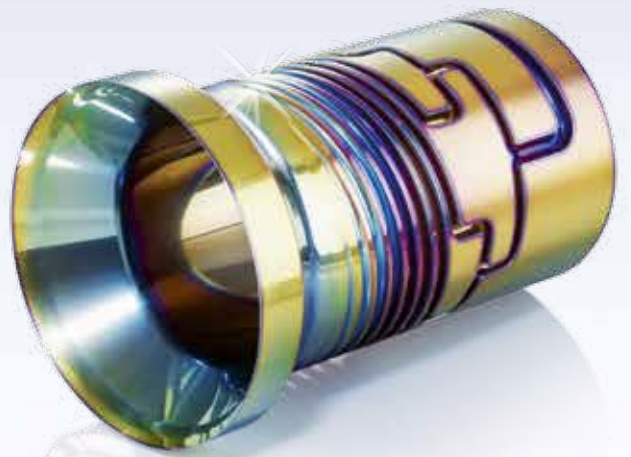
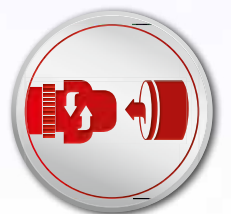


The benchmark in plastics processing.

Our wear-reduction solutions for greater productivity and efficiency in injection molding and extrusion.



Plastics



Injection molding and extrusion at its best. With BALINIT by Oerlikon Balzers.

The mold surface plays a crucial role in injection molding and extrusion: The better its quality, the greater the productivity and efficiency of the manufacturing process. You can reliably attain this objective with innovative BALINIT® wear protection

solutions by Oerlikon Balzers – a technology leader in hard coatings. BALINIT® coatings push your molds to peak performance and offer you numerous advantages in plastics processing.

Extreme coating hardness

Superb protection against abrasive wear

Protection of mold against discoloration when using aggressive masterbatches

Ceramic material – low coefficient of friction

Prevents adhesion, e.g. sticking of melt

Protection against seizure of moving mold parts – even when operated dry

Reduction of sticking due to inert surface technology

Brilliant surface quality

Improved mold filling and demolding

BALINIT® coatings afford longer protection against surface deposits

Improved corrosion resistance of amorphous carbon coatings

Reduction of tool costs due to longer tool life, less scrap, and shorter cycle times

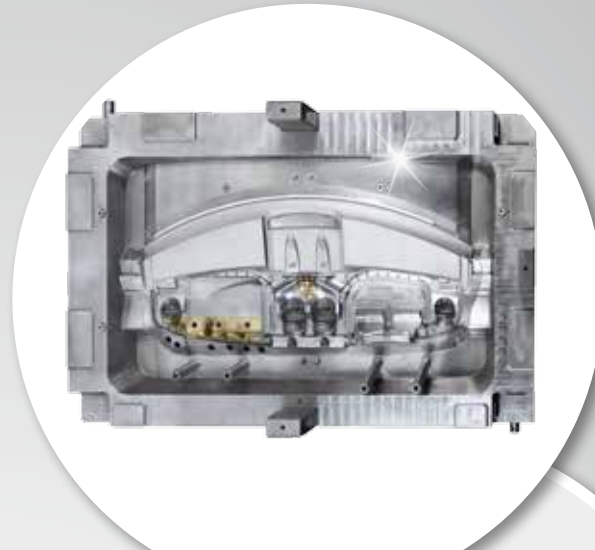
Reduction of production and unit costs due to less machine downtime and improved part quality

Reduction of maintenance costs due to fewer servicing and cleaning intervals

BALINIT® for injection molding and extrusion: Boost productivity, cost-effectiveness, and process reliability



Convincing performance in injection molding.



BALINIT® D for air vents (automotive)

Tool: 4 cavities, steel: 1.2343 ESU

Processed polymer: PA6I/X

High gloss challenge:

Sensitivity of mirror-polished cavities to scratching, critical cleaning of the tool surface

The solution: BALINIT® D

- Improved demolding
- Greater production efficiency and reliability
- Wear and scratch protection of mirror-polished cavities
- Simplified mold cleaning

Source: fischerwerke GmbH & Co. KG, Germany

Tool life
extension
20%

BALITHERM® PRIMEFORM treat- ment for instrument panels (automotive)

Tool: cavity, steel: 1.2738 HH

Processed polymer: PA6.6 GF30

No-treatment challenge:

Tool wear due to fibreglass-reinforced material with flame retardant (V0), scratch-sensitive, flashing, corrosion

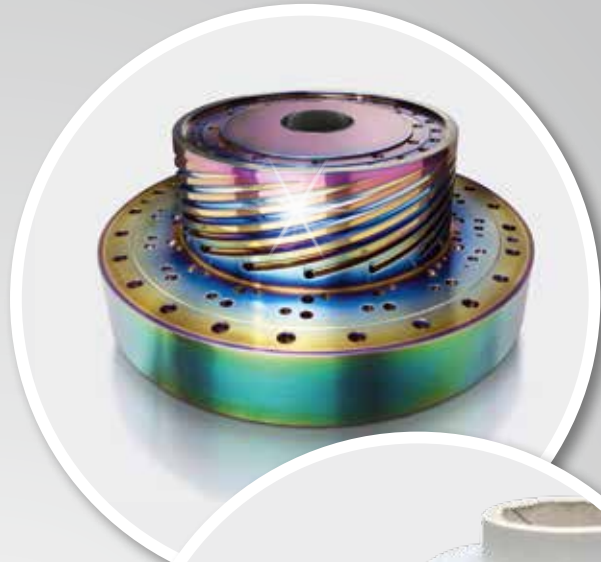
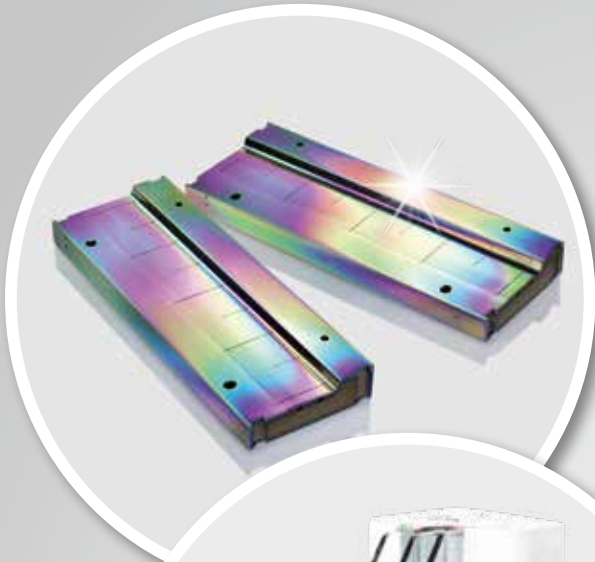
The solution: BALITHERM® PRIMEFORM

For noticeably improved demolding, optimised processability, enhanced component quality.

- Greater production efficiency and reliability
- Reduced scrap costs
- Reduced maintenance costs
- Reduced flashing at parting line

Productivity
gain
30%

Convincing performance in extrusion.



BALINIT® CROMA PLUS for PVC profiles for windows

Tool: Vacuum calibration unit

Processed polymer: PVC

Challenge:

Glas fibres and TiO₂ cause wear at the edges of the vacuum grooves and on the flat sliding surface, this results in scratches on the profile and stick-slips effects

The solution: BALINIT® CROMA PLUS

- Wear and scratch protection
- Increase lifetime of coating up to 6,000 miles / 9.600 km
- Oxyd-Layer improves flow by 30%
- Reduction of sticking
- Greater production efficiency and reliability

Material flow
increase by
30%

BALINIT® CROMA PLUS for plastics films

Tool: Spiral mandrel distributor/dies

Processed polymer: HDPE

Challenge:

Quality issues in the films due to local plastic spots sticking to the surface, abrasive cleaning causing wear and scratches, surface gets dull and rougher after ~1 year process

The solution: BALINIT® CROMA PLUS

- Greater production efficiency and reliability
- Significantly reduced or even eliminated sticking
 - Excellent scratch protection
 - No chemical interaction – no visual change of BALINIT® CROMA PLUS

Reduction
of downtime for
cleaning by
60%

For injection molding, coating properties at a glance:

| | Carbon-based coatings: | | | |
|---|------------------------|-----------------|------------|----------------------|
| | BALINIT® DYLYN | BALINIT® TRITON | BALINIT® C | BALINIT® HARD CARBON |
| Coating material | a-C:H:Si | a-C:H | Me-C:H | ta-C |
| Microhardness (HV 0.05) | 2,500 | 2,500 | 1,500 | 5,000 |
| Coefficient of friction (dry against steel) | 0.1 – 0.2 | 0.1 – 0.2 | 0.1 – 0.2 | 0.1 – 0.2 |
| Coating thickness (µm) | 1 – 3 | 1 – 3 | 1 – 4 | 1 – 2 |
| Residual stress (Gpa) | | | -1.0 | |
| Max. service temperature (°C) | 300 | 300 | 300 | 500 |
| Coating temperature (°C) | 180 – 220 | 180 – 250 | 180 – 250 | <150 |
| Coating colour | Black | Black | Charcoal | Black |
| Coating structure | Multilayer | Monolayer | Lamellar | Monolayer |
| Abrasion | ++ | ++ | + | +++ |
| Adhesion (seizure) | ++ | +++ | +++ | + |
| Corrosion | +++ | ++ | + | ++ |
| Demolding | | | | |
| Mold filling | | | | |
| Available as BALINIT® ARCTIC low-temperature coating (max. 200°C) | | | | |
| Available as STAR version* | x (Ti) | x (CrN) | x (CrN) | |
| Available in BALINIT® DUPLEX Series** | x | x | x | |
| Available in BALINIT® ADVANCED Series*** | | | | |

*The STAR versions deliver better load-bearing capabilities paired with high surface pressures.

The following materials can be coated: High-speed steels, plastic mold steels, cold- and hot-working steels, stainless steels, heat-treatable steels, cemented carbides, suitable CuBe alloys.

Application recommendations:

| | Carbon-based coatings: | | | |
|---------------------------------|--|--|--|--|
| | BALINIT® DYLYN | BALINIT® TRITON | BALINIT® C | BALINIT® HARD CARBON |
| Thermoplastics | | | | |
| PE, PP, PB | | | | |
| PS, SB, SAN, ABS, ASA | | | | |
| PVC | | | | |
| PTFE, SPTFE, PVDF | | | | |
| POM | | | | |
| PA | | | | |
| PC, PBT (B), PET (P) | For moving tool elements / dry operation (slides/ejectors) | For moving tool elements / dry operation (slides/ejectors) | For moving tool elements / dry operation (slides/ejectors) | For moving tool elements / dry operation (slides/ejectors) |
| PPE, PEEK, PAEK / PPS, PSU, PES | | | | |
| PI | | | | |
| CA, CP, CAP | | | | |
| PMMA | | | | |
| TPU | | | | |
| Thermosets | | | | |
| PF | | | | |
| EP | | | | |
| UP | | | | |
| MF, UF, MP | | | | |
| Elastomere | | | | |
| PUR | | | | |
| NBR, EPDM, Si | | | | |
| Multipolymer TPE, FPM | | | | |

- + = Conditionally suited
- ++ = Well suited
- +++ = Excellently suited

All BALINIT® coatings intended for manufacturing food industry packaging have been classified by the FDA as safe for this application. All data provided herein is for reference purposes only. Definitive values depend on the respective substrate, geometry, and surface finish.

Coating properties at a glance:

| | BALINIT® D | BALINIT® CROVEGA | BALINIT® CROMA | BALINIT® CROMA PLUS |
|---|-------------|------------------|----------------|---------------------|
| Coating material | CrN | CrN | CrN | CrN+OX |
| Microhardness (HV 0.05) | 1,750 | 1,750 | 2,500 | 2,500 |
| Coefficient of friction (dry against steel) | 0.5 | 0.5 | 0.3 – 0.5 | 0.3 – 0.5 |
| Coating thickness (µm) | 2 – 4 | 2 – 4 | 4 – 10 | 4 – 10 |
| Residual stress (Gpa) | -1.5/-2.0 | -1.5/-2.0 | -1.5/-2.0 | -1.5/-2.0 |
| Max. service temperature (°C) | 700 | 700 | 700 | 700 |
| Coating temperature (°C) | 200 – 450 | 250 | 250 – 450 | 250 – 450 |
| Coating colour | Silver grey | Silver grey | Silver grey | Rainbow |
| Coating structure | Monolayer | Monolayer | Multilayer | Multilayer |
| Abrasion | ++ | ++ | ++ | ++ |
| Adhesion (seizure) | ++ | ++ | ++ | +++ |
| Corrosion | + | ++ | ++ | ++ |
| Demolding | ++ | ++ | ++ | ++ |
| Mold filling | + | + | + | + |
| Available as BALINIT® ARCTIC low-temperature coating (max. 200°C) | x | | | |
| Available as STAR version* | | | | |
| Available in BALINIT® DUPLEX Series Nitriding in combination with BALINIT® coating | | | x | x |
| Available in BALINIT® ADVANCED Series (enhanced support effect of the tool surface) | | | | |

Especially for extrusion

*The STAR versions deliver better load-bearing capabilities paired with high surface pressures.

The following materials can be coated: High-speed steels, plastic mold steels, cold- and hot-working steels, stainless steels, heat-treatable steels, cemented carbides,

Application recommendations:

| | BALINIT® D | BALINIT® CROVEGA | BALINIT® CROMA | BALINIT® CROMA PLUS |
|---------------------------------|------------|------------------|----------------|---------------------|
| Thermoplastics | | | | |
| PE, PP, PB | ++ | ++ | ++ | +++ |
| PS, SB, SAN, ABS, ASA | ++ | ++ | ++ | +++ |
| PVC | ++ | ++ | ++ | +++ |
| PTFE, SPTFE, PVDF | ++ | ++ | ++ | ++ |
| POM | ++ | ++ | ++ | +++ |
| PA | ++ | ++ | ++ | +++ |
| PC, PBT (B), PET (P) | ++ | ++ | ++ | +++ |
| PPE, PEEK, PAEK / PPS, PSU, PES | ++ | ++ | ++ | +++ |
| PI | | | | |
| CA, CP, CAP | | | | |
| PMMA | | | | +++ |
| TPU | + | + | + | +++ |
| Thermosets | | | | |
| PF | ++ | ++ | ++ | +++ |
| EP | ++ | ++ | ++ | +++ |
| UP | + | + | + | + |
| MF, UF, MP | ++ | ++ | ++ | +++ |
| Elastomere | | | | |
| PUR | + | + | + | +++ |
| NBR, EPDM, Si | ++ | ++ | ++ | ++ |
| Multipolymer TPE, FPM | ++ | ++ | ++ | +++ |

- + = Conditionally suited
- ++ = Well suited
- +++ = Excellently suited

All BALINIT® coatings intended for manufacturing food industry packaging have been classified by the FDA as safe for this application.

All data provided herein is for reference purposes only. Definitive values depend on the respective substrate, geometry, and surface finish.

Benefit from high-end wear protection solutions for your plastics processing applications. Contact us now!

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