



# Smart and innovative zinc-free anticorrosives

HEUCOPHOS® & HEUCOSIL™

**heubach**  
COMPETENCE IN COLOR





#### Introduction

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 anti-corrosive pigments or 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 and universal application
- › Very good dispersion properties
- › Cost efficiency

#### 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 phosphates.

Heubach developed an R&D-program in which various testing procedures demonstrated excellent performance properties when utilizing the synergistic effects proven by using calcium magnesium orthophosphate when compared with straight magnesium phosphate.

Even the protective effect of the reference sample which contained zinc was outperformed by using the HEUCOPHOS® CMP.

A significant improvement in adhesion and rust creepage at the cross-section could also be achieved in this system by using HEUCOPHOS® CMP.

The results clearly show that the identification and use of synergetic interactions is of benefit when developing novel, highly effective anti-corrosive pigments like HEUCOPHOS® CMP.



## 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

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

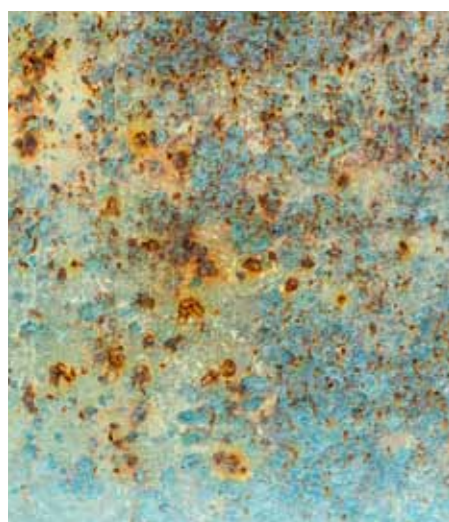
HEUCOPHOS® SAPP & HEUCOPHOS® SRPP are strontium aluminum polyphosphate hydrates and high-performance pigments, alternatives to zinc and chromate containing anticorrosives.

The search for chromate replacements in high-performance applications, such as coil coatings and aircraft primers led to the development of the polyphosphate line, which comprises the types HEUCOPHOS® ZAPP, 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.

### Calcium Modified Silica Pigment

HEUCOSIL™ CTF is a high-performance pigment for demanding coating systems. The corrosion protection of pre-treated steel and aluminum sheets is becoming increasingly important and requires continuous R&D efforts to provide suitable and effective corrosion protection solutions.

It 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
<b>Solvent Based Coatings</b>							
Short and medium oil alkyds	++	+++	+++			++	
Long oil alkyds	+		++			++	
High solids alkyds		++	+				
Epoxies	+	+	+++	+++	++		++
Epoxyesters		++	+++			++	
High solids epoxies		+++	+				++
Polyurethanes	+		++	+++	++	++	++
High solids polyurethanes			+	++	++	++	++
Moisture cured polyurethanes			+			+	
Silicone resins	++	++		++			
<b>Water Based Coatings</b>							
Alkyd emulsions	++	++	++			++	
Epoxy dispersions	+		++	+++	+	+++	
1-part polyurethanes		+	++			+	
2-part polyurethanes	+		++	+++	+	++	++
Silicone resins				++		+	
Acrylics and modified acrylics	+	+	++			++	
Butadienes	++	+++	+++			+	
<b>Specialty Coatings</b>							
Coil coatings				+++	+++	++	+++
Aircraft primers				+++	+++	++	+
Wash and shop primers		+	++			++	
Direct to metal one coat		+++				+	
UV cured systems							++
Powder coatings			+	++			++

+++ Excellent choice    ++ Good choice    + Possible choice

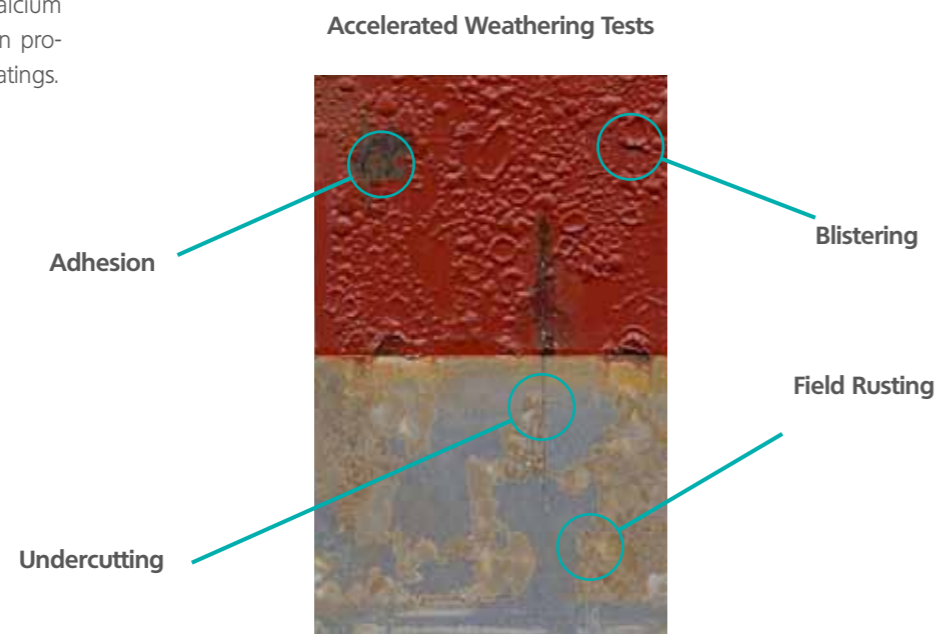
■ In addition recommended in combination with HEUCORIN® RZ

■ Resins with low or no VOCs



## Calcium Phosphate

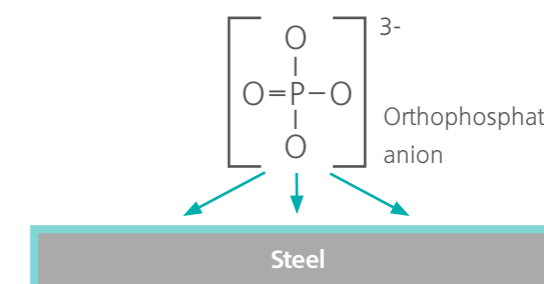
is a cost-effective, slightly soluble calcium phosphate, for medium-level corrosion protection in water and solvent-based coatings.



## Modified Orthophosphates

Corrosion protection with zinc-free orthophosphates

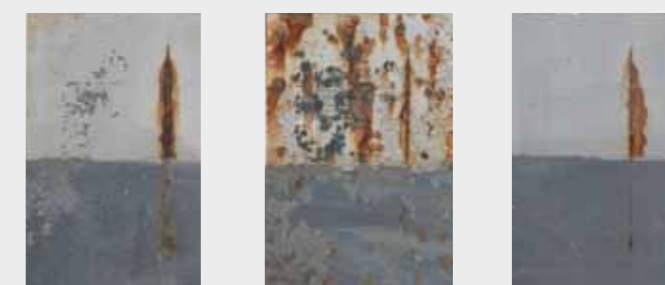
- › Anodic passivation-phosphate layers
- › Precipitation of  $M(OH)_x$  (barrier)  $\rightarrow$  ( $M=Ca, Sr, Mg...$ )



### HEUCOPHOS® CMP

408h Salt Spray (ASTM B 117-11)  
DIN EN ISO 9227: 2012-09

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



Control

Magnesium Phosphate

HEUCOPHOS® CMP

### Calcium Phosphate CP

504h Salt Spray (ASTM B 117-11)  
DIN EN ISO 9227: 2012-09

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



Control

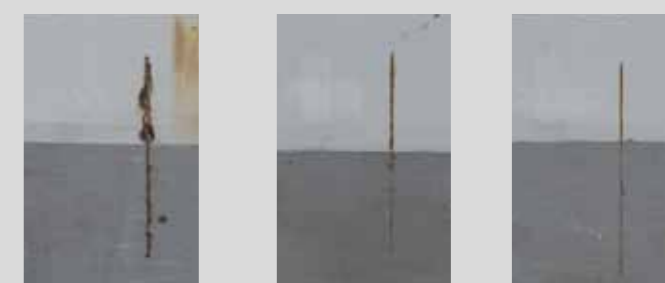
Zinc phosphate

Calcium Phosphate CP

### HEUCOPHOS® CMP

504h Salt Spray (ASTM B 117-11)  
DIN EN ISO 9227: 2012-09

- › Primer: Solvent-borne 2-part epoxy primer
- › DFT: 70 microns
- › Substrate: Sand blasted steel



Control

Zinc Phosphate

HEUCOPHOS® CMP



### HEUCOPHOS® ACP

288h Salt Spray (ASTM B 117-11)  
DIN EN ISO 9227: 2012-09

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



Control

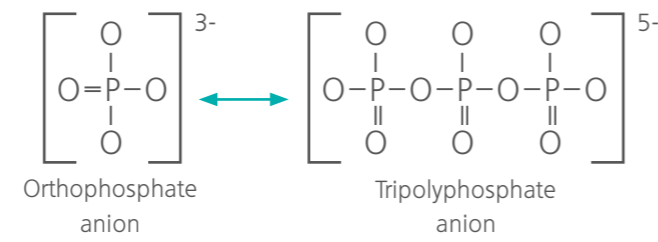
Competition zinc-free pigment

HEUCOPHOS® ACP

## Modified Polyphosphates

Corrosion protection with zinc-free polyphosphates

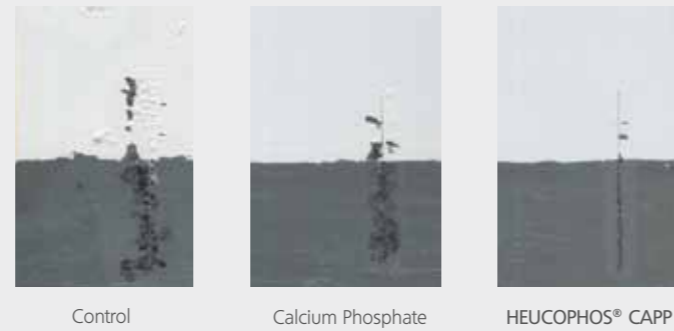
- › Deposition of polyphosphate films on the metal surface
- › Stabilizing metal cations by chelating effect on iron → Ion scavenger
- › Dissociation back to orthophosphates, anodic passivation
- › Precipitation of  $M(OH)_x$  (barrier) → ( $M=Ca, Sr, Mg...$ )



### HEUCOPHOS® CAPP

1406h Salt Spray (ASTM B 117-11)  
DIN EN ISO 9227: 2012-09

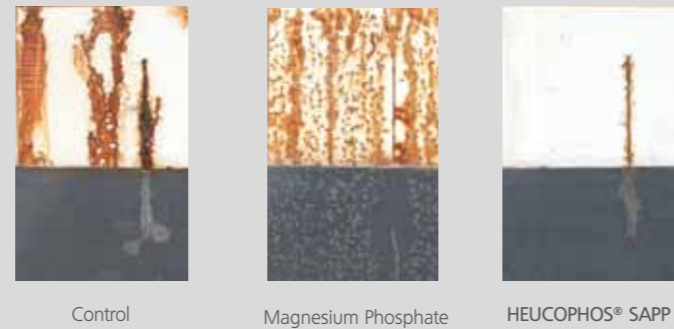
- › Primer: 2K-Polyurethane
- › DFT: 60 microns
- › Substrate: Hot dipped galvanized steel



### HEUCOPHOS® SAPP

432h Salt Spray (ASTM B 117-11)  
DIN EN ISO 9227: 2012-09

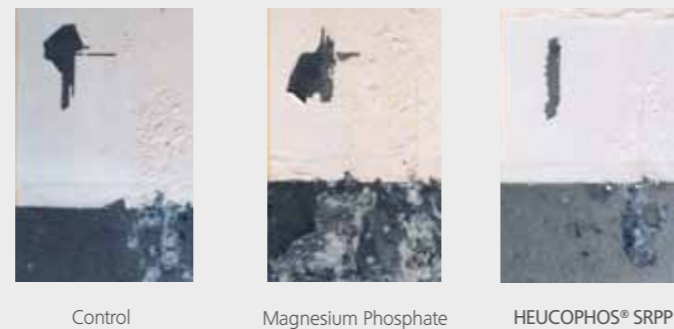
- › Primer: High-Solids 2K-Polyurethane
- › DFT: 70 microns
- › Substrate: Cold rolled steel panels ST 1205



### HEUCOPHOS® SRPP

3360h Salt Spray (ASTM B 117-11)  
DIN EN ISO 9227: 2012-09

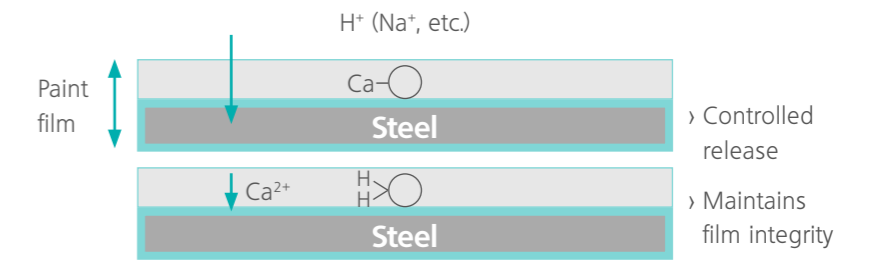
- › Primer: Polyester coil primer with polyester top coat
- › DFT: Primer: 6-8 microns  
Top Coat: 20-24 microns
- › Substrate: Hot dipped galvanized steel, Cr-free pre-treated



## 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

2000h Salt Spray (ASTM B 117-11)  
DIN EN ISO 9227: 2012-09

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



### HEUCOSIL™ CTF

816h Salt Spray (ASTM B 117-11)  
DIN EN ISO 9227: 2012-09

- › Primer: Solvent borne 2-part 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 pigment 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 anti-corrosive 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.





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