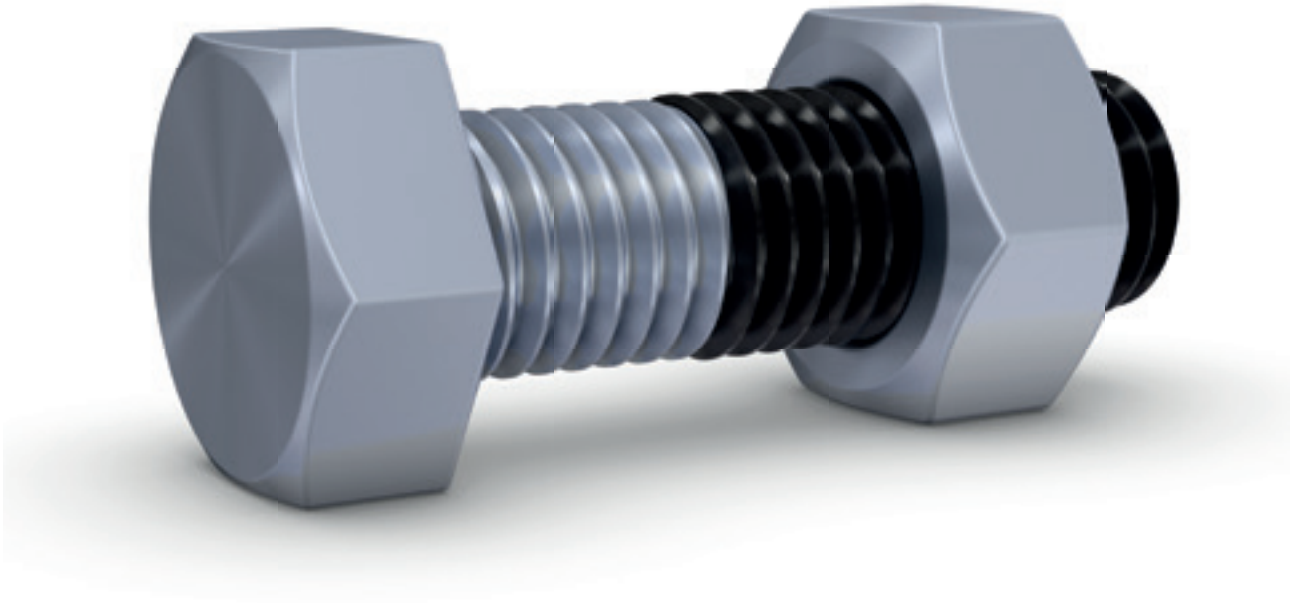
BOSSARD
Proven Productivity



Tribological dry coatings

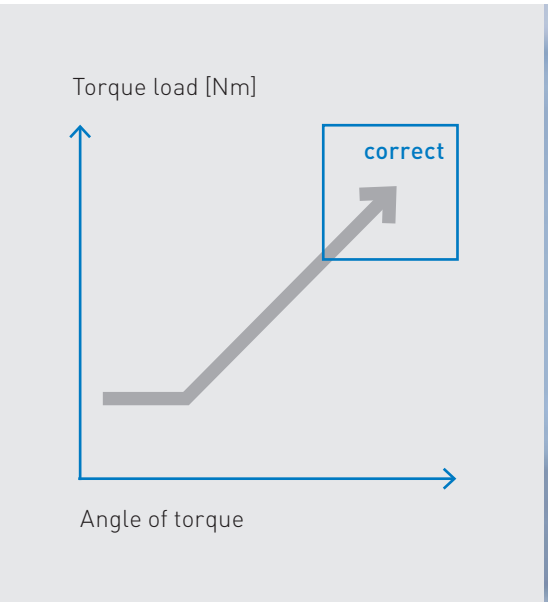
Integrated security of installation

"Process-capable screw installation requires a constant and low friction-value deviation. Tribological dry coatings ensure integrated security of installation."

BOSSARD COATINGS

Tribological dry coatings

Increase process reliability while lowering total costs of fastening with coating solutions from Bossard.



Correctly installed straightaway

Today, industrial screw installation makes increasingly higher demands of process reliability:

- Short assembly time
- Shorter cycle times
- Increasing level of automation
- More exacting installation parameters

With the increasing requirements for economic production and fastening quality, the subject of coating is gaining in importance.

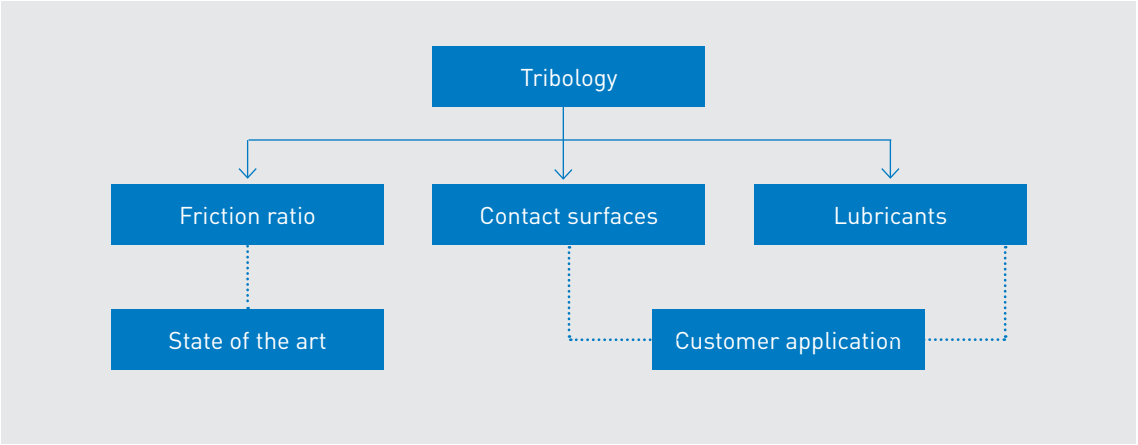
Your competent partner

Bossard is your competent partner for individual system solutions for the surface coating of the most varied mechanically loaded fastening elements. The surface systems are used to optimize the coefficient of friction and improve protection against corrosion. They consist of compositions such as organic solid lubricants and fluoropolymers and can be designed according your requirements.

BOSSARD COATINGS

Appropriate coating options

Good frictional characteristics and high adhesive strength are characteristics which play an increasingly important role in the improvement of performance and the development of new coating solutions in many areas of mechanical engineering and vehicle manufacturing.

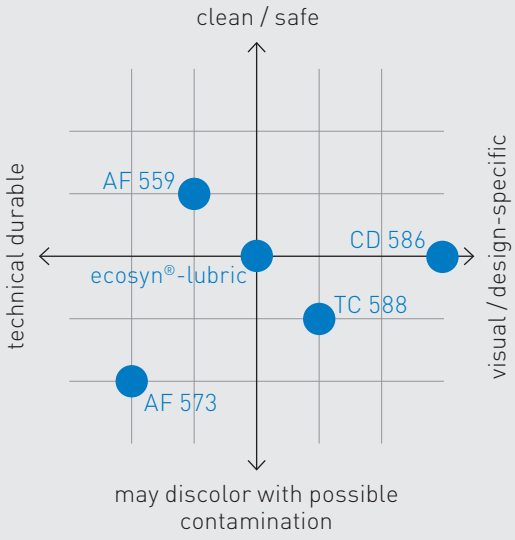


Tribology deals with the scientific description of friction, wear and lubrication

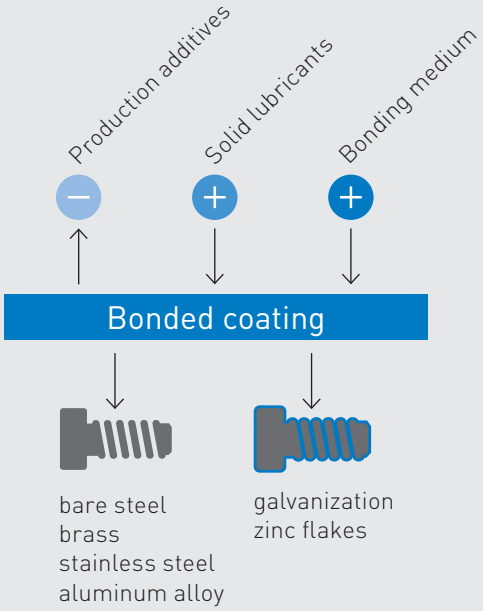
Converting your ideas into economic solutions stands or falls with the right mix of coating technology. Here, the technical solution can be crucially influenced by friction ratios, contact surfaces and lubricants. This is precisely where Bossard Coatings comes in – the integrated lubrication solution in fastening technology for defined friction ratios.

Enhanced tribological knowledge results in considerable savings in the use of energy and materials, production and maintenance. Energy and raw material resources are conserved, environmental damage avoided and work safety improved.

Positioning and principal characteristics



Composition of the bonded coating



Bossard Coatings	Focus	simple	clean	secure	economical	Application-specific characteristics (not exhaustive)
ecosyn®-lubric Black	Industrial assembly	▲	▲	▲	▲	Economic solution with set friction windows in assembly, maintenance and servicing
ecosyn®-lubric Silver	Industrial assembly	▲	▲	▲	▲	
CD 586 ColorDesign "Black"	Decorative requirement	▲	▲	○	●	Black color with demands for a surface design in the furniture industry, measuring equipment and precision equipment
AF 573 AntiFriction "MoS_2"	High pressure resistance	▲	○	●	●	Good sliding properties and high surface loading with appropriate corrosion protection for problem-free disassembly with necessary electrostatic conductivities in the building of power stations and heavy engineering
AF 559 AntiFriction "Synthetic"	Good wear resistance	▲	●	●	●	Good sliding properties with high abrasion resistance for self-tapping screws in the design and manufacture of apparatus and fixtures
TC 588 TopCoat "Wax"	Problem-free application for small screws	▲	●	○	●	Good alternative for initial assembly, protection against corrosion, suitable for products with polyamide inserts, self-tapping fasteners with self-tapping screws in general machine and apparatus construction
Spec Specification	Customer-related focus for engineered parts					Application-specific solutions with defined coating characteristics

▲ optimal solution ● good solution ○ conditional solution

TRIBOLOGICAL DRY COATING

ecosyn®-lubric Black/Silver

ecosyn®-lubric is a high-performance dry lubrication and the simple, clean, secure and economic solution for efficient installation.

Characteristics

- Outstanding friction characteristics, low deviation
- Clean, environmentally friendly coating
- Easy handling for cost reduction
- High assembly security in production and maintenance

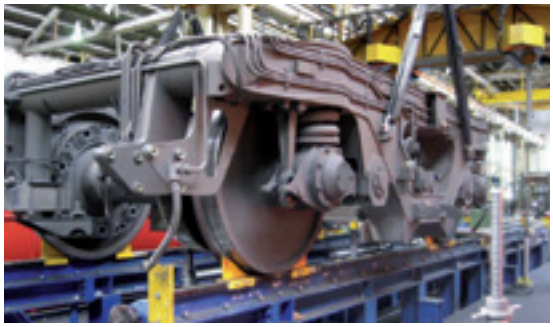
Area of use

- Rail equipment
- Vehicle work
- Machine and apparatus construction
- Pressure devices
- Flanged fittings
- Plant engineering
- Packaging industry

		Use/characteristics
Coarse thread		▲
Nuts		▲
Washers		▲
Sharp thread		●
Parts with plastic		▽
Cylindrical pins with fit tolerance		▽
Color		black/silver
Solid lubricants		PTFE
Lowest coefficient of friction μ_{tot} (initial assembly)*		0.09 (Black) 0.12 (Silver)
Friction value deviation (multiple assembly ≤5)*		small
Multiple assembly		up to 5 x with reproducible friction coefficients
Corrosion protection		> 200 h (blue galvanized)
Temperature range for use		min. -180°C max. 250°C (Black) min. -60°C max. 250°C(Silver)
Application method	Rack goods	spraying
	Bulk products	dip spinning, drum spraying
Declarations of conformity		RoHS, REACH

*Frictional coefficient testing with VZB M12 screws as per ISO 16047 under laboratory conditions

▲ very suitable ● suitable ▽ unsuitable



TRIBOLOGICAL DRY COATING

Bossard Coating CD 586

ColorDesign – the right choice for a decorative appearance with visual requirements of a black coloration. Careful processing and packaging count to make sure that black remains black.

Characteristics

- Black coloration
- Suitable treatment method for decorative requirements
- Specific handling in supply
- Suitable pre-packaging

Area of use

- Construction of machines
- Construction of devices
- Furniture industry
- Consumer electronics

		Use/characteristics
Coarse thread		▲
Nuts		▲
Washers		▲
Sharp thread		●
Parts with plastic		▽
Cylindrical pins with fit tolerance		▽
Color		black
Solid lubricants		PTFE
Lowest coefficient of friction μ_{tot} (initial assembly)*		–
Friction-value deviation (multiple assembly ≤5)*		–
Multiple assembly		possible to a limited extent
Corrosion protection		> 24 h (bare) > 1000 h (stainless steel)
Temperature range for use		min. -180°C max. 250°C
Application method	Rack goods	spraying
	Bulk products	dip spinning, drum spraying
Declarations of conformity		RoHS, REACH

*Frictional coefficient testing with VZB M12 screws as per ISO 16047 under laboratory conditions

▲ very suitable ● suitable ▽ unsuitable

TRIBOLOGICAL DRY COATING

Bossard Coating AF 573

AntiFriction – for demanding, friction-reducing conditions at high pressure loads, proven slide function using MoS_2 and high temperature resistance.

Characteristics

- High pressure resistance
- High temperature resistance
- Suitable for small and large dimensions
- Very good sliding properties

Area of use

- Power station maintenance/servicing
- Pressure devices
- Pump construction
- Energy technology
- Steel construction
- Infrastructure

		Use/characteristics
Coarse thread		▲
Nuts		▲
Washers		▲
Sharp thread		●
Parts with plastic		▽
Cylindrical pins with fit tolerance		●
Color		anthracite
Solid lubricants		MoS_2
Lowest coefficient of friction μ_{tot} (initial assembly)*		0.08
Friction value deviation (multiple assembly ≤5)*		small
Multiple assembly		up to 5 x with reproducible friction coefficients
Corrosion protection		> 24 h (bare) > 1000 h (stainless steel)
Temperature range for use		min. -180°C max. 430°C
Application method	Rack goods	spraying
	Bulk products	dip spinning, drum spraying
Declarations of conformity		RoHS, REACH

*Frictional coefficient testing with VZB M12 screws as per ISO 16047 under laboratory conditions

▲ very suitable ● suitable ▽ unsuitable

TRIBOLOGICAL DRY COATING

Bossard Coating AF 559

AntiFriction – for demanding, abrasion-resistant requirements for process-secure self-tapping screws in aluminum using synthetic solid lubricants.

Characteristics

- Good sliding properties
- High abrasion resistance
- Seizure-free assembly in aluminium possible

Area of use

- Energy technology maintenance/servicing
- Vehicle work
- Machine and apparatus construction
- Plant engineering
- Clean room technology

		Use/characteristics
Coarse thread		▲
Nuts		▲
Washers		▲
Sharp thread		▲
Parts with plastic		▽
Cylindrical pins with fit tolerance		●
Color		olive-gray
Solid lubricants		synthetic solid lubricants
Lowest coefficient of friction μ_{tot} (initial assembly)*		0.10
Friction value deviation (multiple assembly ≤5)*		small
Multiple assembly		up to 5 x with reproducible friction coefficients
Corrosion protection		> 24 h (bare) > 1000 h (stainless steel)
Temperature range for use		min. -70°C max. 200°C
Application method	Rack goods	spraying
	Bulk products	dip spinning, drum spraying
Declarations of conformity		RoHS, REACH

*Frictional coefficient testing with VZB M12 screws as per ISO 16047 under laboratory conditions

▲ very suitable ● suitable ▽ unsuitable

TRIBOLOGICAL DRY COATING

Bossard Coating TC 588

TopCoat – a thin wax coating layer for good sliding properties for self-tapping screws and small stainless steel screws without risk of pitting. When coat is applied at room temperature, it can also be used for nuts with polyamide insert.

Characteristics

- No pitting or cold welding
- Process-secure initial assembly
- Setting at room temperature
- Assembly directly possible with self-tapping screws

Area of use

- Machine- and apparatus construction
- Conveyor equipment
- White goods
- Vehicle assembly interior finishing
- Infrastructure
- Consumer electronics
- Furniture industry

		Use/characteristics
Coarse thread		▲
Nuts		▲
Washers		▲
Sharp thread		▲
Parts with plastic		▲
Cylindrical pins with fit tolerance		▲
Color		transparent
Solid lubricants		none
Lowest coefficient of friction μ_{tot} (initial assembly)*		0.10
Friction-value deviation (multiple assembly ≤5)*		average
Multiple assembly		only suitable for 1x assembly
Corrosion protection		> 24 h (bare) > 1000 h (stainless steel)
Temperature range for use		min. -60°C max. 120°C
Application method	Rack goods	spraying
	Bulk products	dip spinning, drum spraying
Declarations of Conformity		RoHS, REACH

*Frictional coefficient testing with VZB M12 screws as per ISO 16047 under laboratory conditions

▲ very suitable ● suitable ▽ unsuitable

TRIBOLOGICAL DRY COATING

Technical characteristics

Technical data

The different characteristics of Bossard Coatings support most requirements for mechanical screw fastenings.
The table shows the broad range of characteristics of Bossard Coatings.

Layer thickness

Due to the surface coating and the additional tribological coating, the thread pairing of fasteners may tend to seize.
The smaller the dimension is (<M5), the more effect the thickness of the coating has on thread play.

Bossard Coatings	Basis		Solid lubricant	Visual appearance	Temperature			Corrosion protection [1]
					Application temperature		Manufacturing temperature	
	org. binder	synth. wax			min. [°C]	max. [°C]	burning in [°C]	
ecosyn®-lubric Black	●		PTFE	black	-180°	250°	180° – 220°	> 200 h (blue galvanized)
ecosyn®-lubric Silver	●		PTFE	silver	-60°	250°	180° – 220°	> 200 h (blue galvanized)
Coating CD 586 ColorDesign "Black"	●		PTFE	black	-180°	250°	180° – 220°	> 1000 h (stainless steel) >24 h (bare)
AF 573 AntiFriction "MoS_2"	●		MoS_2	anthracite	-180°	430°	150° – 200°	> 1000 h (stainless steel) >24 h (bare)
AF 559 AntiFriction "Synthetic"	●		synthetic	olive-gray	-70°	200°	90° – 120°	>1000 h (stainless steel) >24 h (bare)
TC 588 TopCoat "Wax"		●	none	transparent	-60°	120°	Room temperature	present, depending on variable surface

1) The values provided are reference values based on the starting condition of the material to be coated, the specified intended purpose and the application. Depending on the type of mechanical-dynamical stress, tribological dry coatings change their product characteristics temperature, upressure and time dependently and can influence the function of components.

For details on friction coefficient windows and corrosion protection, see separate product characteristics tables (p. 6–10)

Coating thickness [µm]	Electrical conductivity	Resistance	Dimensional restrictions		Special restrictions
			Drum	Rack	
5–12	Non-conductor (limited insulator)	fuels, hydraulic fluid, cleaning solutions	<150mm <M24	1500mm ⩾ M24	–
8–12	Non-conductor (limited insulator)	fuels, hydraulic fluid, cleaning solutions	<150mm <M24	1500mm ⩾ M24	–
5–12	Non-conductor (limited insulator)	fuels, hydraulic fluid, cleaning solutions	<150mm <M24	1500mm ⩾ M24	corrosion protection
5–12	Non-conductor (limited insulator)	fuels, hydraulic fluid, cleaning solutions	<150mm <M24	1500mm ⩾ M24	abrasion resistance
5–10	Non-conductor (limited insulator)	somewhat limited resistance	<150mm <M24	1500mm ⩾ M24	corrosion protection
⩽ 1	Non-conductor (limited insulator)	limited resistance	<150mm <M24	upon request	ultra-thin wax, only usable for one-time application

BOSSARD COATINGS

When you want to be sure

In nearly all branches of fastening technology the correct specification plays an important role. Bossard meets this challenge with an ultra-modern technical test laboratory.

Many market products have to meet certain safety measures before they can be used. The fastening elements used in them play often a crucial role. Therefore for critical applications written proof is required that the fastening elements have the stipulated corrosion resistance and stability with defined friction characteristics.

For example for screws on pressure containers in chemistry, fastening elements in air- and space travel, bolts in rail vehicles and assembly operations across the whole of LEAN production.

Friction characteristics

Ensuring process-capable screw installations

- Output of preloading forces, torques and friction characteristics
- Examination of various influencing factors on friction according to stipulated general requirements

Corrosion resistance

- Comparison of different corrosion protective coatings
- Determination of the protective effect with pairing of different contact surfaces

The salt spray mist test (e.g. ISO 9227 NSS) is a standardized test for the evaluation of the corrosion protection effect of specified materials and applied coatings.

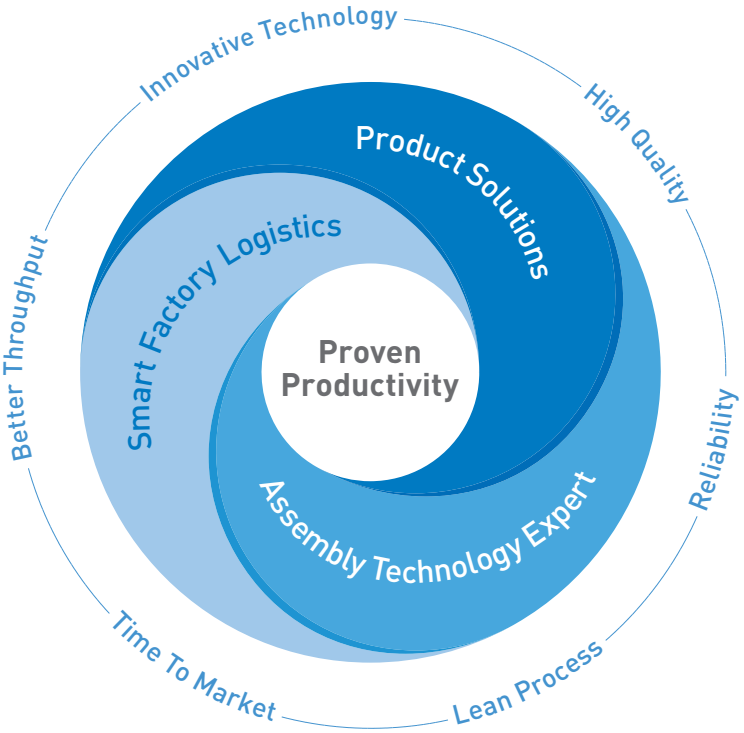
Bossard has ISO/IEC 17025-accredited test laboratories in all three parts of the world. Customers benefit from the test laboratory expertise and most modern measuring- and testing devices. They form the basis for a reliable quality assurance and flawless product quality.

SWISS TESTING
S SCHWEIZERISCHER PRÜFSTELLENDIENST
T SERVICE SUISSE D'ESSAI
S SERVIZIO DI PROVA IN SVIZZERA
SWISS TESTING SERVICE

370 Swiss headquarters

PROVEN PRODUCTIVITY – A PROMISE TO OUR CUSTOMERS

The strategy for success



From years of cooperation with our customers we know what achieves proven and sustainable impact. We have identified what it takes to strengthen the competitiveness of our customers. Therefore we support our customers in three strategic core areas.

Firstly, when finding optimal **Product Solutions**, that is in the evaluation and use of the best fastening part for the particular function intended in our customers' products.

Second, our **Assembly Technology Expert** services deliver the smartest solutions for all possible fastening challenges. Our services cover from the moment our customers developing a new product, to assembly process optimization as well as fastening technology education for our customers' employees.

And thirdly, optimising our clients' productions in a smart and lean way with **Smart Factory Logistics**, our methodology, with intelligent logistics systems and tailor-made solutions.

Understood as a promise to our customers, "Proven Productivity" contains two elements: Firstly, that it demonstrably works. And secondly, that it sustainably and measurably improves the productivity and competitiveness of our customers.

And this for us is a philosophy which motivates us every day to always be one step ahead.

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