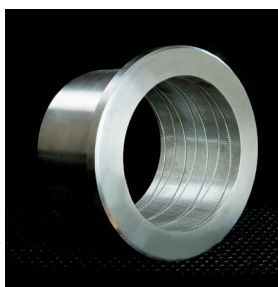




■ MangaDur®SEAMLESS – THE PLAIN BEARING FOR HEAVY-DUTY ENVIRONMENTS



Direct delivery by manufacturer:

- Very even recrystallised, fine-grained, carbide-free austenitic manganese steel forged structure (X120Mn12; Hadfield Steel; 1.3401)
- Cold work hardening results in higher original hardness (approx. 850 to 950 N/mm²)
- Flexible and short delivery times
- Economic advantage
- Special types:
 - Bushing with collar
 - Crowned surfaces
 - Lubrication grooves
 - Lubricating holes
 - Flat bearings
 - ...



Your advantage:

- Maintenance-free
- Eco-friendly as they can be used without lubricant
- Almost 100% breaking strength
- Can be used in dusty, wet and abrasive environments
- Dimensions as specified by customer
- Installation preparation as specified by customer
- Installation by means of shrinking (subcoolable) or pressing
- No processing required after installation
- Low-temperature resistant
- Many years of manufacturing and design experience

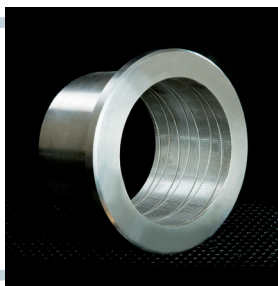


The special property of this very ductile material is that its surface hardness is increased due to the operating load and in this way it forms a protective layer against wear. The hardness values that can be achieved are equal to or higher than that of case-hardened or quenched and tempered steel but with a substantially higher ductility.

As a consequence, the excellent properties of the MangaDur®SEAMLESS plain bearing show to advantage with a comparably high service life and extremely long maintenance intervals – usually, no maintenance is necessary at all! If abrasive wear due to hard interburdens occurs during use (e.g. due to dirt, sand with quartz fractions etc. in the surrounding medium), then the hardness increase is renewed again and again due to the load and provided at the currently used surface! So-called friction martensite is created. Despite this, the core below the hardened layer remains ductile!

FRIESISCHE VERSCHLEISSTECHNIK GmbH & Co. KG

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MangaDur® SEAMLESS – THE PLAIN BEARING FOR HEAVY-DUTY ENVIRONMENTS

Dimensioning aids

Where a bearing allows of a low bearing play as regards usage kinematics, the use of our MangaDur® SEAMLESS plain bearings is especially advisable. Due to load changes, the play very quickly causes an increase of the hardness of the bearing surfaces. However, the material surfaces are also hardened in the case of pulsating loads.

For a first rough dimensioning of bearings to be equipped with MangaDur® SEAMLESS plain bearings, some values are provided below. In a particular case, please send us information about your installation situation for an assessment:

Properties / requirements:

Design:	Homogeneous cross-section, stress zone increases hardness automatically
Admissible load (N/mm ²):	Stat.: 300 dyn.: 65
Operating temperature (°C):	Max. 250
Coefficient of friction, unlubricated:	Approx. 0.15
Stick-slip effect:	Negligible for applications as per the above description
Wearing surface thickness:	In principle any, depending on the residual cross-section of the component which is required for structural reasons
Lubrication:	Usually no lubrication. If desired, tool life is further extended by keeping away abrasive interburden.
Edge load:	Not critical at values in the range specified above; bushing front faces are deformed. Therefore, the design must provide for an appropriate clearance!
Recommendation:	For each front face about 0.25 times the bushing wall thickness
Alternating load:	Desired to achieve hardness increase
Use in case of longitudinal movement:	Use as for slewing bearings
Housing tolerance:	Depends on the type of fastening

Counterpart:

Initial bearing play:	Approx. 1% of the bolt diameter
Material of the counterface:	Quenched and tempered steel
Hardness of the counter-material:	> 52 HRc
Surface of the counterface:	Of minor importance to the joint function, machine accuracy is sufficient (approx. 100 µRa).

Together we will work out an individual and fast solution to your technical problems. Often our specialists are involved in projects from the first technical discussion to delivery.

We hope that we could give you a first overview of our competencies. Since we have already satisfied the requirements of many national and international companies, your demands are a challenge we love to face.

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