



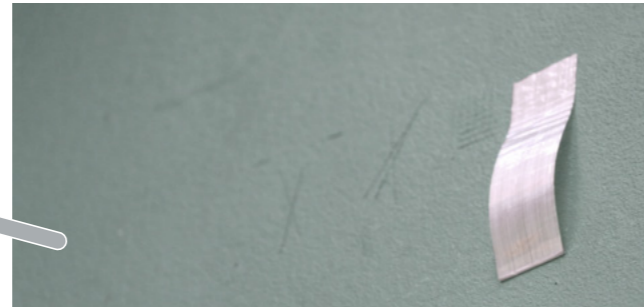
*Pro***FLAKE**

*Pro***FLAKE**[®] Zinc Flake Pigments –
A Perfect Combination of Galvanic
Protection and Barrier Effect

ProFLAKE® – successfully used in corrosion protection for decades

Railway bridge in Immenstadt, Germany

- three-layer commercial system (epoxy primer – ProFLAKE® Zn 2000, epoxy-micaceous iron oxide, PU top coat)
- 25 years of exposure (C3 environment)



Detailed view: adhesion and cross-cut test

Single layer lamp post polyester coating

- ProFLAKE® Zn 2000 and STAPA® 2 n.l.
- C2 rural environment



Single layer coating for factory entrance gate (epoxy-mastix)

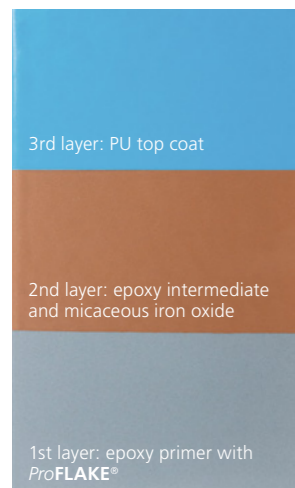
- ProFLAKE® Zn 2000; customer developed formula
- C5 coastal environment



ECKART proprietary developed and certified C5 paint system

- three-layer system (epoxy primer – ProFLAKE® Zn 2000, epoxy-micaceous iron oxide, PU top coat)
- certified by IKS Dresden, Germany (institute for corrosion protection)

For more information and the DIN 12944 C5 and CX certificates, please have a look at our website:



ProFLAKE® Zinc Flake Pigment Portfolio for Heavy Duty Applications

ProFLAKE® zinc pigments combine the two positive aspects of a barrier effect with galvanic protection, leading to superior anticorrosion performance in heavy duty applications.

Your benefits compared to traditional solutions

Technical advantages

- more flexible coating films due to higher binder content
- lower density of a zinc flake based primer -> less weight
- very low degree of rust formation
- very good anti-corrosion properties (two-in-one concept): galvanic plus barrier effect
- less settlement and easier to apply and handle

Economic benefits

- lower metal content without loss in corrosion protection
- cost saving potential of up to 15 %, calculated on coated area in comparison to a zinc rich primer system
- greater formulation flexibility due to lower zinc pigment content

Increased sustainability

- due to greatly reduced zinc metal content
- higher yield compared to traditional solutions
- thanks to the lower zinc metal content in paint film, less zinc is released to the soil e.g. during cleaning or welding processes or into the sea water from offshore constructions

Technical features

- Shape: flake
- aspect ratio: approx. 40/1
- thickness: 0.2 – 0.4 µm
- average particle size: 14 – 31 µm
- material density: 7.1 g/cm³ (solid for PVC calc.)
- oil absorption value: approx. 22 g / 100 g
- specific surface area: 1.2 m²/g

Formulation guideline for ProFLAKE® Zn based primers.

Dosage:

- PVC total 35 – 45 % (fillers + pigments + zinc flake)
- PVC zinc flake approx 15 %
- PVC fillers & pigments 15 – 25 %

Incorporation

- add pigment to the binder (binder to zinc flake ratio approx. 1 : 3 – 4)
- add zinc flake while stirring
 - stirrer equipment: dissolver disc !
 - speed : 4 – 6 m/sec
 - time: 20 – 30 min.

Suitable Coating Systems

- 2C epoxy, 2C PU; epoxyester; alkyd; PVB acrylic ; 1C PU ; polyaspartic, polysiloxane; high solids; UV- curing systems; powder coatings, stoving finish; ethyl silicate

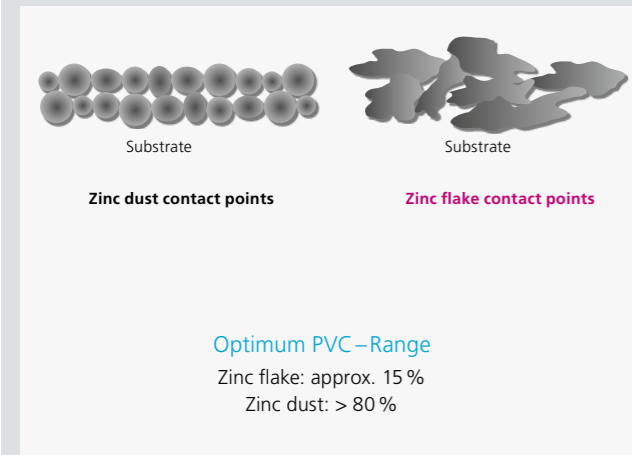
Substrates

- pre-treated steel substrates (e. g. SA 21/2)

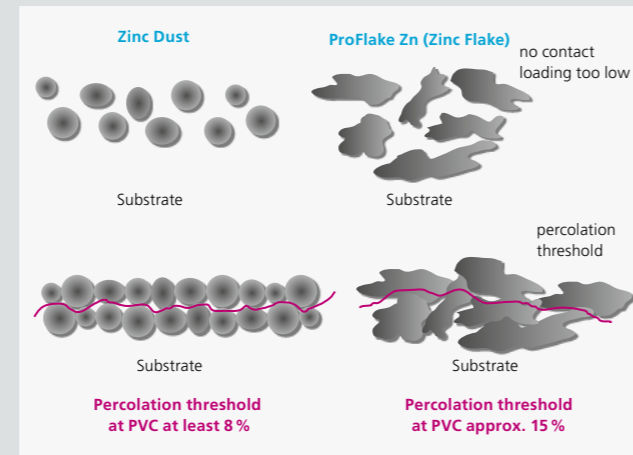
Zinc formulation principles

Zinc particles have to contact each other and the substrate. The probability of forming a conductive network increases with the surface area (i. e. pigment shape) and the pigment concentration.

Optimum pigment volume concentration (PVC) dependant on pigment shape



Percolation threshold principles



ProFLAKE® Technical Information & New ProFLAKE® Zn 3000

ProFLAKE®	Material #	Supply form	Average D50	D50 Range
Product				
NEW: Zn 3000	026196...	powder	31 µm	25–37 µm
Zn 2000	026143...	powder	22 µm	15–30 µm
Zn 1400	026141...	powder	14 µm	7–21 µm
Zn 1590 MS	026142...	90% paste in mineral spirit	16 µm	7–26 µm

In the past, it was mandatory to use zinc rich primers (i. e. zinc dust) to fulfil the requirements of DIN / ISO 12944 C5 or Paint 20. A new release of the standards now also allows the use of zinc lamellar pigments (=zinc flake pigments).

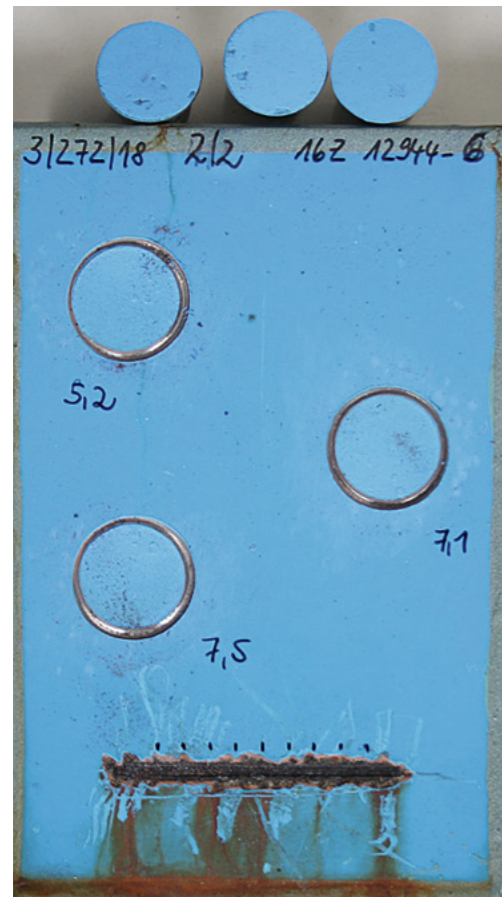
Please find the technical details of our established ProFLAKE® zinc pigments in the table above. Our latest addition, ProFLAKE® Zn 3000 (D50 of approx. 31 µm) enriches the already existing ProFLAKE® portfolio of zinc flake pigments as the coarsest grade.

Thanks to optimized lean production processes, ProFLAKE® Zn 3000 offers an attractive price-performance ratio. The good orientation of the zinc flakes allows the formulation of percolation pathways. Additionally, the barrier effect of the flakes ensures perfect corrosion protection performance, providing a clear advantage over zinc dust.

ProFLAKE® Zn 3000 was especially developed for use in corrosion protective coatings with dry film thicknesses of >80 µm, typically used in heavy duty corrosion protection in accordance to DIN / ISO 12944 C5 and AMPP (SSPC) Paint 29.

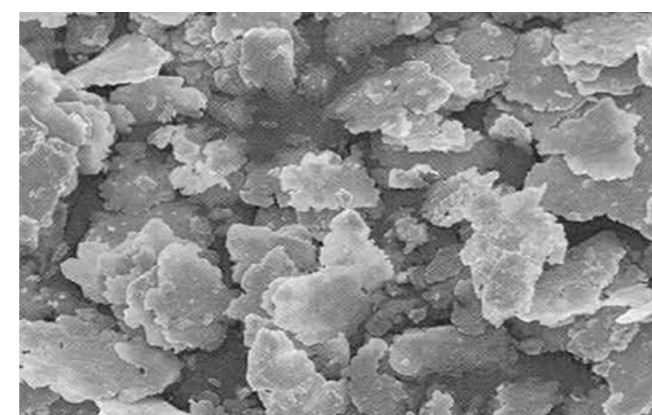
Anticorrosion Test

(According to DIN EN ISO 12944-6, Corrosion Category C5, Evaluation by IKS Dresden)



Creepage at scribe after 2,688 h salt spray test: 1.4 mm

Cross-cut through the tested three-layer paint



SEM picture (x 450) of ProFLAKE® 3000

Salt spray test result

Single layer: zinc primer with zinc flakes (ProFLAKE® Zn 3000), average dry film thickness: 80 µm

DIN/ISO 12944 C5 corrosion protection classification with excellent test results; i.e. creepage at scribe 0.43 mm and 1.00 mm (allowed specification: 2 mm):





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