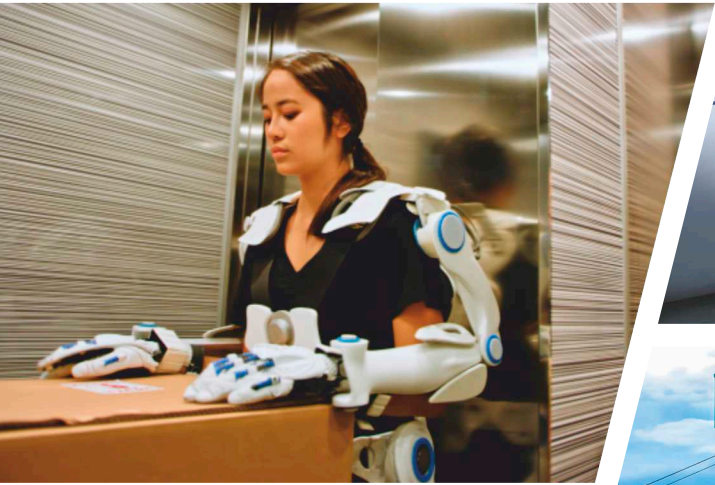


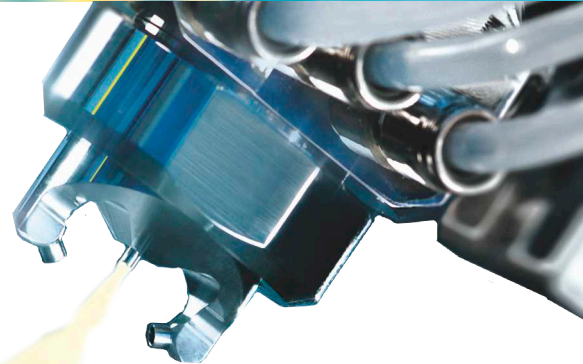


GGB
BY TIMKEN



TRIBOSHIELD® 
POLYMER COATINGS

**THE FUTURE OF ECO-FRIENDLY POLYMER
COATINGS SOLUTIONS STARTS HERE**



The Freedom to Innovate

Across many markets, manufacturers are facing greater demand to deliver better solutions faster than ever that both last longer and meet higher performance expectations. However, complex shapes and surfaces create challenges for engineers searching for solutions that provide the performance they need while offering freedom of geometry for sliding surfaces.

Nowadays, with the higher level of automation, higher process reliability is required.

- Short assembly time
- Shorter cycle times
- Dimensional control
- Robust tribological performance

Although polymer coating technologies have been widely employed in corrosion protection of component surfaces and other applications, recent advances that deliver improved tribological properties are creating opportunities to reduce friction, increase wear life and reduce system noise.

TODAYS COATING MARKET

Today's coating material suppliers are typically large, multinational corporations that formulate and sell coatings. They are experts in polymer science and material design, but have no coating capability. On the other side, coating applicators are typically small companies with expertise in processing but no formulation capability.



By combining our tribological, engineering and polymer science expertise and our legacy of innovation in plain bearing technologies, we created our line of TriboShield® standard tribological polymer coatings for a wide range of industrial applications. Able to be applied to nearly any surface for almost limitless potential, our range of TriboShield® polymers deliver improved tribological properties and are formulated to help meet these challenges and revolutionize component design and manufacturing-allowing you to take full advantage of part shape to maximize service life.

Offering the advantage of geometric freedom for sliding surfaces, TriboShield coatings can coat virtually any shape or surface; helping to improve performance through:

- Reduced friction
- Increased wear life
- Reduced system noise
- Improved corrosion resistance

Coatings Application Process

THREE EASY STEPS TO OPTIMIZE PERFORMANCE

SURFACE PREPARATION

Pyrolysis, advanced thermal decomposition and grit blasting are used for optimal surface preparation.

COATING APPLICATION

With multiple coating applications, GGB can apply a range of surface solutions to meet your coating needs.

CURING

Coated components are then cured with advanced technology that surpasses average cure times.

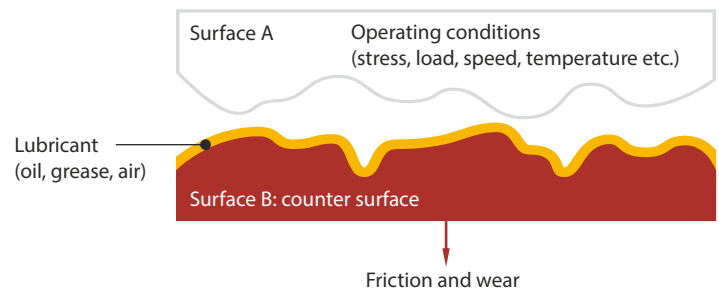
OPTIMIZE YOUR SYSTEM PERFORMANCE

When looking for ways to improve system performance, engineers must consider a number of factors including:

- Lubrication
- Heat transfer and effect of the operating environment
- Surface and counter surface

Effect of the Environment

(Heat transfer)



EXPERIENCE THE TRIBOSHIELD® ADVANTAGE



IN-HOUSE PAINT MANUFACTURE

The ability to formulate and tailor polymer coatings to control surface behavior.



DESIGN SIMPLIFICATION

Allows for more simplistic design that employs fewer parts and easier assembly in complex-shaped surfaces that traditional bearings cannot access.



MOST METALLIC SUBSTRATES

Works with steel, stainless steel, aluminum, titanium, and magnesium (and can be considered for polymeric and composite substrates, too).



CHEMICAL AND CORROSION PROTECTION

Features exceptional chemical and corrosion protection, offering a barrier of inert material between surfaces to extend longevity.



FREEDOM OF SHAPE

Our specially formulated polymer coatings range can be applied to nearly any surface, regardless of shape and material.



EASY TO CUSTOMIZE

Collaborate with our expert team to tailor our polymer coatings to the unique needs of your applications.



SELF-LUBRICATION

Incorporate solid lubricants to deliver self lubricity that can help reduce and sometimes eliminate the need for additional lubrication in machine parts.



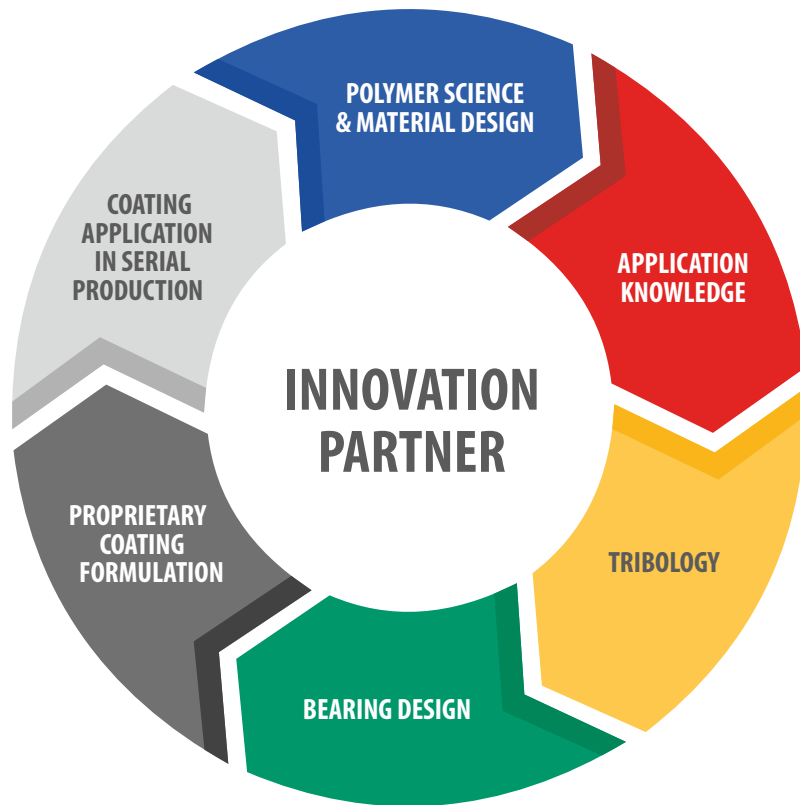
HARD CHROME REPLACEMENT

With toxicity levels, high costs, and bans likely coming soon, chemical hard chrome plating is becoming a thing of the past - making TriboMate® polymer coatings the environmentally conscious way of the future.

One - Stop - Partner

GGB OFFERS A UNIQUE SUPPORT PACKAGE TO ENHANCE THE CUSTOMER EXPERIENCE

GGB offers specialist expertise to help customers optimise their system performance and overcome tribological challenges. Our ability to formulate and tailor polymer coatings helps to control surface behaviour and deliver proprietary solutions. The package of solution design, formulation, coatings and logistics will make customer life a lot easier.



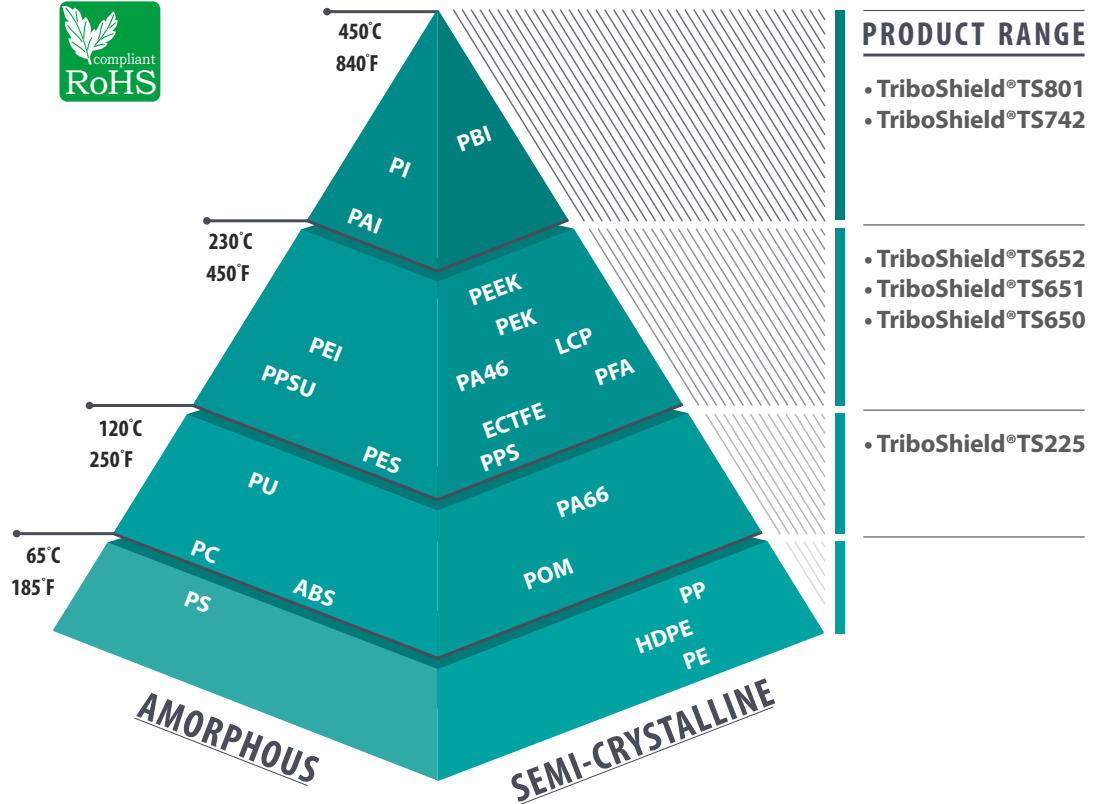
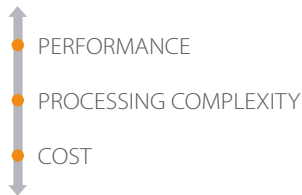
A PARTNERSHIP TO DO MORE

We take pride in working closely with customers in the early stages of design to think broadly and boldly, expanding beyond traditional surface engineered solutions to create something that's uniquely adapted for your needs, demands, and requirements. The earlier we partner together, the more we can help you take advantage of part shape and size throughout the design process.



Product Range

TriboShield® STANDARD COATINGS RANGE



TRIBOSHIELD® POLYMER COATINGS

TriboShield® TS225

Designed for low friction and high wear resistance at low to medium loads

TriboShield® TS652

High performance low friction polymer coating with added corrosion resistance

TriboShield® TS650

High performance polymer coating for lubricated applications

TriboShield® TS742

Low friction polymer coating for very high load applications

TriboShield® TS651

Highly suitable for high-frequency/low amplitude (HFLA) applications

TriboShield® TS801

Low friction polymer coating for high temperature operation

A SMART ALTERNATIVE TO HARD CHROME PLATING

With high toxicity levels, high costs, and more bans likely coming in the next decade - chemical conversion coatings are becoming a thing of the past. GGB Polymer Coatings solutions are the most effective alternative.

- Longer wear life
- Environmental friendly
- Improved corrosion protection
- Subject to fewer current regulations



PHYSICAL AND MECHANICAL PROPERTIES

SLIDING LAYER PROPERTIES	TS225	TS650	TS651	TS652	TS742	TS801
Max Continuous Service Temperature	120 °C	260 °C	260 °C	260 °C	260 °C	400 °C
Max Peak Service Temperature	130 °C	280 °C	280 °C	280 °C	270 °C	450 °C
Dry Friction	Excellent	Fair	Excellent	Good	Excellent	Good
Oil/Grease Friction	Excellent	Excellent	Excellent	Excellent	Good	Good
Load Capacity	Good	Good	Good	Good	Excellent	Good
Wear Resistance	Good	Excellent	Excellent	Good	Excellent	Excellent
Curing Temperature	250 °C*	420 °C	380 °C	400 °C	360 °C**	420 °C
Corrosion Protection	Excellent	Excellent	Fair	Good	Good	Excellent
Chemical Resistance	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent
Recommended Applications	<ul style="list-style-type: none"> - Struts - Garden and DIY tools 	<ul style="list-style-type: none"> - Hydraulic pumps and motors - Hydraulic cylinders - Fluid valves - Thrust surfaces in gearboxes 	<ul style="list-style-type: none"> - Solenoid armatures - Seat mechanisms and struts - Compressors and radial piston pumps 	<ul style="list-style-type: none"> Mechanisms operating under: - Harsh chemical environments - Oil lubricated conditions - Vacuum 	<ul style="list-style-type: none"> - Highly loaded mechanisms - Mechanical couplings, linear guides, cutting tools, etc. 	<ul style="list-style-type: none"> - Metal processing tools - High temperature valves

* Can be cured as low as 180 °C for special applications **Can be cured as low as 200 °C for special applications

TriboShield® applications are compatible with many materials, including



Steel



Stainless Steel



Aluminium



Titanium



Plastics

SUCCESS THROUGH EXPERTISE

We know there's no "one-size-fits-all" approach to efficiency. That's why we're always looking for new ways to tailor our products to meet a wide variety of applications - and these efforts are routinely met with outstanding results in a number of industries, from aerospace and automotive to industrial and beyond.



TRIBOMATE® PAIRED COATINGS

For optimized performance in regard of

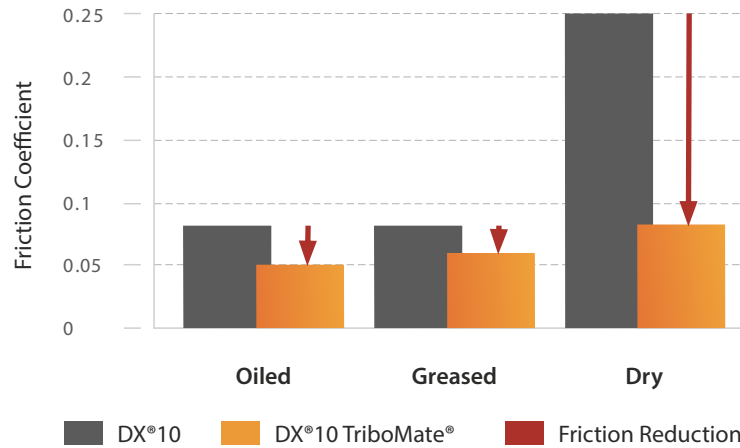
- significant reduction of friction in dry conditions
- improved wear life
- stable performance

we offer TriboMate® paired coatings which are specifically designed to work with and enhance the performance of our polymer coating products.

Pairing a TriboShield® coating with another TriboShield® coating solution or with a GGB bearing material, offers significantly reduced friction and can further extend system lifetime.



DX®10 BEARING FRICTION COMPARISON



APPLICATIONS

TriboShield® polymer coatings are versatile enough to provide tribological solutions in a wide variety of applications from exoskeletons, cranes, transportation chains and solenoids to baby strollers and medical devices (such as prosthetics, dialysis pumps, display mounts and many more).



Stronger. Together.



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GGB is part of The Timken Company's portfolio of engineered bearings and industrial motion products.