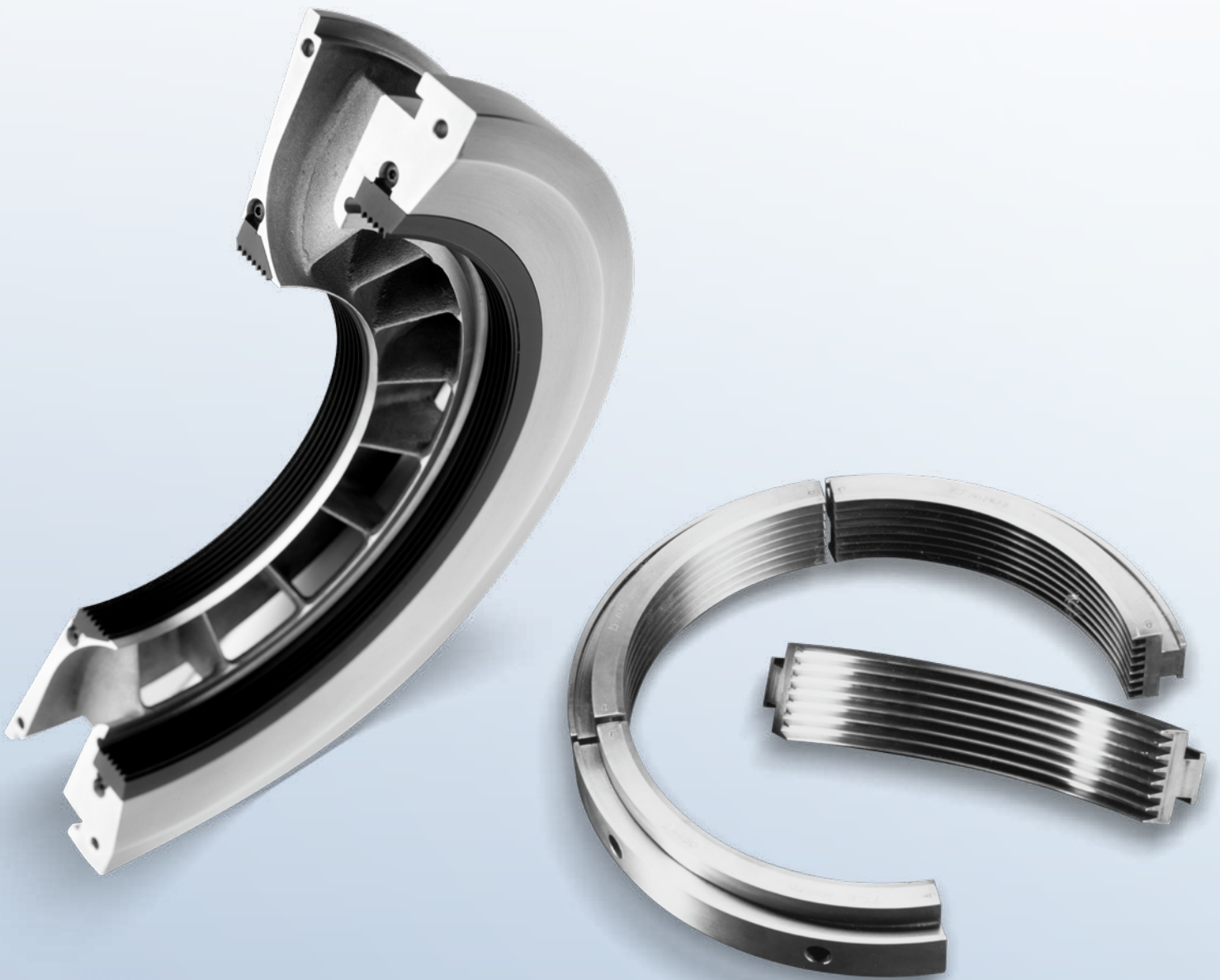


Miba Industrial Bearings Labyrinth Seal Solutions

Get the engineering edge
for your turbomachinery





Advanced Labyrinth Seal Solutions Realized Through Collaboration, Innovation and Expertise

Established over 90 years ago, Miba currently is one of the leading strategic partners to the international engine and automotive industries producing high-performance and technologically demanding products such as sintered components, industrial and engine bearings, friction materials, power electronics components and coatings.

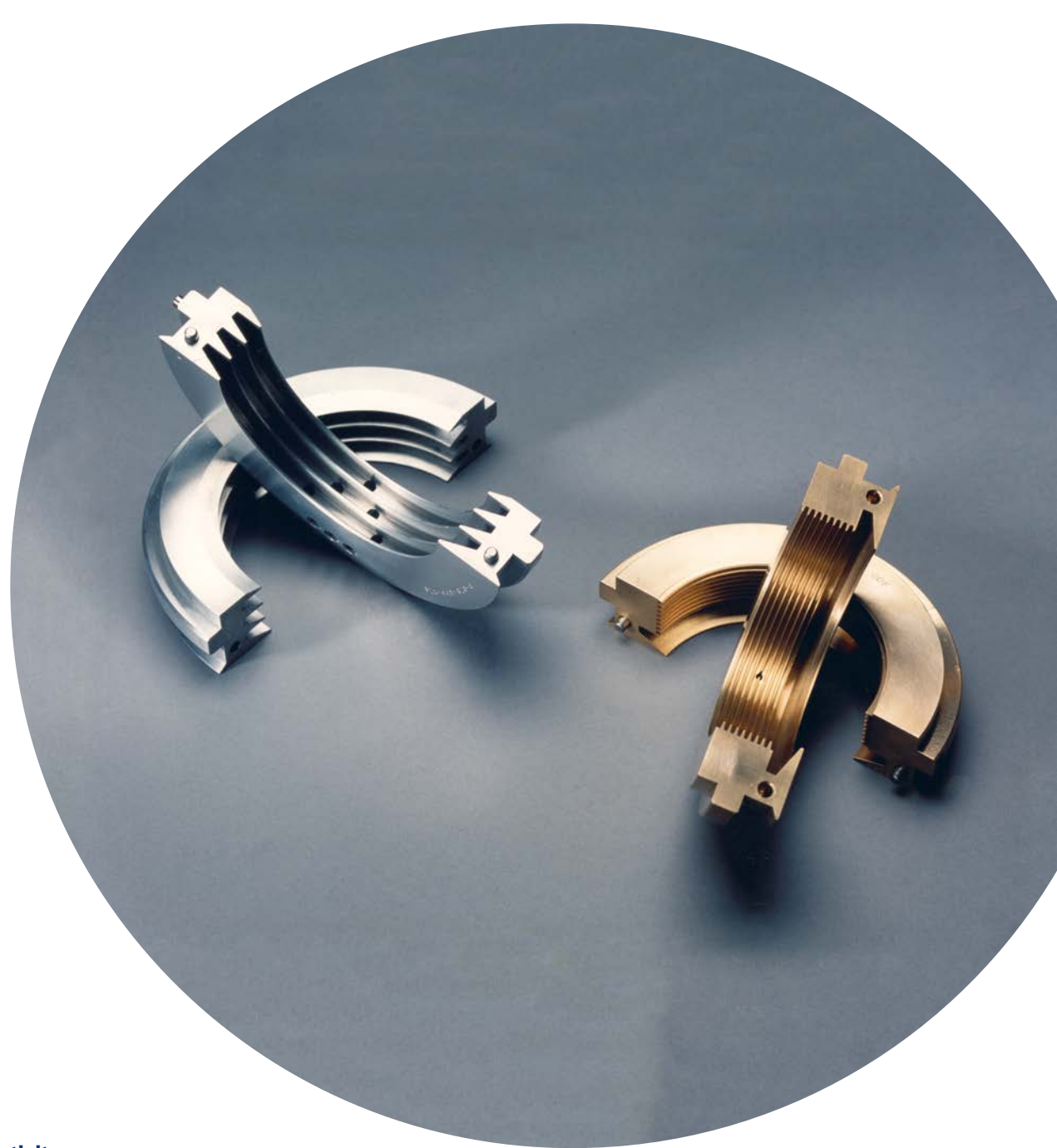
The Houston-based facility provides a center of excellence in labyrinth seal design, troubleshooting and analysis, retrofits and reliability improvement solutions, which complements our existing global network of manufacturing facilities. Miba industrial bearings designs and manufactures turbomachinery components and associated products primarily for the oil and gas, power, chemical, pharmaceutical, pulp and paper, and mining sectors.

Markets are changing more rapidly than ever, and environmental requirements and performance demands are constantly evolving. Around the world, manufacturers face a variety of challenges. Thanks to its global presence, the Miba Bearing Group offers its customers flexible and customized solutions. From development to choice of materials and exceptional application engineering, right through to logistics, we stand for innovative problem-solving skills when it comes to bearings.

Products for Productivity

Miba's, global service and support network will keep you up and running with high-quality new and reconditioned components. Providing unrivaled customer support and quick turnaround when our customers need us most, our dedicated facilities provide 24/7 support and service solutions for:

- Hydrogen Seals
- Thermoplastic and metallic compressor labyrinth seals
- Steam-turbine packing
- Bearing-housing oil seals
- Pump wear rings
- Compressor oil-film seals
- Sleeve and tilting pad journal bearings with spherical pad support
- Fixed and tilting pad thrust bearings



Having the Edge with Miba Labyrinth Seal Solutions

Seal solutions can make a big difference in the way your rotating equipment performs. Our business is servicing our customers' needs for the repair and manufacture of labyrinth seals and bearings for turbomachinery, either in-kind or customized to your operation. For over 25 years, Miba Engineered Bearings Service Solutions (formerly Turbo Components and Engineering) responsive service and engineering skill have given customers in the petrochemical, refining and power generation industries the engineering edge for their rotating equipment.

Why are Miba products and services so important to you now? Take a look at your major business concerns — competition, customer demands, operating costs, fewer people doing more work, and increased environmental and safety regulations. In some way, the efficiency and reliability of your turbomachinery affects all of these issues. More than ever, you need maximum performance from your maintenance expenditures. In addition to our standard range of babbitt lined steel bearings, other material linings are readily available to meet individual customer or application requirements.



Quality is a Major Component of Every Miba Product

Since you have many daily problems to solve, you should not have to worry about the quality of your turbomachinery parts. We recognize that reliability and machine uptime are key objectives for our customers, and our philosophy is to ensure that every product leaving our facility is designed or manufactured to support these needs. With this in mind, we have developed a rigorous quality-control process that ensures strict adherence to engineering guidelines, from the quotation stage to shipment. Our quality-control team has final say over the fitness of materials, components and assembled products at every stage of manufacture. At our facilities, nothing ships until our quality-control team says it can.



Our Engineering is Your Edge

Our engineering staff represents the leading edge of a host of capabilities that includes a fully tooled manufacturing facility, a committed quality-control organization, and an around-the-clock commitment to providing positive solutions to your turbomachinery problems.

- Thermoplastic and metallic compressor labyrinth seals
- Steam-turbine packing
- Bearing-housing oil seals
- Pump wear rings
- Compressor oil-film seals
- Hydrogen seals

Custom-engineered seals

Some of the most overlooked components for increasing overall efficiency are the seals in your compressors. The key to maximizing efficiency is installing seals that can run with close clearances and maintain these clearances even after a normal rub occurs. For over 25 years Miba has been providing seals made of Duratron (Tolron), Ketron (PEEK) and Fluorosint® to answer this dual need. If the shaft contacts rotating or stationary labyrinths made from these thermoplastics, they are more forgiving than aluminum. That is why there is a growing interest in them and our design solutions in particular. Over the years, we have purchased tens of thousands of pounds of these compression-molded materials, making us one of the largest and most experienced manufacturers of thermoplastic seals. Today, there are hundreds of compressors that are running efficiently and reliably with replacement Duratron (Tolron), Ketron (PEEK) and Fluorosint seals made by us. Whether you want directreplacement or custom designed seals, we are

confident that we can provide you with a robust, reliable and efficient design solution.

Improving Oil-Guard Design

One of the problems for rotating equipment and their operators is oil leaks. Miba has engineered many different solutions to the specific problems encountered in the field. As the solution to each issue is generally application-specific, we will work closely with you to eliminate such problems to improve on-site safety and reduce maintenance and operating costs.



Close-up of the split line of a modified seal for a steam turbine.

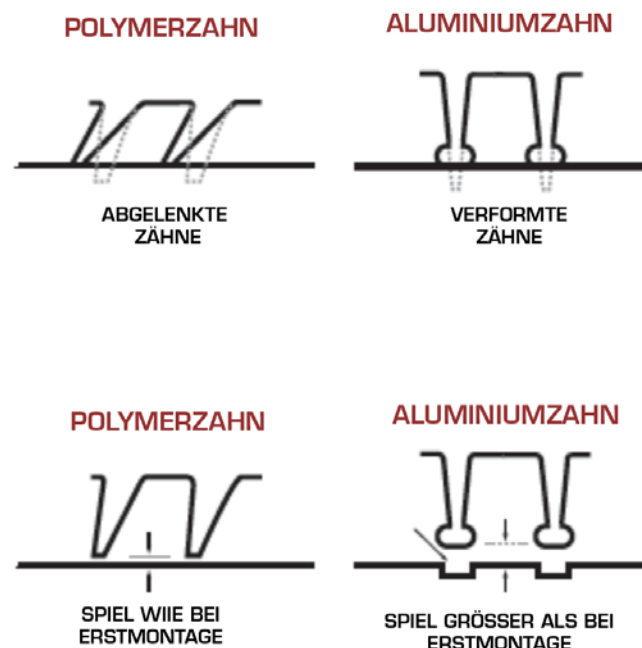
Note: Miba's many innovative design changes, such as the addition of a purge and a wind back labyrinth. In addition, no machine modifications were necessary to accommodate the upgraded seal.

Innovation is a big part of our engineering edge

It would be very easy to help our customers maintain their plants by simply performing only direct replacements of bearings and seals. But that's not our philosophy. Customers return to Miba for help with their turbomachinery because we look at things differently, finding new, more cost-efficient ways to tackle old problems. Here is just one example:

Duratron (Tolron) Seals Upgrade the Efficiency of Nine Compressors in One Plant

An ethylene producer in East Texas wanted to increase the efficiency of its centrifugal compressors without sacrificing reliability. We explained that a good way to achieve that added performance was to replace the OEM aluminum interstage and balance-piston seals with thermoplastic labyrinths. Relying on our reputation for manufacturing and installing these hardworking replacements, they decided to upgrade one compressor and measure the results for themselves. The upgraded unit performed so well, we were asked to do the same for eight more compressors in the plant. The project went smoothly, efficiency improved, and today, that customer is extremely pleased with the performance gains from our seal solution.

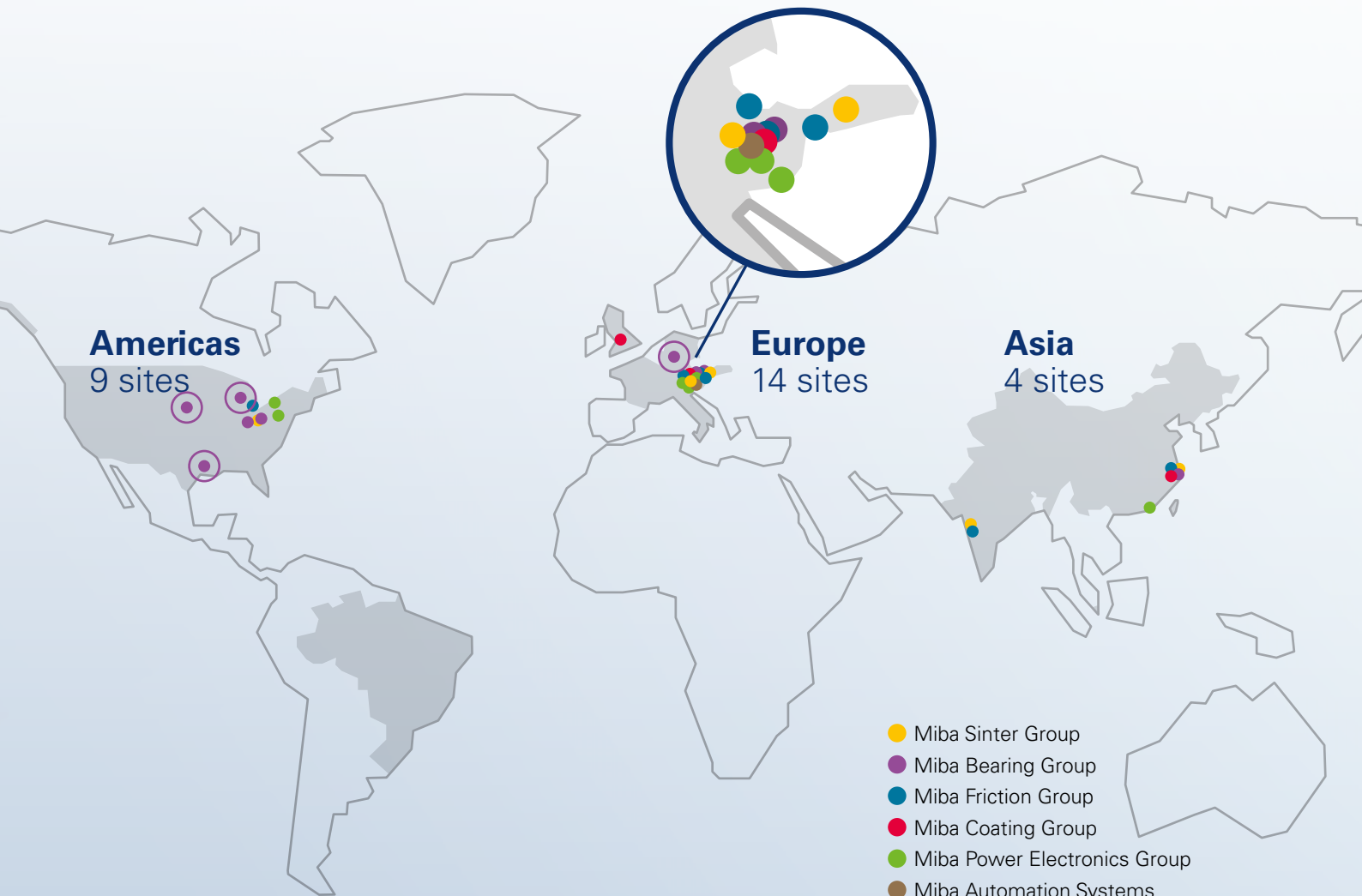


Rotor Contact Scenario:
Thermoplastic vs. Metallic Seal Solutions



Let Miba Engineer Solutions for Your Plant

If you had to typify what we do best, it would be problem-solving. Whether you want to repair, replace or upgrade bearings or seals, the specialists at Miba will assess your situation and show you the best way to get the job done — often with increases in efficiency and reliability that improve your bottom line.



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