm
	+ 200 µm	-150 µm
50 mm <ID<100 mm	+ 50 µm	-200 µm
	+ 300 µm	-250 µm
100 mm <ID	+ 100 µm	-250 µm
	+ 400 µm	-300 µm



Applications

Steel industry:

- Joints of furnaces
- Joints of steel conveyor rolls
- Sheet metal conveyor rolls
- Joints of ingot guide rolls

Handling

- Joints of crane grabs
- Joints of crane spreaders
- Joints of clamshell bucket
- Joints of brake shoes

ALLOY STEEL BEARINGS

PEL®L BUSHES

Due to the duplex surface treatment, PEL®L bushes have excellent protection against seizure and corrosion. These bearings are especially suitable in applications with high static load in combination with vibrations.

Properties	
Static load (max)	650 MPa
Maximum temperature	250 °C

PEL®L bushes are based on a steel alloy with high mechanical resistance (higher than 850 MPa) and on a diffusion thermo-chemical surface treatment (surface hardness higher than 600 Hv1), combined with a special self-lubricating layer. This duplex surface treatment provides excellent friction properties and corrosion and wear resistance. These bearings are extremely suitable at high iMPact load.

Standard tolerances:

UD : p6
ID: H9

Mating shafts:

Hardness: $\geq 57-60$ HRC
Roughness: $Ra \leq 1.6 \mu m$

Applications:

- Railway (brake couplings)
- Infrastructure (tippers)
- Agriculture (sowers and ploughs)

PEL®L advantages:

- High mechanical resistance
- Excellent friction properties



ALLOY STEEL BEARINGS

COD11® BEARINGS

COD 11® bearings are manufactured from copper aluminium alloy with excellent resistance to oxidation, seizure and wear thanks to a hardened surface treatment and grease reservoirs on the contact area. With these bushings, the intervals of lubrication are considerably increased.

Surface characteristics

The surface topography of the COD 11® bushings provides large grease reservoirs with different forms available: holes, cavities, cross hatching, while maintaining an optimum load distribution.

The diffusion surface treatment provides high surface hardness and excellent resistance to seizure and wear.

COD® technology benefits

- Excellent resistance to wear and seizure.
- Long greasing intervals
- Excellent performance in case of random lubrication
- Excellent distribution of the lubricant on the friction area thanks to the surface topography



Conditions of use

Dynamic pressure maximum	60 MPa
Static pressure maximum	200 MPa (cross hatching version)
Maximum speed	0.2 m/s
Maximum temperature	250 °C*
Lubrication	greased
Greasing intervals	depending on the roughness

Standard Tolerances

Housing	H7
Bushing ID	H9
Bushing OD	p6
Shaft	f7
Shaft roughness	Ra < 0.8
Shaft hardness	> 56 HRC

*greasing (up to 350 °C with initial greasing with special high temperature lubricant)

ALLOY STEEL BEARINGS

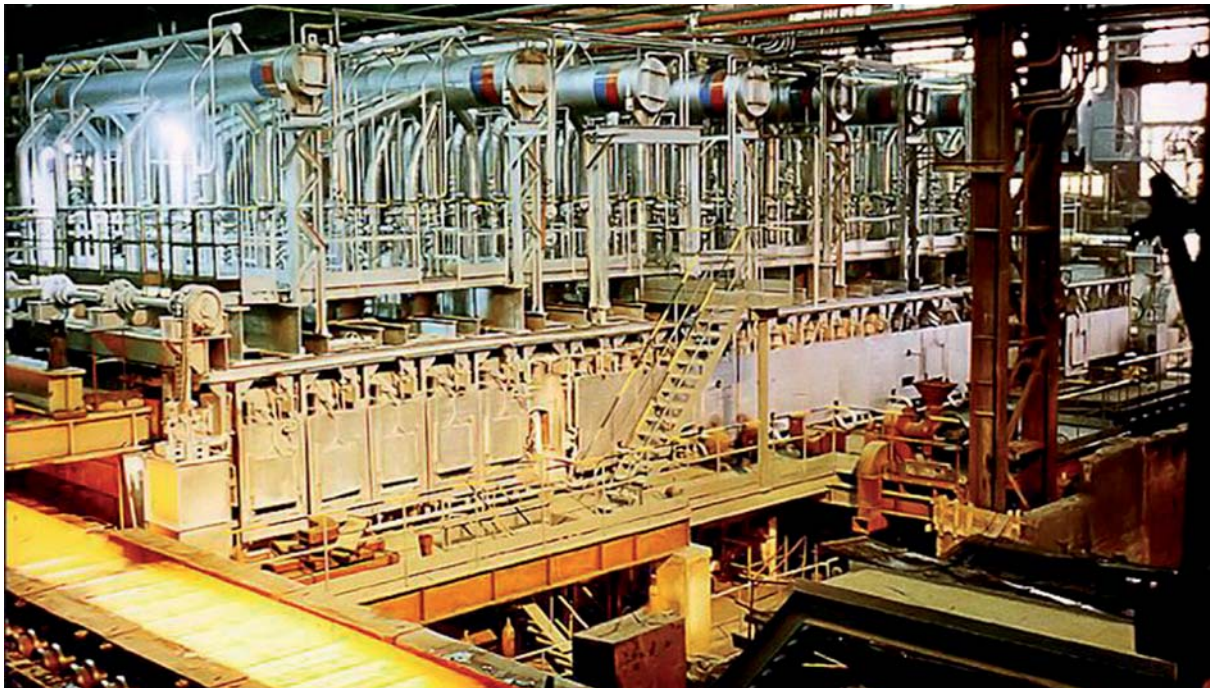
COD11® BEARINGS

Mating shafts

For optimal performance, the surface roughness should be below $0.8 \mu\text{m Ra}$. Under severe working conditions, shafts hardened $\geq 55 \text{ HRC}$ or $\geq 600 \text{ Hv}$ are recommended.

Assembly instructions

COD 11® bushings are best assembled by press fitting or nitrogen mounting.



Applications

Steel industry:

- Screws and swivels for automatic adjustment of ingot moulds
- Bushings for adjustment of rolling mills
- Joints of continuous casting chains
- Joints of sewer settling depots
- Joints of hydraulic machines
- Bearing blocks for overhead cranes
- Gasometer roller bearings
- Guiding slides for rolling mills

Marine:

- Bearings for ship cranes
- Hydraulic cylinder bearings

Offshore:

- Bearings for platform elevators

ALLOY STEEL BEARINGS

PEL[®]T BEARINGS

Characteristics

High resistance to wear and seizure under high load and abrasion environment - low maintenance application.

Surface characteristics

Manufactured from a thin wrapped steel strip, the PEL[®]T bearing has excellent resistance to wear and seizure and is suitable for high contact pressure and abrasive surroundings, in alternative or continuous rotation.

With these bearings the intervals of lubrication are increased.

This bushing exist in standard dimensions and could easily replace wrapped bronze bushing.



Conditions of use

Dynamic pressure maximum	100 MPa
Static pressure maximum	200 MPa
Maximum speed	8 m/s
Maximum temperature	250 °C
Lubrication	greased
Greasing intervals	Up to 250 hours

Standard Tolerances

Housing	H7
Bushing ID	H9
Bushing OD	p6
Shaft	f7
Shaft roughness	Ra < 0.8
Shaft hardness	> 56 HRC

Standard dimensions of PEL T bearings*

Dimensions in mm		Dimensions in mm	
Ø int.	Ø ext.	Ø int.	Ø ext.
20	23	50	55
25	28	55	60
30	34	60	65
35	39	65	70
40	44	70	75
45	49	75	80
		80	85

**We can also produce PEL T bushings in non-standard dimensions on request*

Applications

Earth moving equipment:

- Wheel loaders
- Skid loaders
- Telescopic handlers

Agricultural equipment:

- Ploughs
- Handlers
- Front loaders

ALLOY STEEL BEARINGS

PEL[®]T BEARINGS

Mating shafts

For optimal performances of the joint, the surface roughness should be below 0.8 $\mu\text{m Ra}$. Under severe conditions, shafts hardened to 56-60 HRC are recommended.

Test conditions

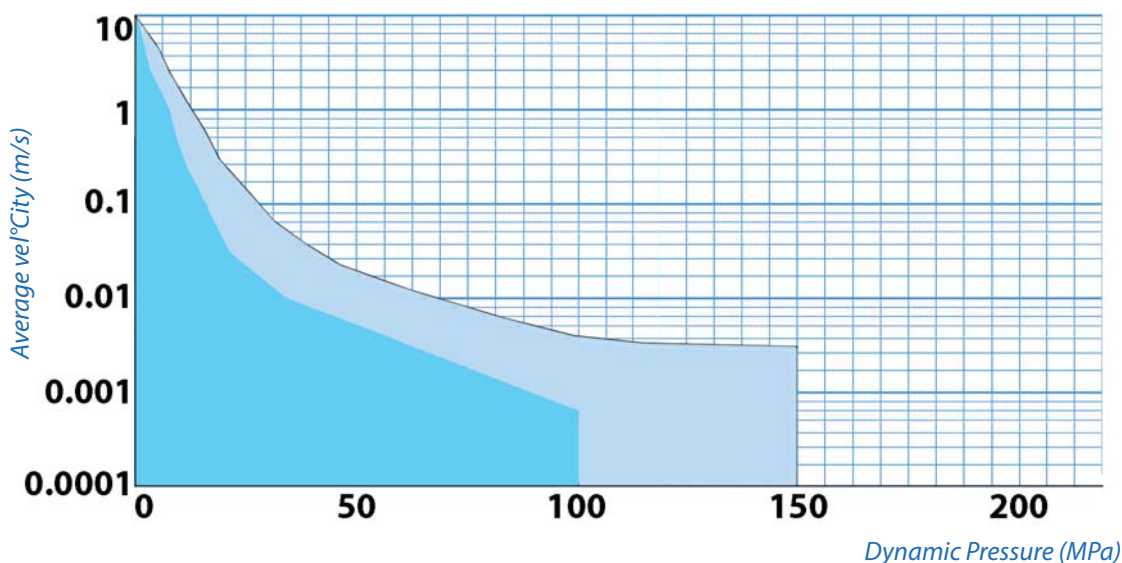
- Oscillating motion, amplitude 100°
- Greasing at mounting
- Dynamic Pressure $P = 80 \text{ MPa}$
- PV factor = 0,18 MPa technology
- Surface roughness 0,4 $\mu\text{m Ra}$
- Test duration 1000 hours



Bushing	Wear after testing (mm)
PEL [®] T Bearing	< 0.05
High performance rolled perforated bronze	0.2
High performance loaded composite	> 0.5
Steel + Sintered Bronze + Polymeric resin	0.2
Bronze with graphite inserts	> 0.5

PEL[®]T : PV FACTOR CURVE

NB: This curve is obtained from bench test results



Normal applications (with marginal lubrication) Possible applications after validity tests (with regular lubrication)

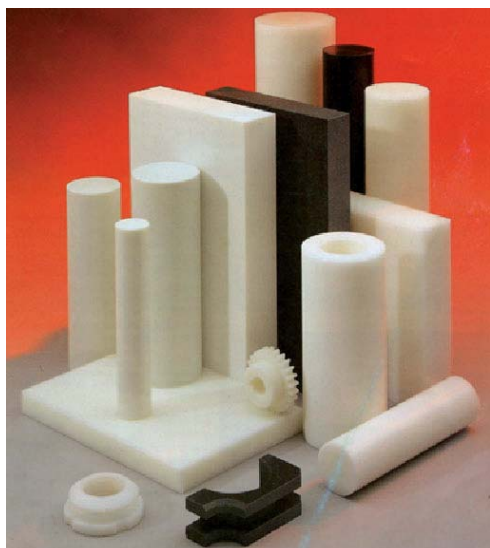
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Technical Plastics

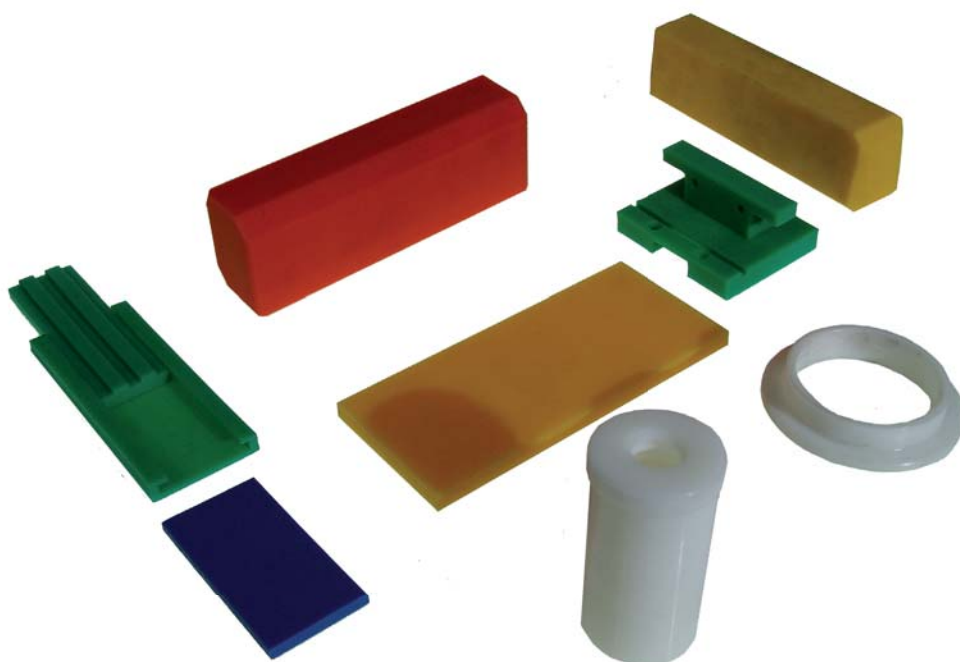


TECHNICAL PLASTICS



Elcee supplies a wide range of technical plastics, with a specialisation in fully machined parts, extrusions and injection molded products. Because of our extensive knowledge of these materials and years of experience, we offer you a customized product solution. A wide range of materials and extensive production facilities for machining, offers you an economic, processed final product.

In collaboration with our clients we have developed many product solutions, including; bearings, sprockets, wear strips, cable pulleys, toothed segments, sliding blocks, extrusion profiles on behalf of the glass industry, food industry, façade design and injection molding products such as rollers, sheaves, etc.



Material properties: mechanical properties											
Material code	Material description	Density DIN53479 ISO 1183 (g/cm 3)	Moisture- absorption at a relative humidity of 50% (%)	Moisture- absorption in water at saturation (%)	Tensile strength DIN53455 ISO R 527 (N/mm -dry / 50% rel. humidity)	Elongation at fraction DIN53457 ISO R 527 (% dry / 50% rel. humidity)	E-modulus DIN53457 ISO R527 (N/mm -dry / 50% rel. humidity)	Compressive strength (1%) DIN53454 (N/mm -dry / 50% rel. humidity)	Ball- hardness DIN53456 ISO 2039 (N/mm)	Time-yield strength at 1% stretch in 1000 hours DIN53444 (N/mm)	Coefficient of friction as to steel at dry running p= 0,05 N/mm2 (% dry / 50% rel. humidity)
ABS	ABS	1,06	0,4	0,7	45	25	2500	-	85	17	0,50
PA4,6		1,18	2,8	9,5	100/55	25/100	3100/1500	-	165	-	0,15/0,25
PA6	Natural / black	1,14	3	9	80/60	60/200	300/1800	88/60	160/80	5	0,38/0,42
PA6 GF20	PA6 + 20% glass fibre + MoS2	1,33	2	6	190/130	5/8	8000/6000	290	210/150	35	0,40/0,50
PA6G	PA6G	1,15	2,5	7	85/60	20/80	3500/1900	90	165/100	6	0,36/0,42
PA6G HR	PA6G HR	1,15	2,5	6	90/63	20/60	3900/2000	90	170/100	6	0,35/0,40
PA6 OLIE	PA6 + Oil	1,15	2	4,8	80/65	35/68	3300/1900	90	160/90	6	0,25/0,38
PA6G PE	PA6G PE	1,14	2	3	80/60	30/100	3000/1800	-	175/140	5	0,18/0,30
PA6.6	PA6.6 Natural/black	1,14	2,8	8	88/68	40/150	3100/2000	82	170/100	6	0,34/0,42
PA6.66	PA6.66 GX Black	1,14	2,8	8	90/68	50/160	3100/2000	88	170/100	6	0,32/0,40
PA11		1,04	0,9	2	45	270	1800	-	100	4	0,38
PA11 GF30	PA11 + 30% glass fibre	1,26	0,4	1,3	120	4	3500	-	150	30	0,48
PA12		1,02	0,7	1,7	47	250	1700	87	95	4	0,38
PAI	Polyamide-imide	1,4	0,33	5	152	12	4800	-	-	-	
PC	Polycarbonate	1,2	0,35	0,5	65	110	2300	-	110	35	0,55
PC GF30	Polycarbonate + 30% glass fibre	1,43	0,15	0,3	90	3	6000	-	150	-	-
PCTFE		2,1	-	-	40	170	1300	-	70	-	0,35
PE300	HDPE	0,95	0	0	28	500	900	-	50	3	0,30
PE500	PE-HMW	0,95	0	0	26	600	800	-	45	3	0,30
PE1000	PE-UHMW	0,94	0	0	22	450	1000	-	38	3	0,12
PE8000	Superglide	0,96	0	0	21	360	1000	-	43		0,09
PEEKmod.	PEEK + Teflon + Graphite	1,48	0,12	0,4	118	3	10000	-	-	-	0,40

Material properties: mechanical properties											
Material code	Material description	Density DIN53479 ISO 1183 (g/cm3)	Moisture- absorption at a relative humidity of 50% (%)	Moisture- absorption in water at saturation (%)	Tensile strength DIN53455 ISO R527 (N/mm -dry / 50% rel. humidity)	Elongation at fraction DIN53457 ISO R 527 (% dry / 50% rel. humidity)	E-modulus DIN53457 ISO R527 (N/mm -dry / 50% rel. humidity)	Compressive strength (1%) DIN53454 (N/mm -dry / 50% rel. humidity)	Ball- hardness DIN53456 ISO 2039 (N/mn)	Time-yield strength at 1% stretch in 1000 hours DIN53444 (N/mn)	Coefficient of friction as to steel at dry running p= 0,05 N/mm2 (% dry / 50% rel. humidity)
PEEK GF30	PEEK + 30% glass fibre	1,49	0,1	0,4	158	2,4	9700	-	-	-	0,11
PEI	Polyetherimide	1,27	0,2	1,2	95	55	3100	-	170	-	-
PES	Polyethersulfone	1,36	0,8	2	82	50	2400	-	150	20	0,40
PETG		1,27	-	0,2	53	40	2200	-	-	-	-
PETP		1,35	0,2	0,5	85	70	2800	100	145	13	0,20
PETP mod		1,34	0,2	0,5	78	85	2700	100	140	13	0,24
PETP mod		1,44	0,23	0,47	78	8	3200	120	160	23	-
PFA	PFA	2,17	0	0	50	60	700	-	-	-	-
PFP	PFP	1,4	-	2	117,7	0,6	6900	-	-	-	-
PFW	PFW	1,4	-	8	78,5	0,6	6900	166	-	-	-
PI	Polyimide	1,35	1,2	3	116	9	4000	-	-	12	0,80
PI GR15	Polyimide + 15% Graphite	1,42	-	-	88	2,8	4000	-	-	-	0,28/0,32
PMMA		1,19	1	4	74	10	3300	-	180	20	0,54
POMc	Polyacetal copolymer	1,41	0,3	0,5	66	40	300	63	150	13	0,30
POMh	Polyacetal homopolymer	1,42	0,3	0,5	69	40	3200	70	160	13	0,30
POM-PE	Polyacetal LX	1,34	0,14	-	43	14	2200	-	-	-	0,19
POM-PTFE	Polyacetal+PTFE	1,52	-	-	49	15	2400	-	-	-	0,25
POM GF30	Polyacetal+30% glass fibre	1,6	0,15	0,8	125	3	9300	-	-	40	0,50
PP	Polypropylene	0,93	0	0	35	600	1100	-	75	4	0,32
PPomod.		1,06	0,1	0,3	45	50	2500	-	100	20	0,35
PPOmod GF30	PPO+ glass fibre	1,27	0,12	0,3	115	3	9000	-	137	-	-
PPS		1,35	0	0,15	75	3	3500	-	190	-	-

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Material properties: thermal properties

Material code	Material description	Melting point (°C)	Thermal conduction DN52612 (W/(K.m.))	Deformation temperature (max) HDT-A (°C)	Maximum brief temperature (°C)	Long-term temperature (°C)	Linear coefficient of expansion Dry / 50% rel. humidity (10-6, K)	Flammability (UL94)
ABS	ABS	115	0,15	90	100	- 25 to + 80	85	HB
PA4,6		295	0,30	160	220	- 30 to + 130	75	V.2
PA6	Natural / black	220	0,23	84	150	- 40 to + 100	70/90	HB
PA6 GF20	PA6 + 20% glass fibre + MoS2	220	0,25	190	180	- 40 to + 120	25/35	HB
PA6G	PA6G	220	0,30	100	160	- 40 to + 100	70/80	HB
PA6G HR	PA6G HR	220	0,30	100	160	- 40 to + 100	70/80	HB
PA6 OLIE	PA6 + Oil	220	0,30	100	160	- 40 to + 100	70/80	HB
PA6G PE	PA6G PE	220	0,28	95	160	- 40 to + 105	50/70	HB
PA6.6	PA6.6 Natural/black	255	0,23	105	160	- 30 to + 115	70/90	V.2
PA6.66	PA6.66 GX Black	255	0,23	100	160	- 30 to + 115	70/90	V.2
PA11		183	0,23	55	130	- 50 to + 80	100	V.2
PA11 GF30	PA11 + 30% glass fibre	183	0,25	130	120	- 50 to + 80	30	V.2
PA12		175	0,23	50	130	- 50 to + 80	100	V.2
PAI	Polyamide-imide	310	0,26	278	260	- 190 to + 260	31	V.0
PC	Polycarbonate	160	0,35	145	140	- 100 to + 120	65	V.2
PC GF30	Polycarbonate + 30% glass fibre	230	0,26	142	140	- 100 to + 120	30	V.1
PCTFE		216	0,24	126	180	- 40 to + 150	50	V.0
PE300	HDPE	130	0,40	45	100	- 40 to + 80	200	HB
PE500	PE-HMW	132	0,40	47	100	- 40 to + 80	200	HB
PE1000	PE-UHMW	132	0,41	48	100	- 150 to + 80	200	HB
PE8000	Superglide	132	0,41	50	100	- 150 to + 80	200	HB
PEEK	PEEK	334	0,25	150	280	- 60 to + 250	47	V.0
PEEKmod.	PEEK + Teflon + Graphite	330	0,24	277	290	- 40 to + 260	22	V.0
PEEK GF30	PEEK + 30% glass fibre	350	0,43	315	290	- 40 to + 260	22	V.0
PEI	Polyetherimide	220	0,22	190	200	- ? to + 170	56	V.0
PES	Polyethersulfone	230	0,18	195	220	- 40 to + 180	60	V.0
PETG		-	0,32	-	70	to + 65	-	V.2
PETP		255	0,24	100	180	- 20 to + 120	70	HB
PETP mod		225	0,24	100	180	- 20 to + 120	70	HB

Material properties: thermal properties

Material code	Material description	Melting point (°C)	Thermal conduction DN52612 (W/(K.m.))	Deformation temperature (max) HDT-A (°C)	Maximum brief temperature (°C)	Long-term temperature (°C)	Linear coefficient of expansion Dry / 50% rel. humidity (10-6, K)	Flammability (UL94)
PETP mod		255	0,29	95	160	- 20 to + 110	75	HB
PFA	PFA	290	0,26	-	260	to + 200	120	V.O.
PPF	PPF	-	0,20	75	140	to + 120	30	HB
PFW	PFW		0,20	65	130	to + 110	30	HB
PI	Polyimide		0,22	-	480	- 270 to + 250	50	V.O.
PI GR15	Polyimide + 15% Graphite		0,53	-	480	- 270 to + 265	38	V.O.
PMMA	PMMA		0,19	95	95	- 40 to + 80	70	HB
POMc	Polyacetal copolymer	165	0,30	110	140	- 30 to + 100	100	HB
POMh	Polyacetal homopolymer	175	0,30	118	148	- 30 to + 100	100	HB
POM-PE	Polyacetal LX	-	-	84	-	to + 95	140	HB
POM-PTFE	Polyacetal+PTFE	165	-	98	140	to + 100	110	HB
POM GF30	Polyacetal+30% glass fibre	165	-	153	140	to + 100	30	HB
PP	Polypropylene	160	0,25	65	120	- 10 to + 90	150	HB
PPomod.		-	0,22	130	110	- 25 to + 90	60	HB
PPomod GF30	PPO+ glass fibre	-	-	135	110	- 25 to + 85	30	HB
PPS		285	0,30	110	300	to + 230	50	V.O.
PPS GF40	PPS + 40% glass fibre	285	0,20	260	260	- 60 to + 230	20	V.O.
PS	Polystyrene	-	0,16	80	70	- 50 to + 60	80	HB
PSU	Polysulfone	190	0,26	174	200	- 100 to + 160	56	V.O.
PTFE	Teflon	325	0,24	260	300	- 300 to + 260	14	V.O.
PTFE GF25	Teflon + 25% glass fibre	327	0,41	-	300	- 200 to + 260	11	V.O.
PTFE C25	Teflon + 25% Carbon	327	0,63	-	300	- 200 to + 260	11	V.O.
PTFE BR60	Teflon + 60% Bronze	327	7,20	-	300	- 200 to + 260	8	V.O.
PUR		160	0,25	-	110	to + 80	150	HB
PVC	PVC	-	0,14	75	80	- 15 to + 60	80	V.O.
PVC-C	High Temperature PVC	-	0,14	105	100	- 15 to + 80	60	V.O.
PVC-MZ	Extra shock-resistant PVC	-	0,17	78	80	- 40 to + 60	80	V.O.
PVC-W	Soft PVC	-	0,15	-	60	- 15 to + 50	180	V.O.
PVDF		180	0,11	95	150	- 50 to + 140	130	V.O.

UHMPE EXTRUDED PROFILES

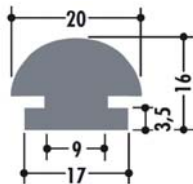
Introduction

Thermoplastic plastics are widely used in machines and equipment used for internal transport equipments. Profiles or chain guides play an important role. For these applications we offer extrusions made of Ultra High Molecular Polyethylene. The usual quality (PE-UHMW / PE 1000) is produced in the colours natural, black, green and blue. Other colours are also available on request.

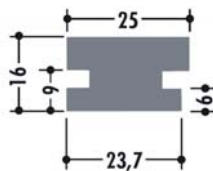
The following sections are examples of special shapes, which are developed together with our customers. Furthermore, we are able to design profiles, tailored to your specific needs.

Lateral profiles

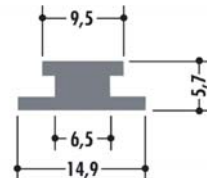
LC-13



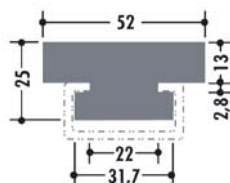
LC-14



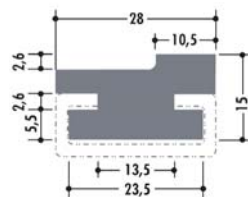
LC-33



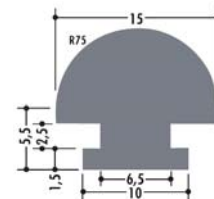
LC-35



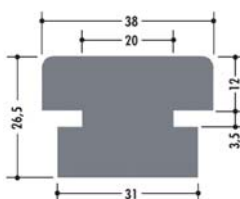
LC-78



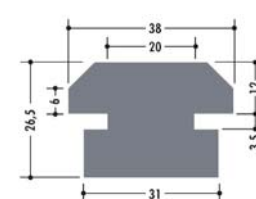
LC-83



LC-207



LC-208

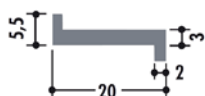


UHMPE EXTRUDED PROFILES

Z-profiles

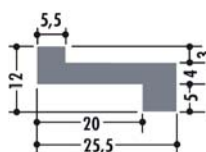
LC-7

Length per roll ± 100 m



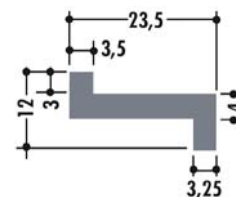
LC-8

Length per roll ± 60 m



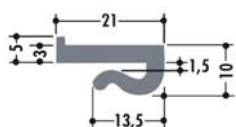
LC-9

Length per roll ± 60 m



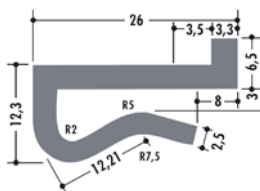
LC-10

Length per roll ± 60 m



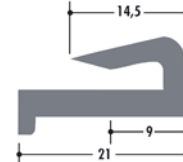
LC-84

Length per roll ± 50 m

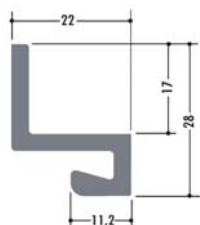


LC-103

Length per roll ± 80 m

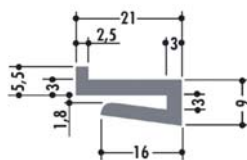


LC-108



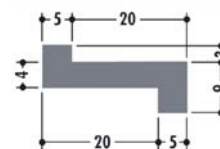
LC-119

Length per roll ± 70 m



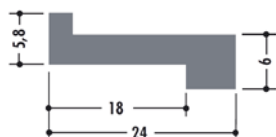
LC-124

Length per roll ± 60 m

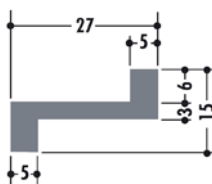


LC-152

Length per roll ± 50 m

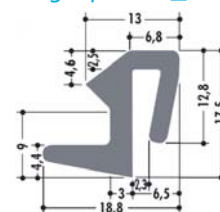


LC-187



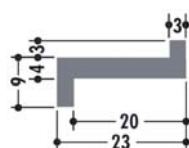
LC-200

Length per roll ± 45 m

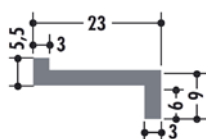


LC-205

Length per roll ± 45 m



LC-211



UHMPE EXTRUDED PROFILES

L-profiles

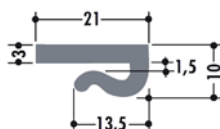
LC-7.1

Length per roll ± 100 m

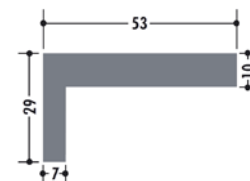


LC-10.1

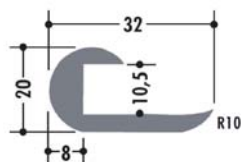
Length per roll ± 60 m



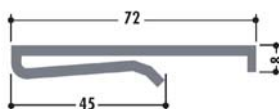
LC-54



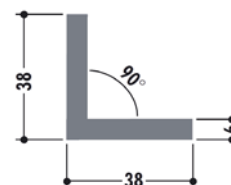
LC-55



LC-107



LC-125

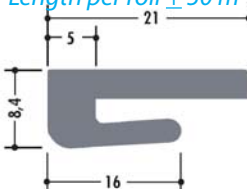


LC-137



LC-138

Length per roll ± 50 m

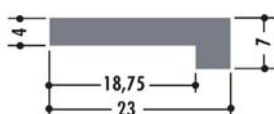


LC-141

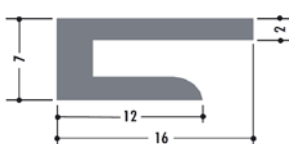


LC-151

Length per roll ± 60 m

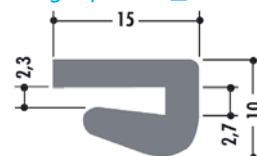


LC-154



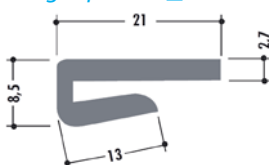
LC-155

Length per roll ± 50 m

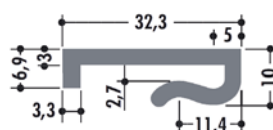


LC-170

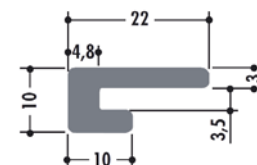
Length per roll ± 50 m



LC-180



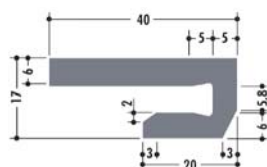
LC-182



UHMPE EXTRUDED PROFILES

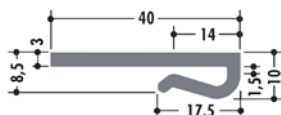
L-profiles

LC-190



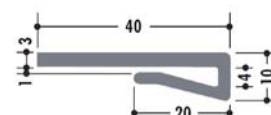
LC-206

Length per roll ± 50 m



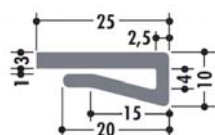
LC-217

Length per roll ± 50 m



LC-218

Length per roll ± 50 m

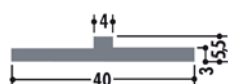


UHMPE EXTRUDED PROFILES

T-profiles

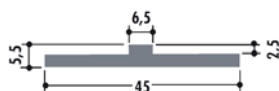
LC-1

Length per roll ± 50 m



LC-2

Length per roll ± 50 m

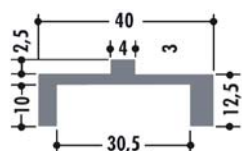


LC-3

Length per roll ± 50 m

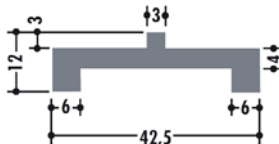


LC-4



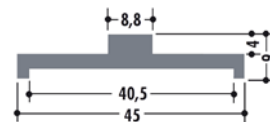
LC-5

Length per roll ± 40 m

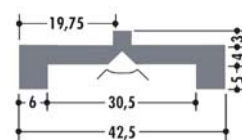


LC-6

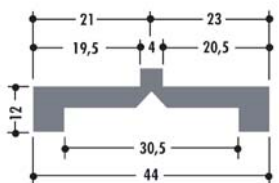
Length per roll ± 50 m



LC-51

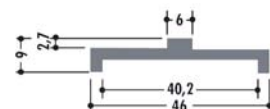


LC-51.1

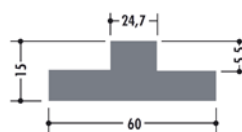


LC-79

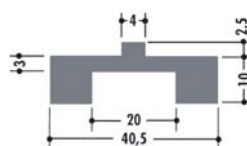
Length per roll ± 50 m



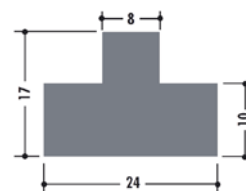
LC-102



LC-133

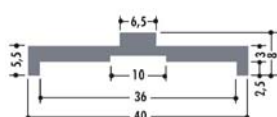


LC-140



LC-149

Length per roll ± 50 m



LC-158

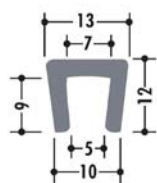


UHMPE EXTRUDED PROFILES

U-profiles

LC-23

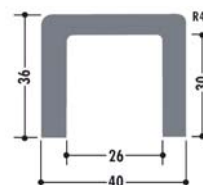
Length per roll ± 50 m



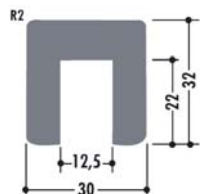
LC-24



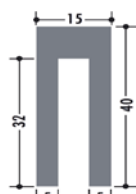
LC-26



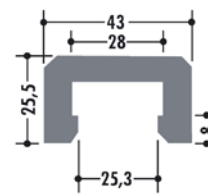
LC-28



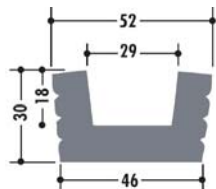
LC-29



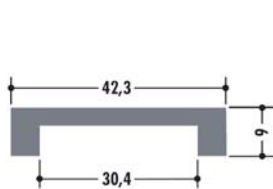
LC-30



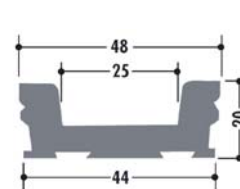
LC-42



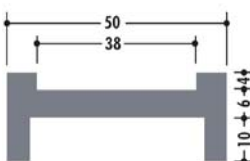
LC-63



LC-68



LC-76

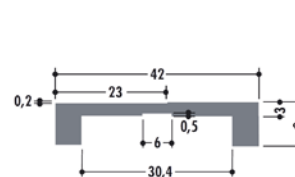


LC-98

Length per roll ± 40 m

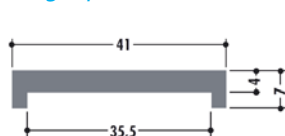


LC-117



LC-123

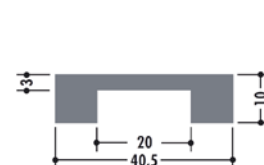
Length per roll ± 50 m



LC-128



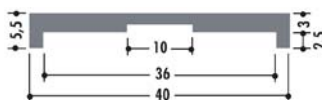
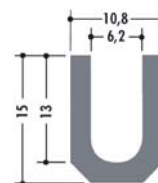
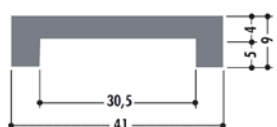
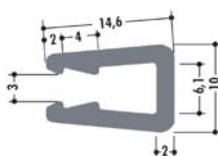
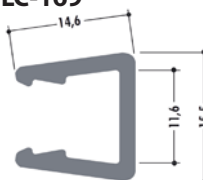
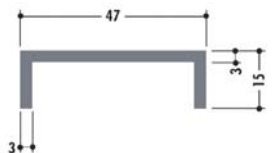
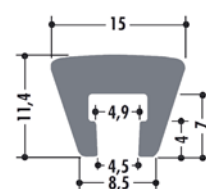
LC-132

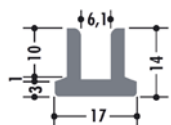
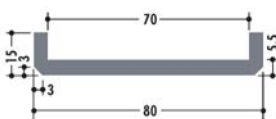
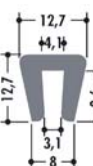
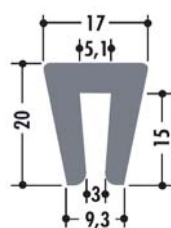
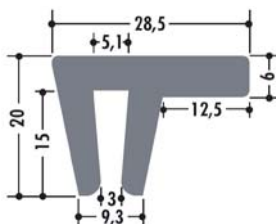
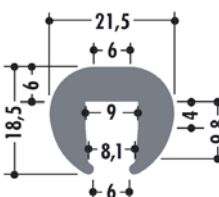


UHMPE EXTRUDED PROFILES

U-profiles

LC-146

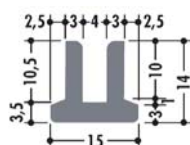
LC-148
Length per roll ± 50 m

LC-150

LC-159

LC-167

LC-169

LC-173
Length per roll ± 40 m

LC-191
Length per roll ± 50 m

LC-210

LC-213

LC-216

LC-219
Length per roll ± 50 m

LC-220

LC-221

LC-222


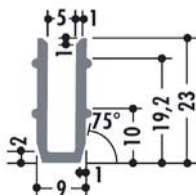
UHMPE EXTRUDED PROFILES

U-profiles

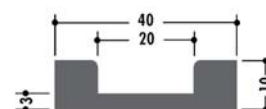
LC-223



LC-229



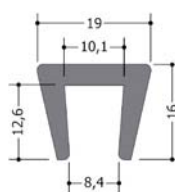
LC-231



LC-235



LC-236



LC-241

Length per roll ± 50 m

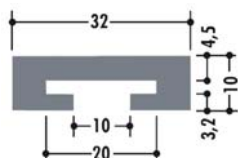


UHMPE EXTRUDED PROFILES

C-profiles

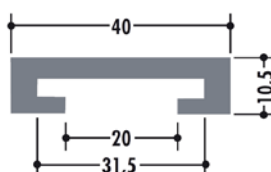
LC-15

For flat steel 20 x 3



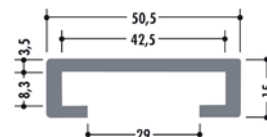
LC-16

For flat steel 30 x 3



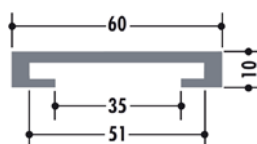
LC-17

For flat steel 40 x 8



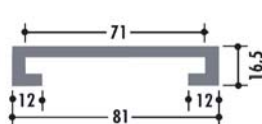
LC-18

For flat steel 50 x 4



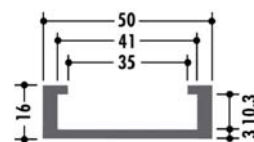
LC-19

For flat steel 70 x 6

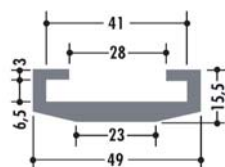


LC-21

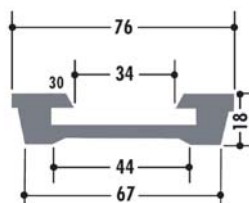
For flat steel 40 x 10



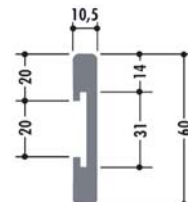
LC-22



LC-62

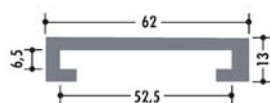


LC-64

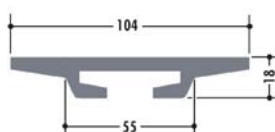


LC-94

For flat steel 50 x 6

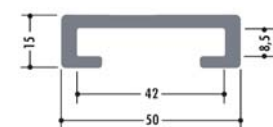


LC-111

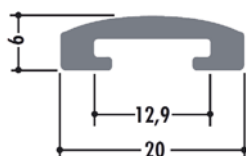


LC-112

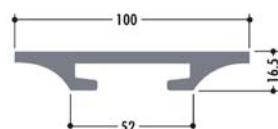
For flat steel 40 x 8



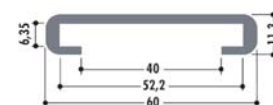
LC-113



LC-115

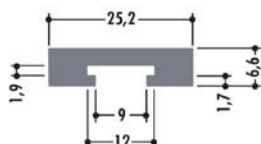
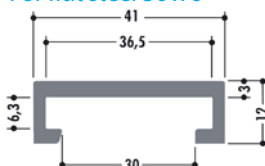
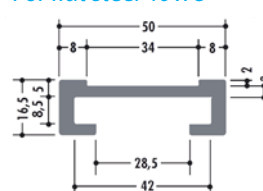
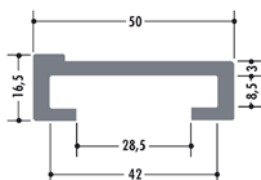
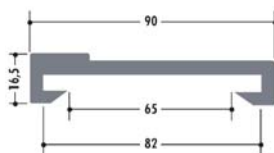


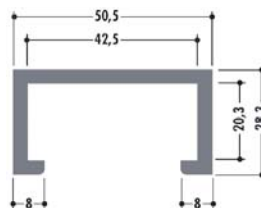
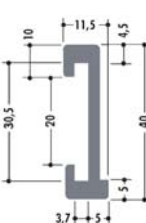
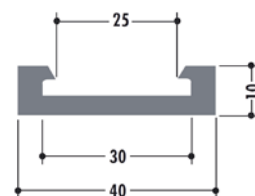
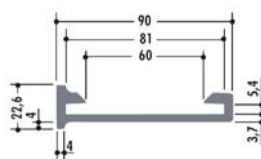
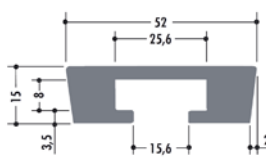
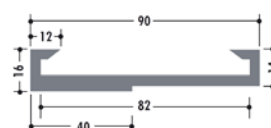
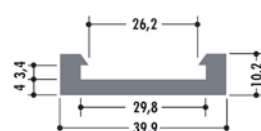
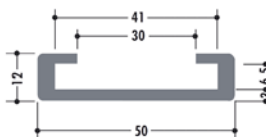
LC-120



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C-profiles

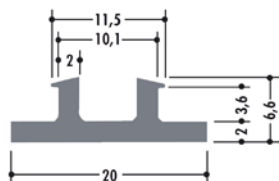
LC-126

LC-127
For flat steel 36 x 6

LC-129
For flat steel 40 x 8

LC-130
For flat steel 40 x 8

LC-131

LC-142
For flat steel 80 x 5

LC-160

LC-161

LC-172

LC-188

LC-192

LC-214

LC-226

LC-227


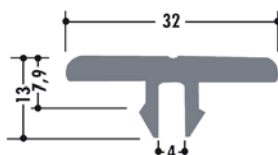
UHMPE EXTRUDED PROFILES

Specials (Clip profile)

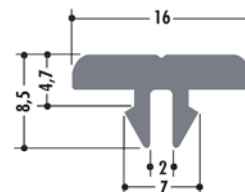
LC-77



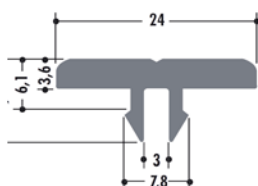
LC-90



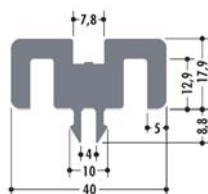
LC-156



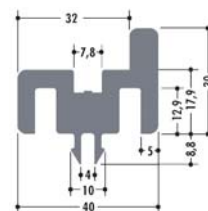
LC-157



LC-196



LC-197

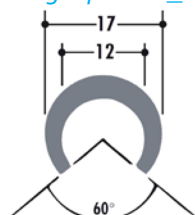


UHMPE EXTRUDED PROFILES

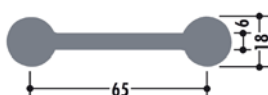
Specials

LC-11

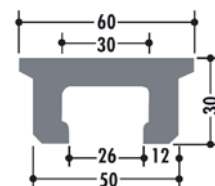
Length per roll ± 40 m



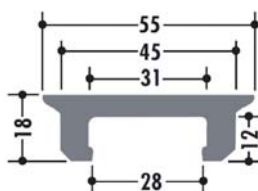
LC-12



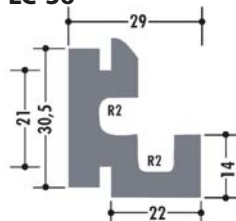
LC-31



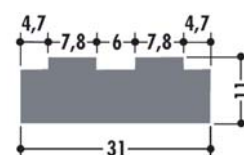
LC-32



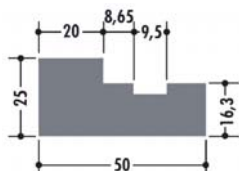
LC-36



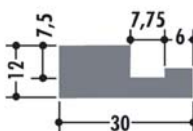
LC-37



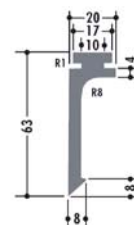
LC-38



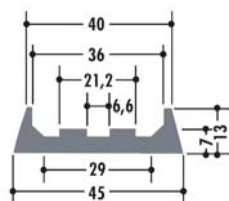
LC-39



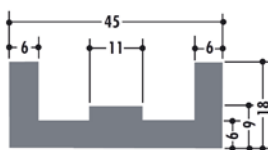
LC-40



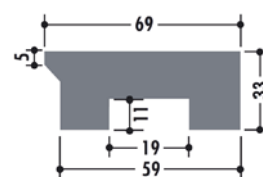
LC-41



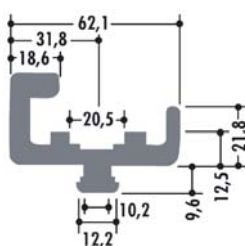
LC-43



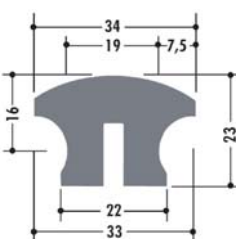
LC-45



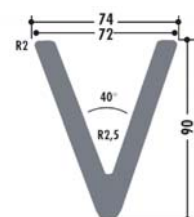
LC-46



LC-48



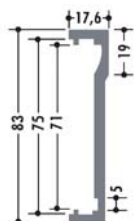
LC-49



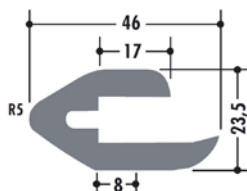
UHMPE EXTRUDED PROFILES

Specials

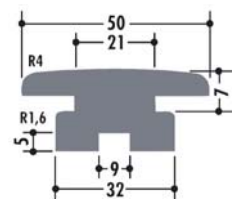
LC-53



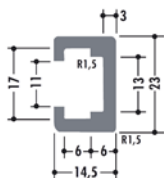
LC-56



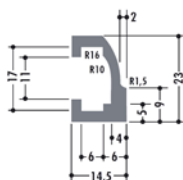
LC-58



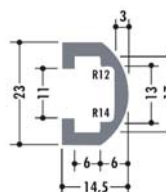
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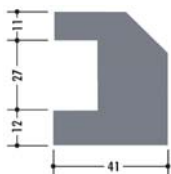
LC-66



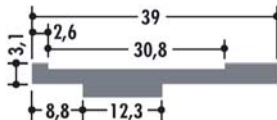
LC-67



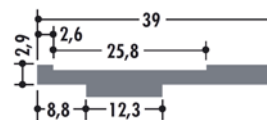
LC-80



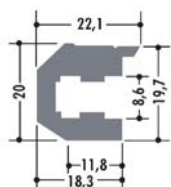
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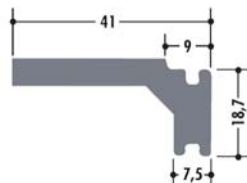
LC-82



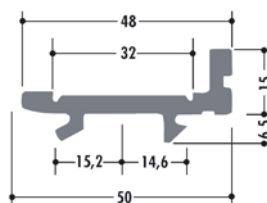
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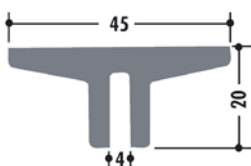
LC-86



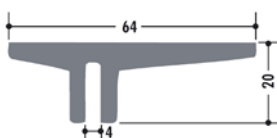
LC-87



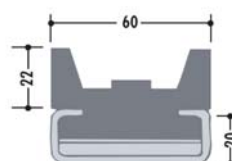
LC-88



LC-89



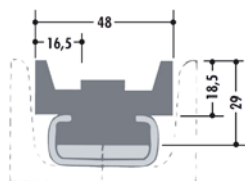
LC-91



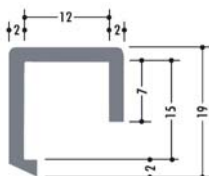
UHMPE EXTRUDED PROFILES

Specials

LC-92



LC-93

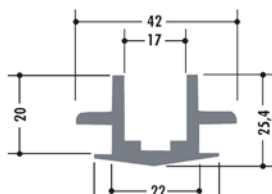


LC-95

Length per roll ± 40 m

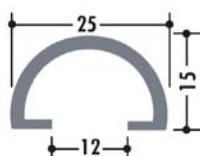


LC-96

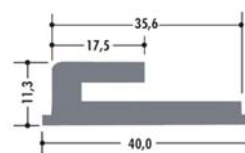


LC-97

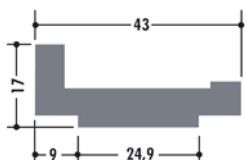
Length per roll ± 40 m



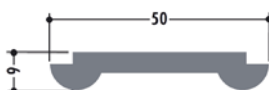
LC-99



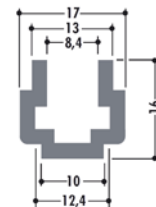
LC-100



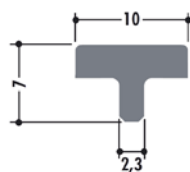
LC-104



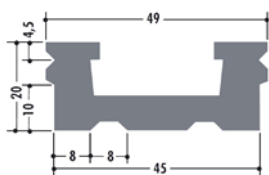
LC-105



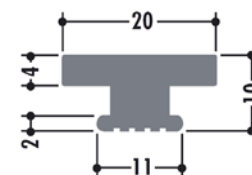
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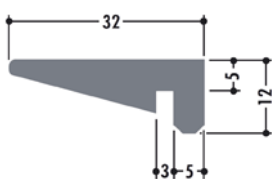
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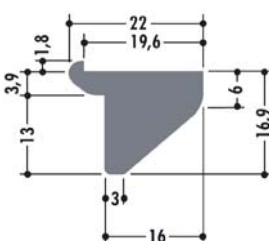
LC-116



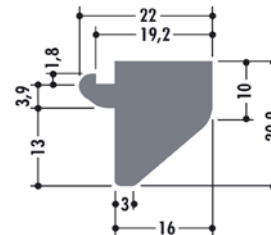
LC-118



LC-121



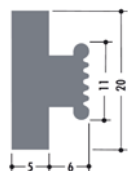
LC-122



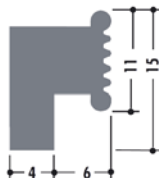
UHMPE EXTRUDED PROFILES

Specials

LC-134



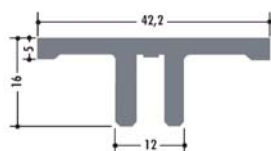
LC-135



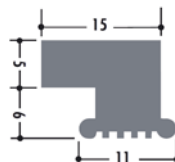
LC-136



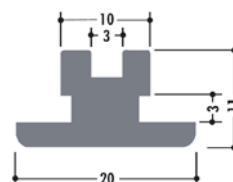
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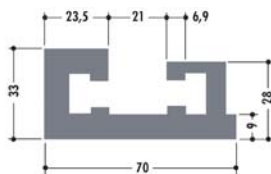
LC-143



LC-144



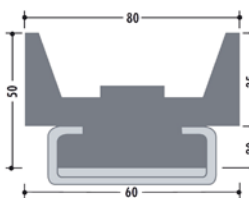
LC-153



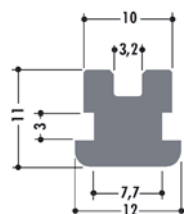
LC-162



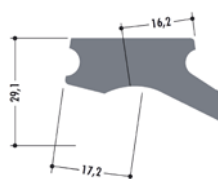
LC-166



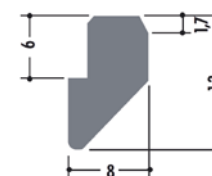
LC-168



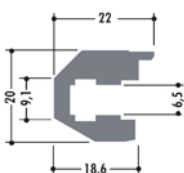
LC-171



LC-174

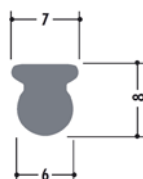


LC-175

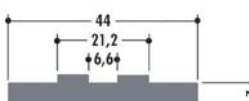


LC-177

Length per roll ± 50 m

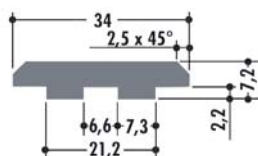
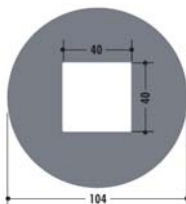
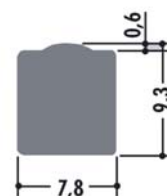
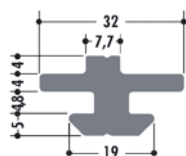
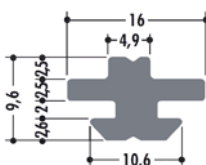
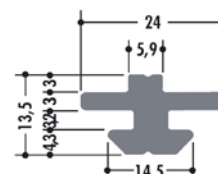
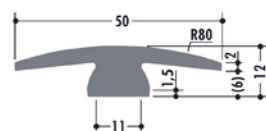
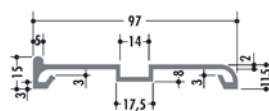
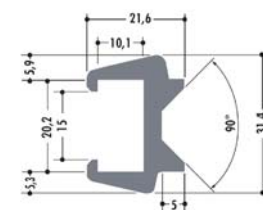
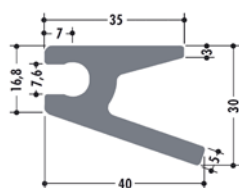
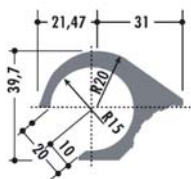


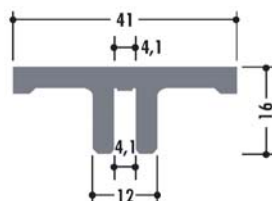
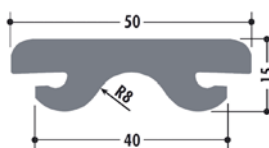
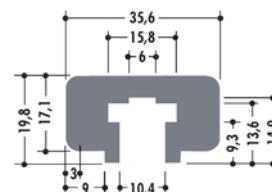
LC-178



UHMPE EXTRUDED PROFILES

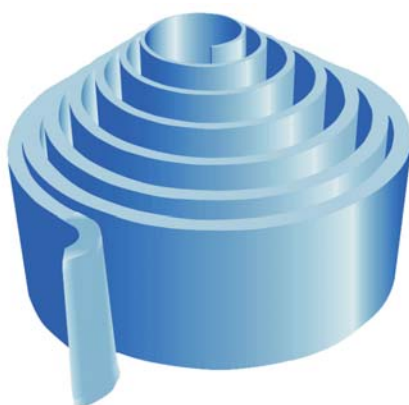
Specials

LC-179

LC-181

LC-185

LC-189

LC-193

LC-194

LC-195

LC-198

LC-199

LC-201

LC-202

LC-204

LC-212

LC-215

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UHMPE EXTRUDED PROFILES

Strip material



Strip width	Length at strip thickness					
	1 mm	2 mm	3 mm	4 mm	5 mm	6 mm
15	270 m	135 m	90 m	68 m	54 m	45 m
18	270 m	135 m	90 m	68 m	54 m	45 m
20	270 m	135 m	90 m	68 m	54 m	45 m
25	270 m	135 m	90 m	68 m	54 m	45 m
30	270 m	135 m	90 m	68 m	54 m	45 m
35		135 m	90 m	68 m	54 m	45 m
40		135 m	90 m	68 m	54 m	45 m
45		135 m	90 m	68 m	54 m	45 m
50		135 m	90 m	68 m	54 m	45 m
55		135 m	90 m	68 m	54 m	45 m
60		135 m	90 m	68 m	54 m	45 m



TRIBO TOP EX[®]S & EX[®]C

High-performance running material for conveying technology & automation



Conveyer system with sliding parts from EX[®]S and EX[®]C

With EX[®]S en EX[®]C, Elcee Holland B.V. offers two new high-performance materials, which have outstanding dry-running properties at their disposal. They have been especially developed for applications in materials-handling and automation technologies. CoMPared with conventional

sliding materials, conveying systems equipped with EX[®] need considerably less energy. The considerably lower coefficient of friction of EX[®] eliminates the possibility of the slip-stick effect (back-sliding) almost completely and thus increases process stability.



Save energy efficiently with Tribo Top EX[®]



Slide Guide, Tribo Top EX[®] C



TRIBO TOP EX[®]S & EX[®]C

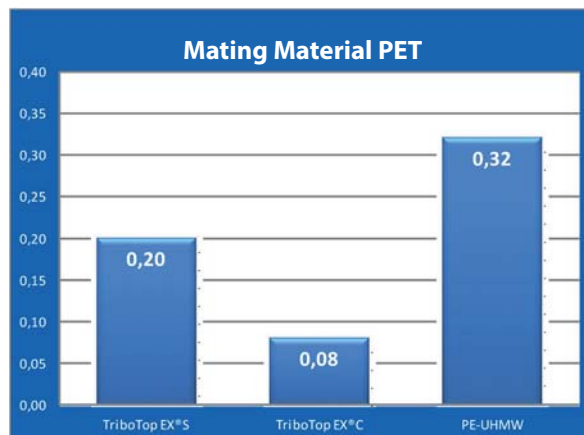
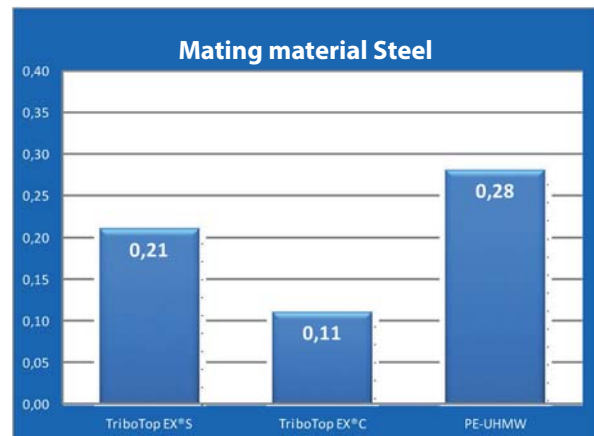
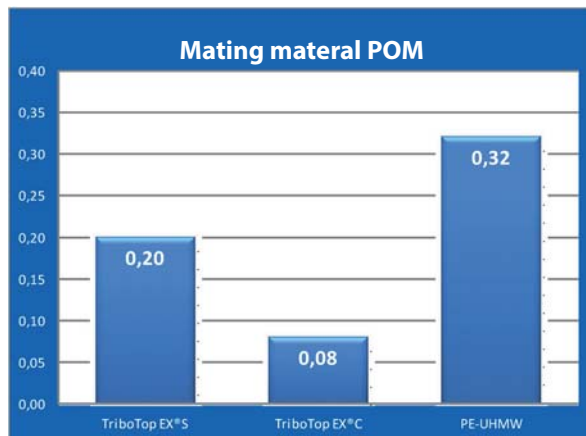
High-performance running material for conveying technology & automation

EX[®]S

- Energy saving
- Especially aligned to the sliding partner PET (particularly beverage bottles)
- Coefficient of friction up to 75% less than of PE-UHMW
- Suitable for contact with foodstuffs (FDA/21CFR177.1520)
- Noise-reducing

EX[®]C

- Energy saving
- Especially aligned to POM and steel (e.g. chain conveyors)
- Coefficient of friction with POM up to 75% less than of PE-UHMW
- Coefficient of friction with steel up to 60% less than of PE-UHMW
- Suitable for contact with foodstuffs (FDA/21CFR177.1520)
- Noise-reducing



*Coëfficiënten van glijwrijving onder droge omstandigheden
gevalideerd op de toepassing-gerelateerde testopstelling:
snelheid: 0,25 m/s, oppervlakedruk: 0,25 MPa, test duur: 24 uur.*



TRIBO TOP EX[®]S & EX[®]C

High-performance running material for conveying technology & automation

Tribological systems

In the development of EX[®] products, great care has not only been taken to minimise the coefficient of friction of the sliding materials, but also to consider the tribological system of the sliding partners in an integrated manner and especially aligned to the particular specific requirements concerned.

Energy efficiency

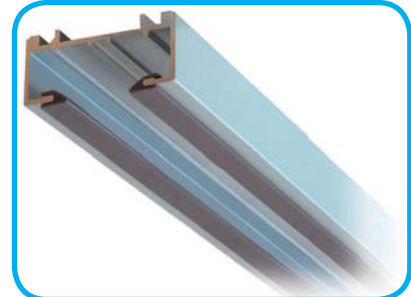
The individual motion and transport segments of different conveying systems were analysed, and the relative movements of the elements and the frictional forces arising at the points of contact examined. These frictional forces have a decisive iMPact on the performance of the conveying system.

Our own pilot plants

The conveying processes were subjected to different tests under real conditions. The tribology test stand used is developed in cooperation with scientists in the material laboratory for the necessary preliminary examinations of the materials to be tested on it. In the development of EX[®] materials, this enabled the individual parameters to be exactly tested and even minimum improvements identified, which then targeted the further direction of development.

Supply range

- Extruded profiles
- Sheets (dimensions to 2500 x 6000 mm)
- Round rods (up to 250 mm diameter)
- Prefabricated components according to the customer's drawing.



Geëxtrudeerde EX[®]S profielen voor air conveyors



Railgeleiding, geëxtrudeerde EX[®]S profielen



EX[®]C Kettinggeleiding voor RVS ketting



Geleiding, EX[®]C profiel



For more information about the Elcee Group:
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