

# GMW High Temperature Bearings and Components



## Vision

To develop a company focused on the design, production and commercialization of bearings with high precision and technical added value, mainly targeting high temperatures bearings.

Exceptional customer service. Take our quality and delivery commitments seriously

Continuous innovation focuses on designing our own products and continuously improving each of our processes

Pre- and post-sales technical service is a differentiator Operational excellence focuses on doing more with less.

With a value proposition recognized by our clients and supported by the following pillars:

- Extraordinary customer service. Fulfill our quality commitments and delivery deadlines with close attention
- Continuous innovation focused on own product design and the continuous improvement of each and every one of our processes
- Pre-sales & after-sales technical service as a differentiating element
- Operational excellence focused on doing more with less

### Focused on achieving:

- Persons committed and proud of working at SHM. Own Culture and Values
- Satisfaction of our clients, gaining their trust and loyalty through multi-year agreements, and consequently achieving a win-win relationship
- Satisfied shareholders generating sustainable profitability in the medium-term, always with absolute transparency
- Supply chain based on close and long-term relationships and mutual trust

## GMW High-Temp Bearings and Components history milestones

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## Strengths



### Commercial capacity

Supplying high-temp bearings for a variety of OEM's applications with high technical requeriments



### Design and manufacturing

Continuous investment in R&D supported by own design softwares and life test simulation programs



### Financial Position

Solid financial health thanks to a robust cash position



### Strategic alliances

Joint Ventures to integrate vertically the production of bearing compo

## GMW High-Temp Bearings in fact - strong in



1 bearing manufacturing plants and components  
1 R&D centers



Strong customer



Capacity of equipment  
5MM bearing units produced a year



Around  
>50 employees



Supplying to  
segments worldwide



More than 5.000 different references on stock from 20 mm ID to 110 mm ID

## Product design

### What is the High-Temp bearing line?

We specialize in rotating solutions, incorporating design experience for high temperature applications, primarily bearings. Our main product line includes high temperature deep groove ball bearings, high temperature tapered roller bearings, high temperature spherical roller bearings, high temperature radial insert ball bearings, high temperature Cam followers and high-temp grease. Can handle temperatures from 150°C up to 400°C

- Premium steel and improved heat treatment (AISI 52100)
- Tighter manufacturing tolerances (multiple of C4 and C5)
- Enhanced surface finish
- Optimized internal geometry and cage design
- Enhanced lubrication with special grease heat resistant from 150°C up to 400°C

#### **SRB (High-Temp Spherical Roller Bearings)**



- Different cage materials (brass, steel)
- Sealing options suitable to various environmental conditions
- Made from material AISI 52100 steel, Increased radial clearance (multiple of C3 or C4) design compensates for temperature-induced distortion can adapt range to temperatures from 200°C up to 250°C (effective operating temperature 230°C (446 °F))
- Manganese phosphate (Mn<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>) surface coating (according to EN ISO 9717) ensures enhanced corrosion protection
- Enhanced rolling contact surface finishing

#### **DGGB (High-Temp Deep Groove Ball Bearings)**



- AISI 52100 Steel
- Increased radial clearance: (multiple of C4 and C5)
- Manganese Phosphate surface treatment
- Increased radial clearance to compensate expansions
- Enhanced lubrication with special grease (MoS<sub>2</sub>) heat resistant range from 150° up to 400°
- ZZ and OPEN available
- Suitable for slow speeds and fast speeds

#### **TRB (High-Temp Taper Roller Bearing)**



- AISI 52100 steel material
- Can be applied at temperatures range from 150°C up to 200°C
- Manganese phosphate (Mn<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub>) surface coating (according to EN ISO 9717) ensures enhanced corrosion protection.
- The roller retaining cage and the roller after being coated still ensure increased performance, especially at high temperature



**RIBB**  
**(High-Temp Radial Insert Ball Bearings)**



- AISI 52100 Steel
- Increased radial clearance: (multiple of C4 and C5)
- Manganese Phosphate surface treatment
- Increased radial clearance to compensate expansions
- range to temperatures from 200° C up to 350° C
- ZZ and OPEN available
- Suitable for slow speeds and fast speeds

**CF**  
**(High-Temp Cam Follower)**



- AISI 52100 Steel
- Increased radial clearance: (multiple of C5)
- Manganese Phosphate surface treatment
- Increased radial clearance to compensate expansions
- Designed to handle moderate loads and heavy loads providing low speeds from 120rpm up to 280rpm
- Enhanced lubrication with special grease (MoS2) heat resistant range from 300° up to 350°
- Suitable for slow speeds

**LUBRICATION**  
**(High-Temp Special Grease)**



- For the thin-film lubrication of low-speed rolling and plain bearings
- For lubricant adapt up to 400 °C
- Also suitable for low temperatures
- High load-carrying capacity
- Is a graphite-containing high-temperature paste

**PTFE**  
**Teflon-Polytetrafluoroethylen (PTFE) bearing**



- AISI 52100 Steel
- Increased radial clearance: (multiple of C4 and C5)
- PTFE coating the bearings receive longer lasting protection and significantly increased resistance against fretting and fretting corrosion Increased radial clearance to compensate expansions
- Curing PTFE in a furnace requires a temperature of 150° C to 300° C, has a very small friction coefficient (0.04), high temperature resistance (up to 400° C )
- Suitable for medium speeds

## Metrology laboratory

- ✓ Coordinate measurement machine 3D
- ✓ Roundness testers for small and large rings as well as for harmonics
- ✓ Profilometer-roughness testers
- ✓ Optical comparator to measure contour form
- ✓ Accelerated bearing life testers
- ✓ Equipment to measure and evaluate capacity and behavior of different sealing systems for bearings
- ✓ machine to test adherence between Manganese Phosphate surface treatments & steel
- ✓ Salt fog chamber for evaluating different advanced anti-corrosion coatings performance
- ✓ Virtual tool for bearing performance analysis

## GMW Quality

GMW has the latest state-of-the-art heat treatment technology and equipments

- **Quality control inspection** procedure throughout the whole bearing manufacturing process.
- **The most advanced heat treatment** Martensitic hardening: high hardness.
- **Bainitic hardening**: strength to resist fracture and absorb shocks.
- **Case hardening**: can endure heavy shock loads-
- **Surface coatings available**
- **Zinc coating**: to protect from corrosion.
- **Manganese Phosphate**: for running-in and under poor lubrication.
- **Hard chromium**: to resist corrosion, wear and friction.
- **PTFE**: for starting up and reducing stick-slip phenomenon.
- **DLC**: for high mechanical strength, reduced wear and optimal friction properties.
- **Nitriding / Nitrocarburizing**: increases the resistance against fatigue, wear and corrosion.

## Manufacturing plants



1.000 m<sup>2</sup> surface for manufacturing



Automatic production line for manganese phosphate coating of bearings



Certified with: DIN EN ISO 9717

## Application engineering

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### Assistance for maintenance issues, fitting practice, internal clearance selections

Analysis and reporting submission backed by SHM fully equipped metrology, metallographic and other tests laboratories to best guide and support customer to select parameters



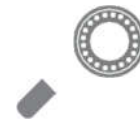
### Technical trainings and seminars

Sharing SHM expertise for the benefit of its clients' technical and maintenance staff



### Lubrication analysis

Current lubricants' performance evaluation and improvement measures with recommendations for the best lubrication solutions suitable to applications







### High-temp bearing damage analysis

Finding out and understanding the causes of bearing damage: Visual, dimensional, metallurgical evaluation



## Frame agreements

 <p>Own &amp; technically advanced manufacturing set up</p>	 <p>Strategic stock locations and wide range available</p>	 <p>Best alternative of premium brands</p>
 <p>Application engineering support</p>	 <p>Customer centric mindset</p>	 <p>Standard and tailor-made solutions</p>

### SHM compromises

- Provide price stability during the period of the agreement
- Update periodically evolution of orders, deliveries and deviations between the original estimations and real demands
- Better adaptation to future deliveries (based on an initial estimation and adjusted by real figures)
- Maintain a percentage of the agreed contract quantity as safety stock to satisfy unexpected demands

### Client's compromises

- Consume the quantities of the references to which the customer committed to in the period of the agreement
- Provide a visibility of the next 3 months' confirmed deliveries
- Update periodically estimations for the incoming 6 months to be able to react accordingly





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