

Aluminium Alloy and Metal-Polymer Bearing Sub-Assemblies



Technical Information



WORLD - WIDE SPECIALIST FOR HYDRAULIC BUSHING BLOCKS

This brochure describes GGB's cast aluminium alloy and metal-polymer bearing sub-assembly products and in particular, bushing blocks for external gear pumps for industrial and automotive applications.

Most of GGB's metal-polymer bearing materials and all the aluminium

alloys presented are lead free and comply with the European Parliament's End of Life Vehicles directive (ref: 2000/53/EC) on the elimination of hazardous materials in the construction of passenger cars and light trucks.

ducts, GGB has considerable experience in the formulation, casting and machining of aluminium alloys for plain bearing and other applications.

This blend of expertise and experience allows GGB to offer optimised bearing sub-assemblies for automotive and industrial applications.

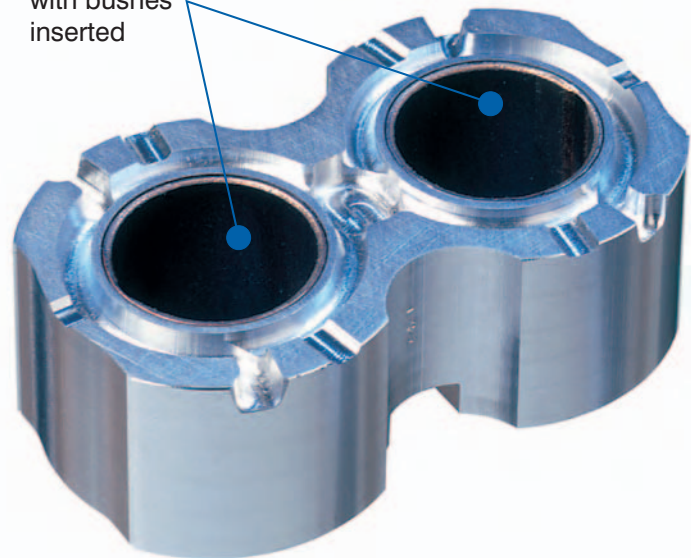
Metal-polymer plain bearing materials were introduced by GGB over 50 years ago and have since been adopted in a wide range of industrial and automotive applications, where they provide improved friction and wear performance relative to conventional bimetal bearing alloys.

In addition to GGB's extensive range of metal-polymer plain bearing pro-

Introduction

Bushing Blocks

Sical block with bushes inserted



GGB has manufactured bushing blocks for hydraulic external gear pumps and motors for more than 40 years and currently produces more than 8 million bushing blocks annually.

This success is a result of GGB's ability to employ in-house competences to integrate the different components required by the application:

- Specification and manufacture of aluminium alloys for bearing applications
- Specification and manufacture of metal-polymer materials and components
- Assembly
- High precision machining
- Tribology, metallurgy and polymer science expertise
- Global technical and commercial sales force

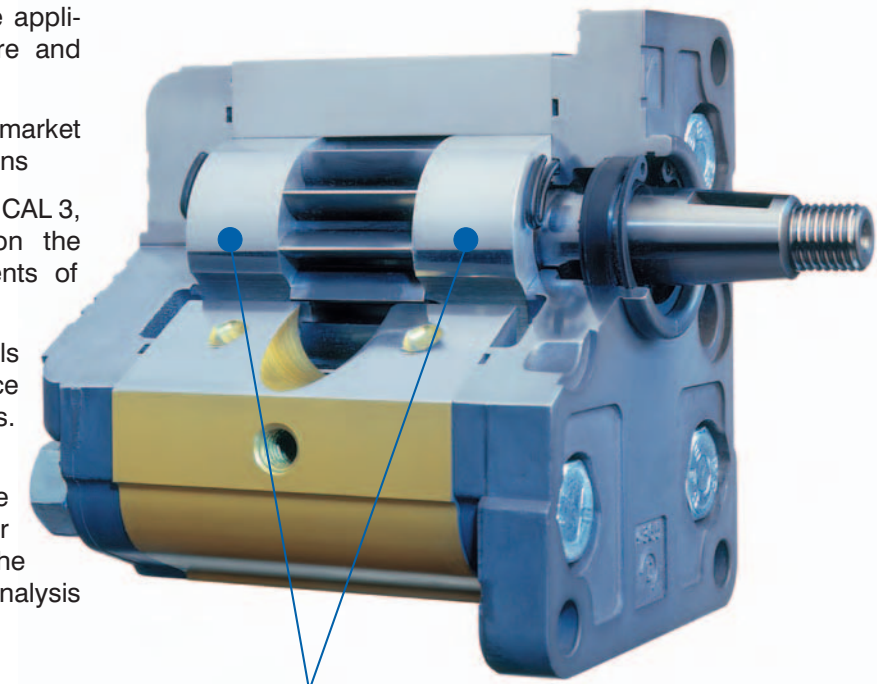
To satisfy the various demands of the hydraulic market GGB manufactures a range of bushing blocks with the following options:

- "Series 0" bushing block for automotive applications to "series 4" for large off-shore and agricultural applications
- Low volume manufacture for the aircraft market to high volumes for automotive applications
- Proprietary aluminium alloys: SICAL 6, SICAL 3, SICAL 3D, SICAL 3DSi depending on the tribological and mechanical requirements of the application
- A wide range of metal polymer materials designed to offer effective performance under a variety of running conditions. (eg. DU, DP4, DP20, DP30, DP31, etc.)

GGB provides a complete service to the hydraulics market, including customer support and design recommendations, the development of new products, technical analysis and innovative solutions.

Materials

Typical Gear Pump Cross Section



Bushing Blocks

Bushing Block Alloy Options

	Sical 6	Sical 3	Sical 3D	AS9U3
Sn	5 - 7%	3 - 4%	3 - 3,5%	-
Cu	1,2 - 1,8%	3 - 4%	4,2 - 4,6%	2,5 - 4%
Si	-	<0,6%	<0,6%	7,5 - 10%
Fe	-	<0,7%	<0,7%	<1,3%
Other	<1,5%	<1,6%	<1,6%	-
Al	balance	balance	balance	balance

Aluminium Alloy Material Composition

Property	Units	Sical 6	Sical 3	Sical 3D	AS9U3
Tensile strength	MPa	90	265	300	150
Ultimate tensile strength	MPa	160	335	350	200
Elongation	%	24	10	8	1
Brinell hardness	HB	45 - 70	85 - 110	100 - 135	80

Mechanical Properties

Assembled Bearing Options

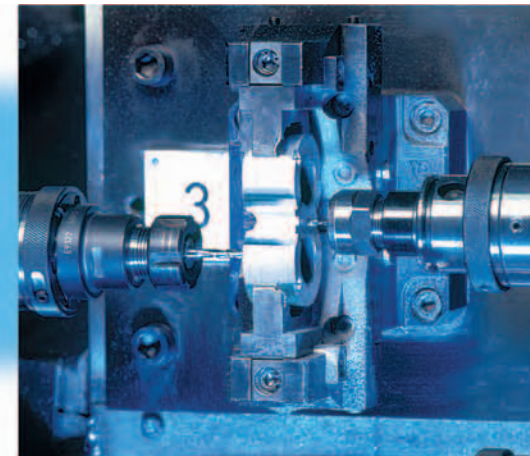
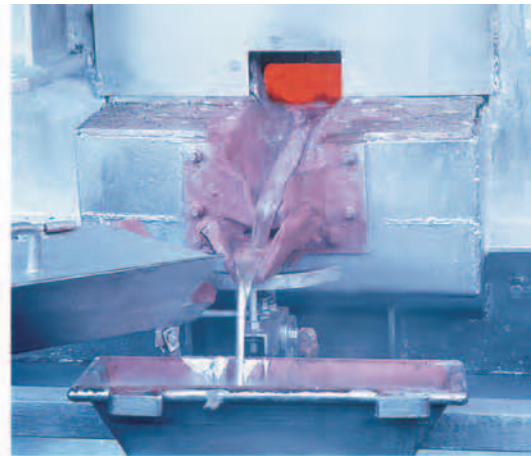
Material	Bearing Lining
DU	PTFE + Pb
DP4	PTFE + CaF2 + aramid fibre
DP20	PTFE + thermoplastic polymer
DP30	PTFE + thermoplastic polymer
DP31	PTFE + fluoropolymer + fillers
DX	POM
Hi-eX	PEEK + PTFE + fillers

Bearing Material Composition

GGB PROVIDES THE COMPLETE SUB-ASSEMBLY SOLUTION

1 Aluminium Alloy Production

- Specification
- Die casting
- Continuous casting
- Extrusion
- Stamping



2 High Performance Machining

- High speed milling
- Lathe machining
- Broaching
- Calibrating



7 Quality and Environmental Certificates



3 Plain Bearing Technology

- Specific material development
- Tribology, metallurgy and polymer science expertise
- Wide range of metal-polymer bearing materials



6 Global Distribution

- Standard and customized packaging
- "Just in Time" delivery
- World-wide shipment

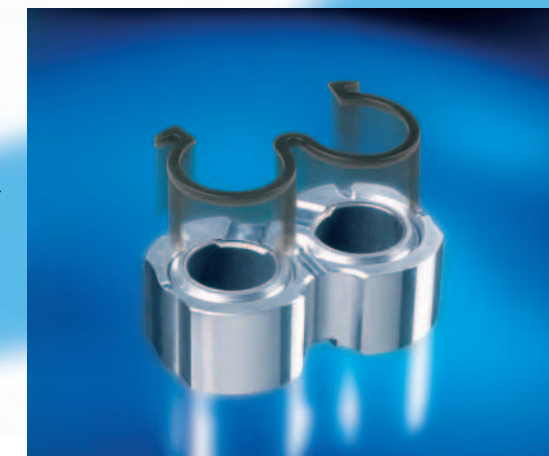


5 Sub-Assembly

- Bushes
- Seals
- Metallic and polymer components
- Design recommendations

4 Plastic Integration

- Sealing
- Over-moulding
- Polymer components
- Design recommendations



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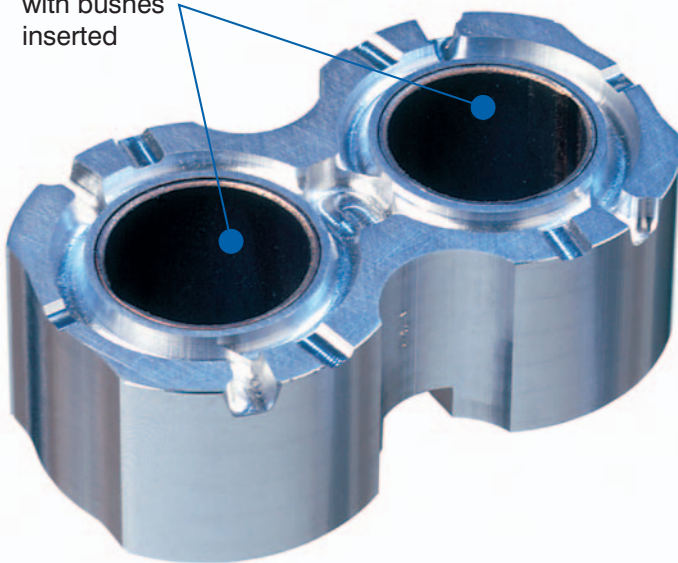
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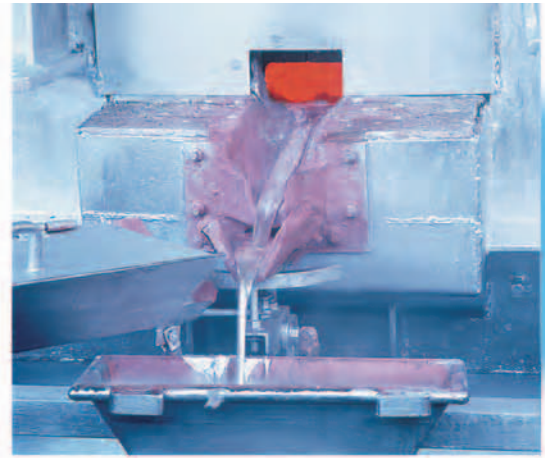
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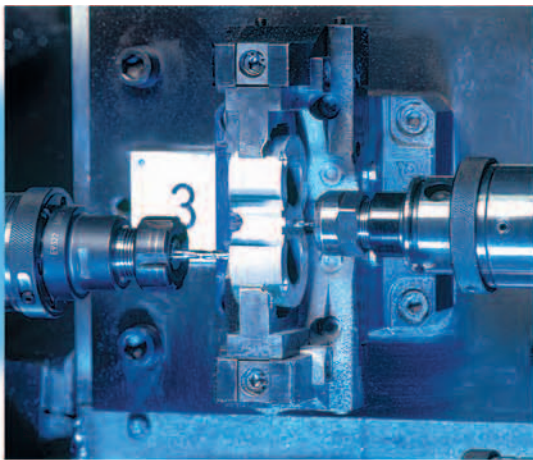
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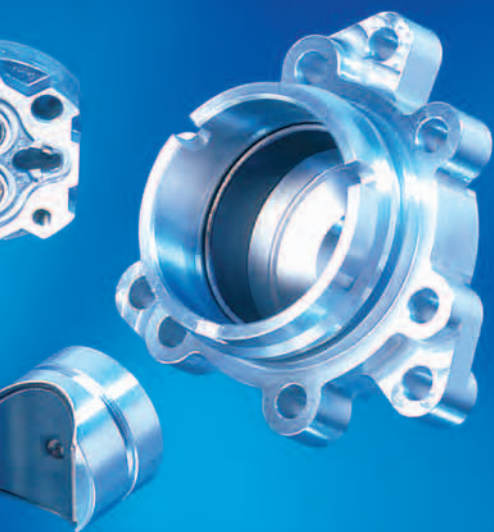
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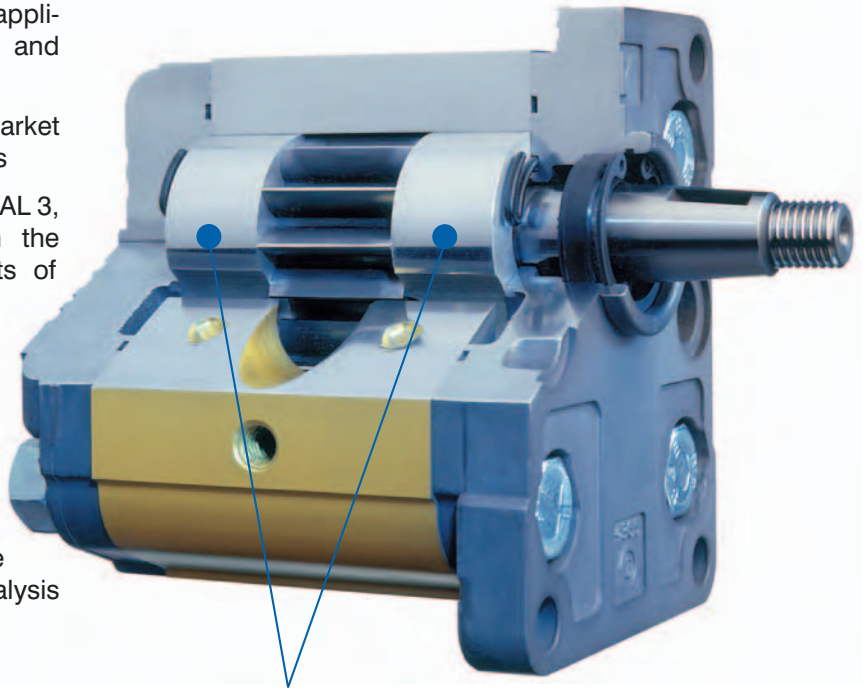


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