oerlikon
balzers

Resist

With innovative PVD coating solutions for high-performance precision components

General Engineering

Oerlikon Balzers‘ BALINIT coatings boost performance

Mechanical engineering components frequently operate under extreme conditions: high loads, high sliding speeds or poor lubricating conditions can lead to wear or excessive friction and thus reduced lifetime and/or efficiency.

Trust BALINIT® wear protective coatings from Oerlikon Balzers – a global technology leader in hard coatings. BALINIT® coatings provide a wide range of matchless advantages that push components to peak performance and unmatched reliability.

Low friction

High hardness

Dry running

Good wear resistance

Good adhesion

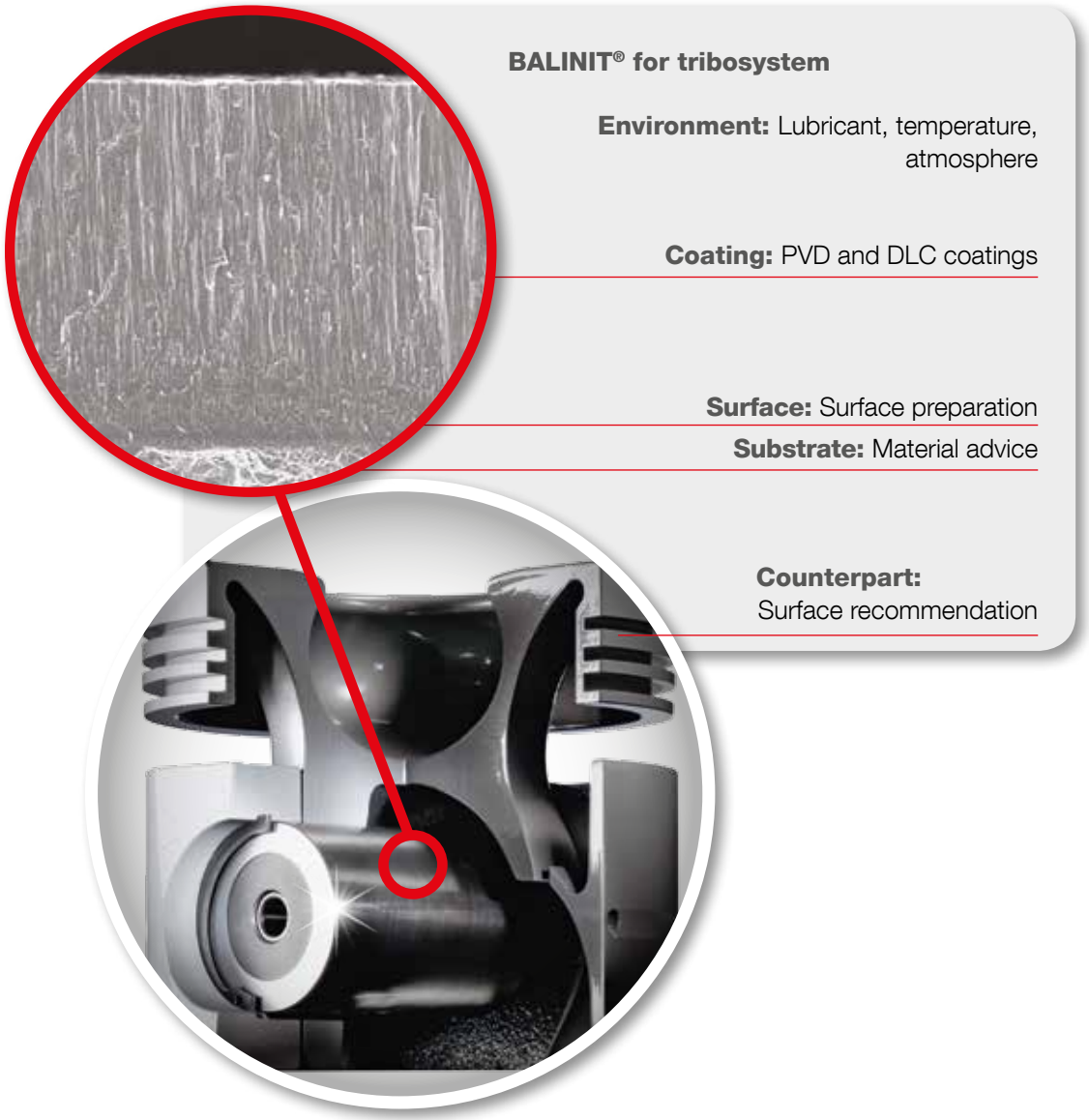
Equipment for low-friction and wear resistant coatings with Oerlikon Balzers‘ RS50 coating system

BALINIT COATINGS

GOOD TO KNOW!

From planning, through installation and applications-specific training to your own production, you profit from the decades of our coating equipment experience.

Highest level wear protection



To find a proper solution, our Oerlikon Balzers surface engineers are starting with an analysis of the whole tribosystem: the parts and their materials, hardnesses and surface finish, the environment and wear mechanism.

The analysis results enable Balzers surface engineers to select the appropriate coatings. Experienced job coating centers apply well proven, standardized procedures which are moreover ISO, and in many cases also QS 9000 or NADCAP certified. Sophisticated after-test analyses complete the solution.

Accredited Nadcap™

Oerlikon Surface Solutions
Oerlikon Balzers not only offers PVD- and DLC thin coatings, but also special nitriding solutions. Oerlikon Balzers has e.g. the worlds largest plasma nitriding equipment for parts up to 40 t weight, 10 m in length and 3 m in diameter.

oerlikon balzers

Oerlikon Metco, also part of the Oerlikon Surface Solutions segment, is also a leading supplier of thermal spray materials, equipment and job coating service for thick abrasion and erosion resistant coatings such as WC-Cobalt or oxides e.g. for turbine blades.

oerlikon metco

Main applications of wear-resistant and low-friction BALINIT coatings

Engines

Motorcycles

Racing

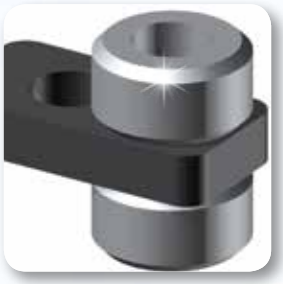
Gears

Roller bearings

Food processing

Hydraulics

Compressors



Sub sea valves

Water- and steam-turbines

Machine tools

Linear guides and ball screw drives

Textile spinning and weaving

Printing

Packaging

Further applications

Leisure and domestic appliances

Ceramic discs for faucets

Medical instruments

Medical devices

More decorative coatings & heat treatment by Oerlikon Balzers

BALTONE

As well as hard and wear resistant coatings, Oerlikon Balzers also offers decorative BALTONE™ coatings in a broad range of colours which are applied using specialized coating machines for very economic decorative treatment.

BALITHERM IONIT

The low temperature heat treatment process creates a wear resistant and durable surface on large components. No harmful chemicals or gases are used in the IONIT process. This means that IONIT is the environmentally-friendly and efficient alternative to conventional nitriding methods.

Coating properties at a glance

	Coating material	Process technology	Coating hardness H_{IT} (GPa)	Typical coating thicknesses (µm)	Friction against steel, dry running	Coating temperature (°C)	Max. service temperature (°C)	Max. treatable dimensions [mm] D x L
BALINIT® C	WC/C	Sputter	8 - 12 / 12 - 15	1 - 4	0.1 - 0.2	< 250	300	250 x 1,000
BALINIT® DLC	a-C:H	PACVD	~15 - 25	1 - 3	0.1 - 0.2	< 250	300	250 x 1,000
BALINIT® DLC STAR	CrN/a-C:H	PACVD	~15 - 25	2 - 5	0.1 - 0.2	< 250	300	250 x 1,000
BALINIT® CAVIDUR	a-C:H	PACVD	~25 - 35	2 - 4	0.1 - 0.2	250 - 350	350	320 x 665
BALINIT® CNI	CrN	Sputter	18 +/- 3	1 - 20	0.5	< 250	700	250 x 1000
BALINIT® CROMA PLUS	CrN	Arc	25 +/- 3	4 - 10	0.3 - 0.5	250 / 400	700	700 x 1,450 600 x 4,500 1,200 x 1,200
BALINIT® A	TiN	Arc	30 +/- 3	1 - 4	0.4	250 / 400	600	700 x 1,450
BALINIT® ALCRONA PRO	AlCrN	Arc	36 +/- 3	2 - 6	0.35	< 500	1000	700 x 1,450
BALINIT® DYLYN	a-C:H:Si	PACVD	~20 - 25	1 - 3	0.1 - 0.2	180 - 220	300	330 x 900
BALINIT® DYLYN PLUS	a-C:H:Si	PACVD	~17 - 23	1 - 3	0.05 - 0.1	180 - 220	350	330 x 900
BALINIT® DYLYN PRO	a-C:H:Si	PACVD	~15 - 20	1 - 3	0.05 - 0.1	180 - 220	350	330 x 900

All given data are approximate values, they depend on application, environment and test condition.

Coating description and recommended applications

BALINIT® C: The standard coating for sliding and rolling elements under poor lubricating conditions, counteracts seizure and galling (e.g. roller bearings, gears).

BALINIT® DLC: Harder than BALINIT® C and therefore used to withstand higher levels of abrasive wear and high sliding speeds. Standard for diesel injection, engine valve train and piston pins.

BALINIT® DLC STAR: Tribological performance like DLC, but enhanced with a very ductile CrN base layer for additional high loads.

BALINIT® CAVIDUR: Very hard and smooth DLC coating. The standard for highly loaded racing parts such as cam-shafts and finger followers.

BALINIT® CNI: Chromium nitride is very ductile and highly oxidation resistant and is therefore used in high temperature applications requiring high wear resistance (e.g. piston rings, exhaust valves).

BALINIT® CROMA PLUS: Similar to CNI with higher hardness and a special top layer for reduced friction.

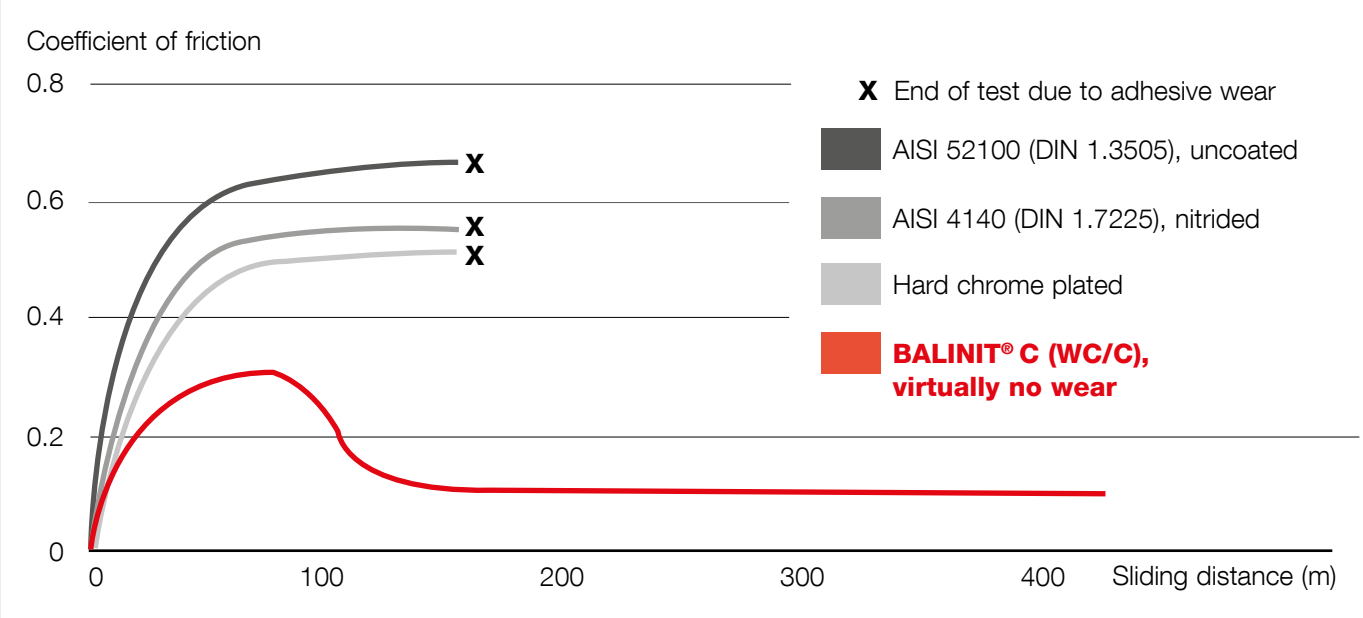
BALINIT® A: The historical first coating for tools and components, impressive golden color. Used therefore in long-lasting specification industries such as aerospace or for colouring and designation purposes.

BALINIT® ALCRONA PRO: Extremely oxidation resistant and therefore used in high temperature and abrasive environments (e.g. for turbocharger parts or exhaust valves).

BALINIT® DYLYN: Silicon-enriched DLC coatings for lower friction, higher corrosion resistance and good release properties (e.g. plastic moulds).

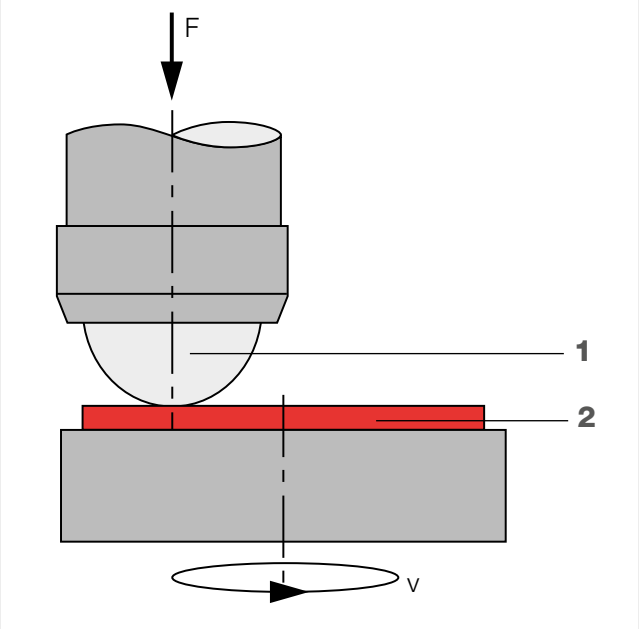
Harness the main advantages of carbon-based coatings: low friction and low sliding wear

Pin-on-disc test to compare friction and wear of materials



Wear track (30x) of nitrided ring, exhibits heavy galling after 150 m sliding distance

Wear track (30x) of BALINIT® C coated ring exhibits only slight running in (wear depth approx 0.2 um) after 2000 m sliding distance



Experimental method

1. Ball, non-rotating
diameter 3mm
AISI 52100, DIN 1.3505 100Cr6
60 HRC

2. Test ring
AISI 52100, DIN 1.3505 100Cr6
60 HRC
Abrasive-blasted
or polished
Coated

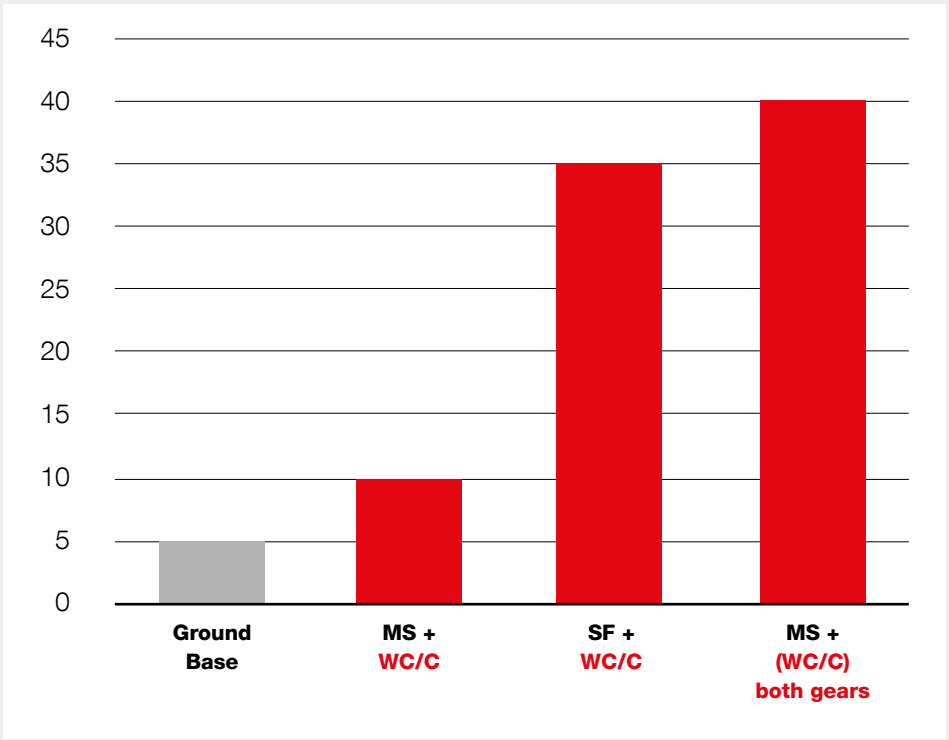
Test conditions

F = 30 N
v = 0.3 m/s
Dry contact

The coating as a design element – Increased service life due to higher wear resistance

BALINIT® hard coatings are frequently only employed after completion of product development when it is discovered that there is too much wear (acute problem solving). However, the coating itself is more and more playing a role as a design element during development to achieve improved performance. A recent example of this is the use of the BALINIT® C coating in combination with special pre-treatments designed to increase the load capacity of gears.

Cycles x10⁸ to pitting failure



800% increased pitting life

BALINIT® C (WC/C) coating, micro-blasting or superfinish increase pitting life. Maximum lifetime is achieved with a combination of superfinish and BALINIT® C on one gear, or microblasting and BALINIT® C when both gears are coated.

MS	Microblasting
SF	Super Finish
WC/C	**BALINIT® C coating**

ground MS SF

Benefit from high-performance BALINIT coatings Contact us now!

Headquarters Balzers
Oerlikon Balzers Coating AG
Balzers Technology & Service Centre
Iramali 18
9496 Balzers
Liechtenstein
T +423 388 75 00
F +423 388 54 19
E info.balzers@oerlikon.com

For more information on our centres, please visit:
www.oerlikon.com/balzers

HQ205EN (1611)

oerlikon balzers