

HEUCOPHOS[®] & HEUCOSIL[™] SMART AND INNOVATIVE ZINC-FREE ANTICORROSIVES



INTRODUCTION



HEUBACH'S UNIQUE ZINC-FREE ANTICORROSIVE WITH UNIVERSAL APPLICABILITY

The real challenge is that it is only possible in rare cases to combine universal application with very good corrosion protection. Even though the periodic table offers several alternatives to zinc that do not contain heavy metals, only a few metals qualify as suitable replacements.

When making a selection, the emphasis is therefore on possible positive interactions between calcium and magnesium phosphate compounds.

Through an extensive series of tests, Heubach was able to demonstrate the excellent performance properties using the synergistic effects by the use of calcium magnesium orthophosphate compared to pure magnesium phosphate, with even the protective effect of the zinc-containing reference sample being exceeded by the use of HEUCOPHOS® CMP. In this system also a significant improvement in adhesion and rust creepage at scribe was achieved. The results clearly show that the identification and use of synergistic interactions is of great advantage in the development of novel, highly effective corrosion protection pigments.

Besides economic considerations, ecological and regulatory factors play an increasingly decisive role nowadays in the formulation of innovative coating systems. It is therefore no surprise that the call for zinc-free anticorrosive pigments and those that do not require labeling has steadily increased in recent years. Heubach's range of zinc-free modified metal complex anticorrosives provides environmentally friendly solutions even in demanding primer systems fulfilling requirements such as:

- Highly effective anodic corrosion protection in solvent- and water-based systems
- Stability
- Universal application
- Very good dispersion properties
- Cost efficiency



PRODUCT PORTFOLIO



MODIFIED ORTHOPHOSPHATES

Calcium Phosphate CP is a zinc-free anti-corrosive pigment for the application in protective coatings. It is an alternative to standard zinc phosphate.

HEUCOPHOS® CMP is a unique zinc-free anticorrosive with universal applicability. It is a calcium magnesium orthophosphate as alternative to versatile pigments for long-term performance.

HEUCOPHOS® ACP is a modified calcium phosphate silicate, as alternative to versatile pigments for long-term performance.

MODIFIED POLYPHOSPHATES

The search for chromate replacements in high-performance applications, such as coil coatings and aircraft primers led to the development of the polyphosphate product line, which comprises the Zn-free types HEUCOPHOS® SAPP, SRPP and CAPP. Heubach's high performance polyphosphates are among the technically most sophisticated anticorrosive inhibitors in today's market and the preferred option wherever ultimate protection is required.

HEUCOPHOS® CAPP gives good results in water based 2K epoxy resins and coating systems based on dispersions. It is a calcium aluminum polyphosphate silicate hydrate.

HEUCOPHOS® SAPP and HEUCOPHOS® SRPP are strontium aluminum polyphosphate hydrates and high-performance pigments, alternatives to zinc and chromate containing anticorrosives.

CALCIUM MODIFIED SILICA PIGMENT

The corrosion protection of pre-treated steel and aluminum sheets is important and requires continuous development efforts to provide suitable and effective corrosion protection solutions.

HEUCOSIL™ CTF is a highly effective zinc-free anticorrosive based on a calcium modified silica gel meeting the specific performance requirements for thin-film applications.

APPLICATION GUIDE

	CALCIUM PHOSPHATE	ORTHOPHOSPHATES		POLYPHOSPHATES		OTHERS	
		HEUCOPHOS®				HEUCOSIL™	
	CP	ACP	CMP	SAPP	SRPP	CAPP	CTF
SOLVENT BASED COATINGS							
Short and medium oil alkyds	++	+++**	+++			+++	
Long oil alkyds	+		++			+++	
High solid alkyds*		++	+				
2K Epoxies	+	+	+++	+++**	++		++
Epoxy esters		+++	+++			++	
High solid epoxies*		+++**	+				++
2K Polyurethanes	+	+	++	+++**	++	+++	++
High solid polyurethanes*			+	++	++	++	++
Moisture cured polyurethanes			+			+	
Silicone resins	+++	++		++			
WATER BASED COATINGS							
Alkyd emulsions*	+++	+++	++			+++	
2K Epoxies*	+		++	+++	+	+++**	
1K Polyurethanes*		+++	++			+	
2K Polyurethanes*	+		++	+++	+	++	++
Silicone resins*				++		+	
Acrylics and modified acrylics*	+++	+	++			+++	
Butadienes*	+++	+++	+++			+	
SPECIALTY COATINGS							
Coil coatings				+++**	+++**	+++	+++
Aircraft primers				+++**	+++**	+++	+
Wash and shop primers		+	++			+++	
Direct to metal		+++	++			+	
UV cured systems*							++
Powder coatings*			+	++		++	++

* = Resins with low or no VOCs

** = In addition recommended in combination with HEUCORIN® RZ

+++ Excellent choice

++ Good choice

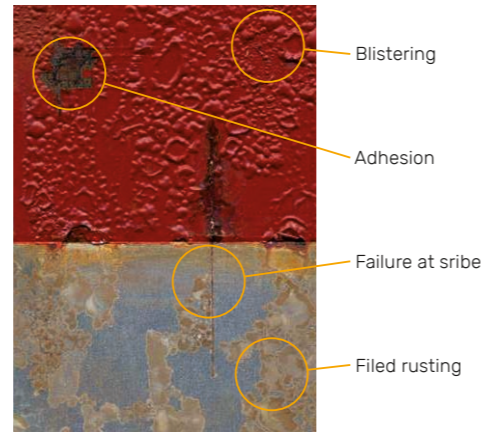
+ Possible choice

PROTECTIVE EFFECT AND WEATHERING EXAMPLES

ACCELERATED WEATHERING TESTS

The requirements for innovative coating systems are constantly increasing, since corrosion resistance is an essential criterion for the quality of metallic components. With the aid of comparative application tests, we determine the performance of our anticorrosives in various coating systems of the "Protective Coatings World" on diverse metal substrates.

In order to be able to assess the influence of the corrosion protection pigments / inhibitors on the performance behavior of the respective coatings, we use different rapid weathering methods. These include the condensation humidity test and the salt spray test. Before and after the weathering tests, the film properties and thus any changes in the coating are assessed.



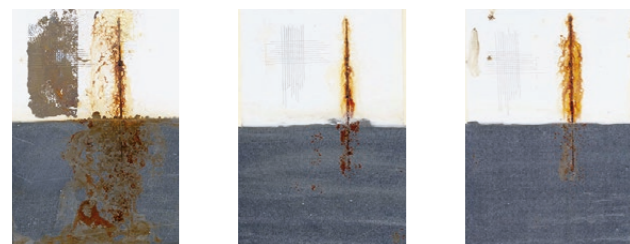
Evaluation after salt spray test

- Blistering
- Adhesion
- Failure at scribe
- Filed rusting

CALCIUM PHOSPHATE

is a cost-effective, slightly soluble calcium phosphate, for medium-level corrosion protection in water and solvent based coatings.

CALCIUM PHOSPHATE CP



Control Zinc phosphate Calcium Phosphate CP

504 h Salt spray (ASTM B 117-19)
DIN EN ISO 9227:2022-02

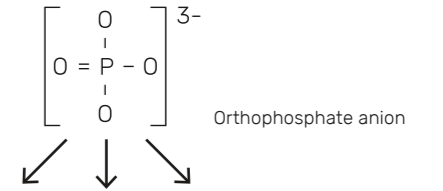
Primer: Solvent-based short-oil alkyd
DFT: 70 microns
Substrate: Cold rolled steel panels ST 1205



MODIFIED ORTHOPHOSPHATES

Corrosion protection with zinc-free orthophosphates

- Anodic passivation-phosphate layers



HEUCOPHOS® CMP



Control Magnesium phosphate HEUCOPHOS® CMP

408 h Salt spray (ASTM B 117-19)
DIN EN ISO 9227:2022-02

Primer: Solvent-based short-oil alkyd
DFT: 70 microns
Substrate: Cold rolled steel panels ST 1205

HEUCOPHOS® CMP

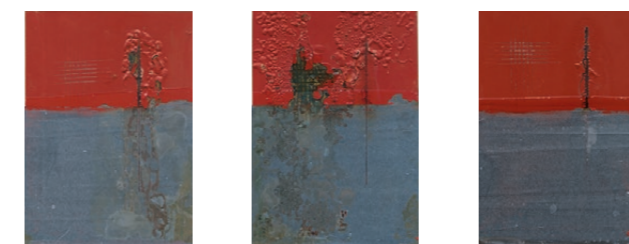


Control Zinc phosphate HEUCOPHOS® CMP

504 h Salt spray (ASTM B 117-19)
DIN EN ISO 9227:2022-02

Primer: Solvent-based short-oil alkyd
DFT: 70 microns
Substrate: Sand blasted steel

HEUCOPHOS® ACP



Control Competition zinc-free phosphate HEUCOPHOS® ACP

288 h Salt spray (ASTM B 117-19)
DIN EN ISO 9227:2022-02

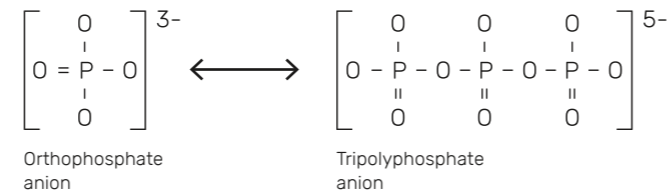
Primer: Water-based alkyd emulsion
DFT: 80 microns
Substrate: Cold rolled steel panels ST 1205

PROTECTIVE EFFECT AND WEATHERING EXAMPLES

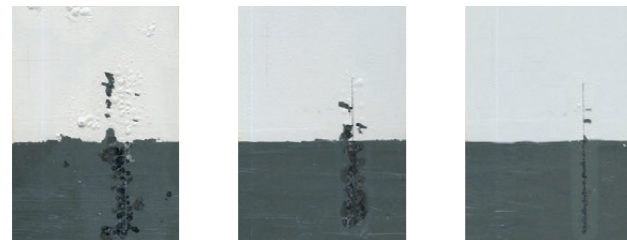
MODIFIED POLYPHOSPHATES

Corrosion protection with zinc-free polyphosphates

- Stabilizing metal cations by chelating effect
 - Dissociation to orthophosphates
- anodic passivation-phosphate layers



HEUCOPHOS® CAPP



Control Calcium phosphate HEUCOPHOS® CAPP

1406 h Salt spray (ASTM B 117-19)
DIN EN ISO 9227:2022-02

Primer: 2K Polyurethane
DFT: 60 microns
Substrate: Hot dipped galvanized steel

HEUCOPHOS® SAPP



Control Magnesium phosphate HEUCOPHOS® SAPP

432 h Salt spray (ASTM B 117-19)
DIN EN ISO 9227:2022-02

Primer: High solid 2K polyurethane
DFT: 70 microns
Substrate: Cold rolled steel panels ST 1205

HEUCOPHOS® SRPP



Control Magnesium phosphate HEUCOPHOS® SRPP

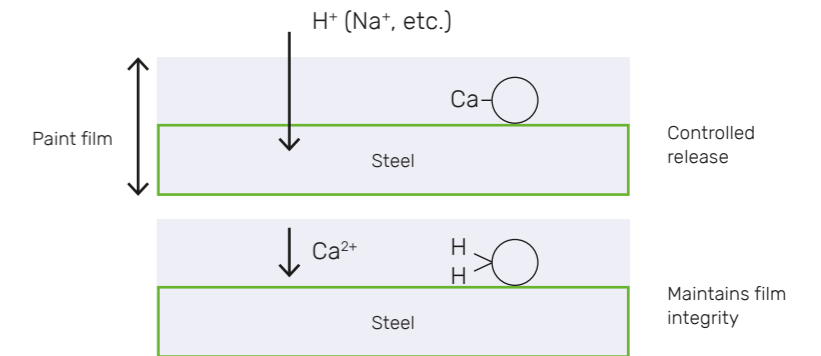
3360 h Salt spray (ASTM B 117-19)
DIN EN ISO 9227:2022-02

Primer: Polyester coil primer with polyester top coat
DFT: Primer 6-8 microns; Top coat 20-24 microns
Substrate: Hot dipped galvanized steel, Cr-free pre-treated

CALCIUM MODIFIED SILICA PIGMENT

HEUCOSIL™ CTF is a highly effective zinc-free anticorrosive based on a calcium modified silica gel.

- Formation of a passive layer (barrier)
- Adsorption of corrosion stimulators



HEUCOSIL™ CTF



Control Strontium chromate HEUCOSIL™ CTF

2000 h Salt spray (ASTM B 117-19)
DIN EN ISO 9227:2022-02

Primer: High molecular polyester coil primer
DFT: PVDF top coat; Primer 6-8 microns; Top coat 20-24 microns
Substrate: Hot dipped galvanized steel, Cr-free pre-treated

HEUCOSIL™ CTF



Control Competition zinc-free pigment HEUCOSIL™ CTF

816 h Salt spray (ASTM B 117-19)
DIN EN ISO 9227:2022-02

Primer: Solvent-borne 2K epoxy/polyamide primer
DFT: 60 microns
Substrate: Cold rolled steel panels ST 1205



OUR SERVICE



At Heubach, customer satisfaction comes first. The performance of anti-corrosion pigments depends on a number of factors (binder agent system, base coat, formulation etc.) all of which can be demonstrated in practical tests. Accordingly the identification of the right anticorrosive pigment for your paint or coating application can prove a complicated undertaking.

In our laboratories we investigate the corrosion behavior of our products in a variety of different binding agents. Supported by extensive laboratory facilities, Heubach's technical specialists are always on hand to assist you in identifying the right solution, no matter how challenging your task.

With active service centers both globally and regionally we provide our customers with the technical support essential for the implementation of customer-specific requirements and solutions.

We also make our extensive experience with various binder systems available to our customers by providing a wide range of different guideline formulations on our website.



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