AuGlide™, SY and SP

BIMETAL BEARING SOLUTIONS FOR LUBRICATED APPLICATIONS
GGB Company History

FOR MORE THAN 120 YEARS, GGB HAS IMPROVED SURFACE ENGINEERING TO MOVE THE WORLD FORWARD.

GGB began in 1899 as Glacier Antifriction Metal Company, producing plain bearings and introducing many successful new products to the market, including internationally recognized polymer materials. Over the past 120 years, our company has continued forming strategic partnerships, continuously expanding into a global network of manufacturing facilities, increasing production capabilities and resources to become who we are today: world leaders in tribological innovation.

Today, our products can be found everywhere – from scientific vessels at the bottom of the ocean to race cars speeding down the tarmac to jumbo jets slicing through the sky to the Curiosity rover exploring the surface of Mars.

Throughout our history, safety, excellence and respect have formed the foundational values for the entire GGB family. They are of paramount importance as we seek to maximize personal possibility, achieve excellence and establish open, creative work environments with the highest safety standards in the industry.

SAFETY

GGB’s deep-rooted culture of safety places a relentless focus on creating a secure, healthy work environment for all. A core value of GGB, safety is critical at all levels of business in order to achieve our goal of having the safest employees in the industry.

EXCELLENCE

A world-class organization is built by fostering excellence throughout the company, across all roles. Our world-class manufacturing plants are certified in quality and excellence in the industry according to ISO 9001, IATF 16949, ISO 14001 and OHSAS 18001, allowing us to access the industry’s best practices while aligning our quality management system with global standards.

RESPECT

We believe that respect is consistent with the growth of individuals and groups. Our teams work together with mutual respect regardless of background, nationality or function, embracing the diversity of people and learning from one another.

The GGB Advantage

With 8 manufacturing facilities around the world, including cutting edge R&D facilities, flexible production platforms and extensive customer support networks, GGB offers unmatched technical expertise combined with razor sharp responsiveness and customized solutions. Our global presence and local logistics networks ensure our customers receive only the highest quality bearing solutions, in a timely manner and with extensive engineering support. We don’t just make products, we build partnerships. That’s the GGB Advantage.
The Highest Standards in Quality

Our world-class manufacturing plants in the United States, Brazil, China, Germany, France and Slovakia are certified in quality and excellence according to ISO 9001, IATF 16949, ISO 14001 and OHSAS 18001. This allows us to access the industry’s best practices while aligning our management system with global standards.

For a complete listing of our certifications, please visit our website: www.ggbearings.com/en/company/certificates

Content

### AuGlide™, SY and SP Bimetal Bearings

The more and more demanding specifications of today’s high performance equipment and systems require that the bearings operate not only under severe working conditions with minimal or no maintenance but that they also offer increased reliability and durability with lower operating costs. With more than 100 years of experience and expertise in tribology, GGB offers, along with the widest range of lubricated and self-lubricating bearing products, a comprehensive technical and application engineering knowledge.

In this respect, our Application Engineers can assist you in:

- Choosing the right type of plain bearing for your application
- Establishing a life time estimate
- Design of the bearing according to standard dimensions or to customer specific requirements
- Assembly and installation recommendations

Thanks to our global production and supply network, we are able to offer customers throughout the world the industry’s most extensive range of self-lubricating and prelubricated plain bearings for literally thousands of applications in scores of industries.

As a reliable supplier with flexible manufacturing, we can respond quickly to customer needs with either standard or customized products.

Our advanced R&D and testing facilities help us deliver comprehensive solutions and assure their performance, reliability and cost-effectiveness. Our high performance bearing specialists have the experience and expertise to provide innovative solutions to even the most challenging applications.
Applications

AuGlide™, SY and SP bearings are perfectly suited to a wide range of applications.

**AuGlide™ AND SY**

The bimetallic structure of AuGlide™ and SY bearings offers a bearing with very high mechanical strength, fatigue and wear resistance. AuGlide™ and SY bearings are particularly recommended for lubricated applications working under extreme loads including shock loads and low speed oscillating movements.

**Typical applications include:**
- Agricultural machinery, earth-movers, textile machinery, pneumatic equipment, king pin bushes, brake caliper bushes, mechanical handling and lifting equipment, hydraulic cylinders, off-highway equipment etc.

**SP**

The specific overlay composition of SP bearings make them suitable for high speed lubricated applications for which good emergency running is required.

**Typical applications include:**
- Oil pump bearings, gearbox bushes, steering gear, power steering, pedal bushes, king pin bushes, tailgate pivots, brake caliper bushes, machine slides, hydraulic cylinders, hydraulic motors, pneumatic equipment, medical equipment, textile machinery, etc.
Material Structure

AU GLIDE™, copper bismuth on steel lead-free bearings with high load capacity and excellent wear resistance. Innovative bimetal bearing for harsh operating conditions.

SY and SP are bimetal plain bearing materials each consisting of a steel backing to which is sintered a lead bronze sliding layer.

**Available Forms**

SY is available as a standard range of cylindrical wrapped bushes and thrust washers in metric sizes. Non standard parts, strip and special forms to order. AU GLIDE™ and SP can be ordered as metric and inch bushes, strip and special forms.
Characteristics

**AUGLIDE™ AND SY**
- Capable of supporting high specific loads
- Excellent fatigue strength under dynamic and shock load conditions
- Suitable for oil and grease lubrication
- Superior performance under oscillating movement
- Steel backing provides strength and rigidity
- Thin wall construction permits compact bearing assembly
- Indents in the bearing surface provide a reservoir for grease and thus allow extended re-greasing intervals
- Tolerant of relatively poor mating surface finish

**SP**
- Bush bore may bored, reamed, broached or ball burnished in situ to control the assembled bearing clearance
- Suitable for oil or grease lubrication
- Steel backing provides strength and rigidity
- Hardened shafts are not required
- Thin wall construction permits compact bearing assembly

Physical and Mechanical Properties

Typical sliding layer and bearing properties for AuGlide™, SY and SP products.

<table>
<thead>
<tr>
<th>BEARING PROPERTIES</th>
<th>VALUE</th>
<th>UNIT</th>
<th>AUGLIDE™</th>
<th>SY</th>
<th>SP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GENERAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum load, p</td>
<td>N/mm²</td>
<td></td>
<td>300</td>
<td>300</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td>N/mm²</td>
<td></td>
<td>140</td>
<td>140</td>
<td>120</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>°C</td>
<td></td>
<td>-40</td>
<td>-40</td>
<td>-40</td>
</tr>
<tr>
<td></td>
<td>°C</td>
<td></td>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>°C</td>
<td></td>
<td>250</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td><strong>GREASED / OIL LUBRICATED</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Maximum sliding speed, U</td>
<td>m/s</td>
<td></td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
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<tr>
<td>Maximum pU factor</td>
<td>N/mm² x m/s</td>
<td></td>
<td>2.8</td>
<td>2.8</td>
<td>2.8</td>
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<tr>
<td>Coefficient of friction, f</td>
<td>Greased</td>
<td></td>
<td>0.05 - 0.12</td>
<td>0.05 - 0.12</td>
<td>0.05 - 0.12</td>
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<tr>
<td></td>
<td>Oil lubricated</td>
<td></td>
<td>0.04 - 0.12</td>
<td>0.04 - 0.12</td>
<td>0.04 - 0.12</td>
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<td><strong>RECOMMENDATIONS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shaft surface roughness, Ra</td>
<td>μm</td>
<td></td>
<td>≤ 0.8</td>
<td>≤ 0.8</td>
<td>≤ 0.4</td>
</tr>
<tr>
<td>Shaft surface hardness</td>
<td>Normal</td>
<td></td>
<td>&gt; 200 HB</td>
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</tr>
<tr>
<td></td>
<td>For longer service life</td>
<td></td>
<td>&gt; 350 HB</td>
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</tbody>
</table>

Table 1: Physical and Mechanical Properties of AuGlide™, SY and SP
Installation

AuGlide™, SY and SP bushes should be inserted into the bearing housing with the aid of a stepped mandrel. Care must be taken to insert the bush squarely into the housing to avoid damage to the bearing lining material. A slight lead-in chamfer should be machined in the housing and a smear of oil applied to the outside surface of the bush to assist the fitting operation. Recommended mandrel and chamfer dimensions are given in figure 4.

\[ \text{for } D_a \leq 125 = 0.8 \quad \text{for } D_a > 125 = 2 \]

\[ \text{for } D_a < 55 \text{ mm} \]

\[ \text{for } D_a > 55 \text{ mm} \]

\[ \text{for } D_a > 120 \text{ mm} \]

Note: Lightly oil back of bush to assist assembly

Lubrication

AuGlide™, SY and SP bearings must be lubricated. Care should be taken at temperatures above 100°C to avoid attack of the bearing lining by any acidic degradation products from the lubricant. Unlike polymer composite bearing materials these materials are suitable for use with lubricants containing MoS₂ or graphite.

**AuGlide™ AND SY**

Suitable for use with oil or grease lubrication. For use with grease lubrication, the bearing surface is manufactured with a uniform pattern of indents which form a reservoir for the lubricant and provide the optimum distribution within the loaded area of the bearing.

**SP**

Suitable for use with oil or grease lubrication. Particularly suitable for high speed applications with oil lubrication.
Cutting and Machining

**AUGLIDE™ AND SY**

AuGlide™ and SY bushes do not normally require sizing after assembly.

Should machining of the bearing lining be required then care should be taken to avoid any burrs around the edges of the indents in the bearing surface.

A diamond tipped boring tool should be used with a fine feed of 0.1 mm/rev. and a cutting speed of 2 - 3 m/s.

**SP**

The bushes must be finish sized after assembly. This may be done by burnishing, broaching or boring as described below.

For many applications burnishing with a hardened sphere or spherically ended or ribbed tool will give adequate bore size. The required diameter (d1) of the burnishing tool is as shown on the right to allow for recovery of the bearing bore after sizing.

If boring is carried out, care must be taken to maintain good concentricity with the housing. It is advisable to use H6 limits and work towards the maximum bore size.

The cutting tool should have a small point radius, approximately 0.7 mm, an approach angle of 30°, primary angle of 10° and a cutting speed of 2 - 3 m/s, with a fine speed of 0.1 mm/rev.

**Product Information**

GGB gives an assurance that the products described in this document have no manufacturing errors. The details set out in this document are registered to assist in assessing the material’s suitability for the intended use. They have been developed from our own investigations as well as from generally accessible publications. They do not represent any assurance for the properties themselves.

Unless expressly declared in writing, GGB gives no warranty that the products described are suited to any particular purpose or specific operating circumstances. GGB accepts no liability for any losses, damages or costs however they may arise through direct or indirect use of these products.

GGB’s sales and delivery terms and conditions, included as an integral part of quotations, stock and price lists, apply absolutely to all business conducted by GGB. Copies can be made available on request.

Products are subject to continual development. GGB retains the right to make specification amendments or improvements to the technical data without prior announcement.

Edition 2020 (This edition replaces earlier editions which hereby lose their validity).
AuGlide™ cylindrical bearings are available on order

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>Nominal Diameter</th>
<th>Wall Thickness</th>
<th>Width</th>
<th>Shaft-Ø D1</th>
<th>Housing-Ø D4</th>
<th>Bush-Ø D4 Ass. in H7 housing</th>
<th>Clearance C0</th>
<th>Oil Hole Ø</th>
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<td>20 23</td>
<td>1.940</td>
<td>15</td>
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### AuGlide™ cylindrical bearings

**PART NO.**

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<th>GGB</th>
<th>Nominal Diameter</th>
<th>Wall Thickness $S_3$ max. min.</th>
<th>Width</th>
<th>Shaft-$Ø D_h$ max. min.</th>
<th>Housing-$Ø D_h$ max. min.</th>
<th>Bush-$Ø D_h$ Ass. in H7 housing max. min.</th>
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<td>0.276 0.080</td>
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<tr>
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<td>90.000 89.946</td>
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<td>90</td>
<td>135.000 134.946</td>
<td>140.040 140.000</td>
<td>+ 0.240 + 0.080</td>
<td>0.342 0.080</td>
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</table>

### AuGlide™ washers

**PART NO.**

<table>
<thead>
<tr>
<th>GGB</th>
<th>Inside Ø $D_i$ max. min.</th>
<th>Outside Ø $D_o$ max. min.</th>
<th>Thickness $S_t$ max. min.</th>
<th>Dowel Hole Ø $D_b$ max. min.</th>
<th>Pitch Circle Ø $d_P$ max. min.</th>
<th>Recess Depth $H_a$ max. min.</th>
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<tbody>
<tr>
<td>WC30SY</td>
<td>32.00 32.25</td>
<td>54.00 53.75</td>
<td>1.45 1.41</td>
<td>4.125 4.375</td>
<td>43.12 42.88</td>
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<td>WC35SY</td>
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<td>62.00 61.75</td>
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<td>4.125 4.375</td>
<td>50.12 49.88</td>
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<td>WC40SY</td>
<td>42.00 42.25</td>
<td>66.00 65.75</td>
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<td>WC45SY</td>
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<td>74.00 73.75</td>
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<tr>
<td>WC50SY</td>
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<td>78.00 77.75</td>
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<td>4.125 4.375</td>
<td>66.12 64.88</td>
<td>1.45 1.70</td>
</tr>
</tbody>
</table>
Bearing Application Data Sheet

Please complete the form below and share it with your GGB sales engineer or send it to: usa@ggbearings.com

DATA FOR BEARING DESIGN CALCULATION

Application: ____________________________________________________________

Project/No.: __________________________________________________________

Quantity: ___________  □ New Design  □ Existing Design

□ Steady load  □ Rotating load  □ Rotational movement  □ Oscillating movement  □ Linear movement

DIMENSIONS [MM]

<table>
<thead>
<tr>
<th>Inside diameter</th>
<th>D_i [mm]</th>
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</thead>
<tbody>
<tr>
<td>Outside diameter</td>
<td>D_o [mm]</td>
</tr>
<tr>
<td>Length</td>
<td>B [mm]</td>
</tr>
<tr>
<td>Flange Diameter</td>
<td>D_fl [mm]</td>
</tr>
<tr>
<td>Flange thickness</td>
<td>B_f [mm]</td>
</tr>
<tr>
<td>Wall thickness</td>
<td>S_T [mm]</td>
</tr>
<tr>
<td>Length of slideplate</td>
<td>L [mm]</td>
</tr>
<tr>
<td>Width of slideplate</td>
<td>W [mm]</td>
</tr>
<tr>
<td>Thickness of slideplate</td>
<td>S_S [mm]</td>
</tr>
</tbody>
</table>

LOAD

□ Static load  □ Dynamic load

Axial load F [N]
Radial load F [N]

MOVEMENT

Rotational speed N [1/min]
Speed U [m/s]
Length of stroke L_S [mm]
Frequency of stroke [1/min]

Oscillating cycle

Osc. frequence N_osz [1/min]

MATING SURFACE

Material
Hardness HB/HRC
Surface finish Ra [µm]

FITS & TOLERANCES

<table>
<thead>
<tr>
<th>Shaft</th>
<th>D_j [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bearing housing</td>
<td>D_H [mm]</td>
</tr>
</tbody>
</table>

OPERATING ENVIRONMENT

Ambient temperature T_amb [°C]
Bearing housing material

□ Housing with good heating transfer properties
□ Light pressing or insulated housing with poor heat transfer properties
□ Non metal housing with poor heat transfer properties
□ Alternate operation in water and dry

LUBRICATION

□ Dry
□ Continuous lubrication
□ Process fluid lubrication
□ Initial lubrication only
□ Hydrodynamic conditions

Process fluid
Lubricant
Dynamic viscosity η [mPas]

SERVICE HOURS PER DAY

Continuous operation
Intermittent operation
Operating time
Days per year

SERVICE LIFE

Required service life L_H [h]

CUSTOMER INFORMATION

Company ________________________________________________________________
Street ________________________________
City / State / Province / Post Code _________________________________________
Telephone ________________________________ Fax ___________________________
Name ___________________________________________ Date ____________________

BEARING TYPE

□ Cylindrical bush
□ Flanged bush
□ Thrust washer
□ Slideplate
□ Special parts (sketch)

THE TRIBOLOGICAL SOLUTION PROVIDER FOR INDUSTRIAL PROGRESS, REGARDLESS OF SHAPE OR MATERIAL