

HEUCOPHOS[®], HEUCOSIL[™],
HEUCORIN[®] & HEUCOFLASH[™]
ANTICORROSIVES FROM THE EXPERTS



BRIGHTER COLORS.
BRIGHTER LIFE.

INTRODUCTION





CORROSION

“The degradation of metal by chemical or electrochemical means resulting from exposure to weathering, moisture, chemicals or other agents in the environment in which it is placed.”

Worldwide, corrosion destroys a ton of steel every second and the damage causes US\$ 2.5 trillion annually.

With many years of experience in the field of innovative corrosion protection and comprehensive research and development, Heubach is dedicated to extending the lifetime of steel.

INNOVATION AND CUSTOMER SERVICE

The corrosion of iron is an electrochemically driven process. With the presence of humidity iron passes into solution at the anode and hydroxyl ions are formed out of water and oxygen at the cathode. Due to the existence of an electrolyte there is the possibility for the electrons to react at the cathode with the environment. The result is the formation of rust (Fig. 1).

THE CORROSION CELL

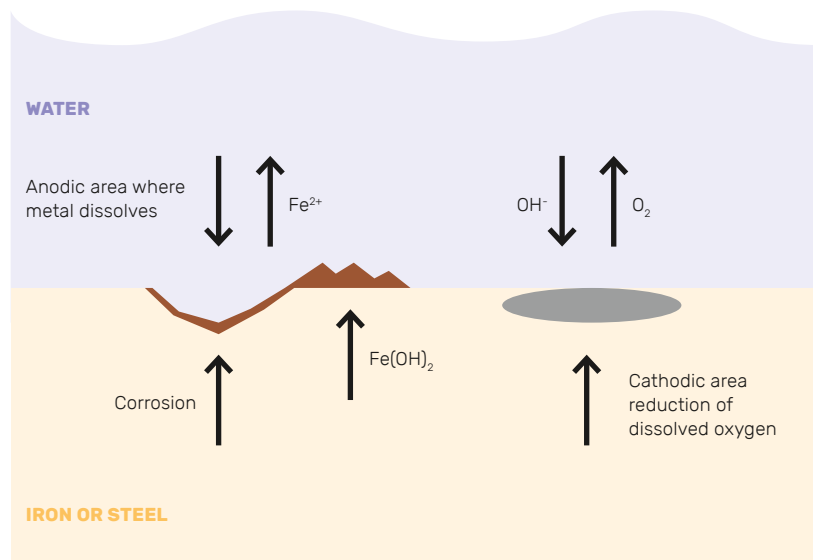


Fig. 1: The formation of rust, a corrosion cell

CORROSION PROTECTION

Anticorrosive pigments inhibit the described process either physically (Barrier Pigments) or chemically and/or electrochemically (Active Pigments) and can be classified according to their type of protective mechanism.

EVALUATION OF PROTECTIVE COATING APPLICATIONS

The anticorrosion primer plays a major role in a protective coating system and the performance of the primer is influenced by numerous key factors:

- Kind of resin
- Relation PVC to CPVC
- Kind of anticorrosive pigment (physical, chemical and electrochemical properties)
- Anticorrosive pigment loading
- Other pigments and fillers
- pH-value, pH-stability during storage (especially when incorporated in water based systems)
- Entire formulation
- Dispersing conditions
- And others

All these factors have to be taken into account by the determination and investigation of the ultimate corrosion inhibition formulation. Our experts can assist you with testing, formulations and corrosion protection know how.



INNOVATION AND CUSTOMER SERVICE COMMITMENT

Heubach's laboratory capabilities allow us to continue our strong commitment for innovation in anticorrosives and protective coating technologies for a wide range of applications.

Our global service team of highly motivated technical specialists is able to provide you with a suitable corrosion protection solution for your system.

Our extensive application laboratories and competent service team enable us to answer your individual inquiries in short time. As a service, we provide you with our experience in the form of various guide formulations.

In addition to the usual test methods, our testing capabilities also includes weathering stations and accelerated weathering test equipment. Furthermore we have special laboratories for powder and coil coatings. Due to this versatility we are able to support our customers in finding the optimal corrosion protection system for a wide range of coatings and application areas.

We are looking forward to providing our experience and technology know how to you. A wide reaching network of strategically located offices on six continents ensures global customers short delivery times and flexible service.

PRODUCT PORTFOLIO



ANTICORROSIVE PIGMENTS

As the global leader in the replacement of carcinogenic chrome-based anticorrosives, Heubach's pioneered the use of standard zinc phosphates. To address the limitations in matching the excellent performance of chromates, Heubach introduced modified product lines such as modified orthophosphates, polyphosphates, the wide spectrum anticorrosives (WSA), organic inhibitors and flush rust inhibitors resulting in a complete modular system. The innovative energy fueling this process is reflected in four product lines, which satisfy the full spectrum of modern protective coatings requirements. The field ranges from early rust to long term protection.

MODIFIED ORTHOPHOSPHATES

The modified orthophosphates are a milestone in chrome-free anticorrosive pigments. HEUCOPHOS® ZPA, ZPO and ZMP set new standards in the industry by significantly improving the performance efficiency compared to conventional zinc phosphates. With HEUCOPHOS® CMP there is also a unique zinc-free modified orthophosphate available.

HIGH-PERFORMANCE POLYPHOSPHATES

The search for chromate replacements in high-performance applications, such as coil coatings and aircraft primers led to the development of the high-performance polyphosphates, which are the preferred option wherever ultimate protection is required. Besides HEUCOPHOS® ZAPP the product range includes HEUCOPHOS® SAPP, SRPP and CAPP as high effective zinc-free polyphosphates.

WSA - WIDE SPECTRUM ANTICORROSIVES

HEUCOPHOS® ZAM^{PLUS} and ZCP^{PLUS} are the first chrome-free anticorrosives for universal use. These products are specially designed to meet the demand of corrosion protection coatings based on conventional, but also high solids, water-borne and powder resins. In the past broad applicability has been a unique feature of chromate pigments, but the wide spectrum anticorrosives are the universal technology of today's protective coatings.

CALCIUM MODIFIED SILICA PIGMENT

The corrosion protection of pre-treated steel and aluminum sheets is very important. Our HEUCOSIL™ products are highly effective zinc-free modified silica pigments meeting the specific performance requirements for thin-film applications and coil coating. They offer further zinc-free solutions for standard coating systems.



FLASH RUST INHIBITORS

The addition of the liquid flash rust inhibitors HEUCOFLASH™ LQ1 and LQ2 to a water based corrosion protection system prevents the formation of rust spots on the surface, known as flash and early rusting, caused by the water migration during the gelling and curing time.



ORGANIC INHIBITORS

The combination of HEUCOPHOS® with the organic inhibitor HEUCORIN® RZ in solvent-borne and especially water-borne coatings shows significant improvement of the anticorrosive properties even at low dosages. It provides early protection of the substrate, reduces the tendency to blistering, improves adhesion and wet adhesion properties and thus also leads to increased long-term protection. This effect reduces formulation costs and optimizes the protective properties of anticorrosive coatings at the same time.

CHEMICAL INVENTORY LISTING STATUS

All substances of described HEUCOPHOS®, HEUCOSIL™ and HEUCOFLASH™ are listed in the National Chemical Inventories:

EC-List (Europe)
TSCA [active or exempt] (USA)
DSL (Canada)
AICIS (Australia)
NZIoC (New Zealand)
ENCS [MITI] (Japan)
KECL (Korea)
PICCS (Philippines)
IECSC [2010] (China)
TCSI (Taiwan)

APPLICATION GUIDE

| ORTHOPHOSPHATES | | | | |
|---------------------------------|-------|-------|------|-----|
| HEUCOPHOS® | | | | |
| SOLVENT BASED COATINGS | ZPA | ZPO | ZMP | CMP |
| 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 | ZPA | ZPO | ZMP | CMP |
| Alkyd emulsions* | + | +++ | +++ | ++ |
| 2K Epoxies* | + | | ++ | ++ |
| 1K Polyurethanes* | | ++ | ++++ | ++ |
| 2K Polyurethanes* | ++ | | + | ++ |
| Silicone resins* | ++ | +++ | | |
| Acrylics and modified acrylics* | | + | ++++ | ++ |
| Butadienes* | | +++ | ++ | +++ |
| SPECIALTY COATINGS | ZPA | ZPO | ZMP | CMP |
| 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

| POLYPHOSPHATES | | | | WSA | | OTHERS |
|----------------|-------|-------|-------|---------------------|---------------------|-----------|
| HEUCOPHOS® | | | | | | HEUCOSIL® |
| ZAPP | SAPP | SRPP | CAPP | ZAM ^{PLUS} | ZCP ^{PLUS} | CTF |
| ++ | | | +++* | +++ | +++** | |
| ++ | | | +++* | ++ | +++** | |
| | | | | +++ | ++** | |
| + | +++** | ++ | | +++ | +++** | ++ |
| | | | ++ | +++ | +++** | |
| | | | | +++ | ++** | ++ |
| +++** | +++** | ++ | +++* | +++ | ++** | ++ |
| ++ | ++ | ++ | ++ | +++ | ++ | ++ |
| | | | + | + | +++** | |
| | ++ | | | +++ | +++ | |
| | | | | | | |
| ZAPP | SAPP | SRPP | CAPP | ZAM ^{PLUS} | ZCP ^{PLUS} | CTF |
| ++ | | | +++* | +++ | +++** | |
| +++* | +++ | + | +++** | ++ | ++** | |
| | | | + | +++** | +++** | |
| +++ | +++ | + | ++ | ++ | +++ | ++ |
| ++ | ++ | | + | ++ | +++ | |
| | | | +++* | ++* | +++** | |
| | | | + | +++* | +++** | |
| | | | | | | |
| ZAPP | SAPP | SRPP | CAPP | ZAM ^{PLUS} | ZCP ^{PLUS} | CTF |
| + | +++** | +++** | +++* | | | +++ |
| | +++** | +++** | +++* | | | + |
| +++* | | | +++* | +++* | +++** | |
| | | | + | +++ | ++ | |
| | | | | | +++ | ++ |
| | ++ | | ++ | +++ | +++ | ++ |

MODIFIED ORTHOPHOSPHATES

HEUCOPHOS® ZPA, ZPO and ZMP are active multi-level anticorrosive pigments. Since the market introduction the three grades are among the most popular anticorrosives in the industry. As zinc-free and universal pigment HEUCOPHOS® CMP complements our portfolio.

HEUCOPHOS® ZPA is a zinc aluminum orthophosphate hydrate with improved phosphate loading. This leads to a controlled increase of inhibiting water soluble content and thus a better formation of protective layers on the metal surface.

HEUCOPHOS® ZPO is a organically modified basic zinc orthophosphate hydrate showing excellent protective behaviour in many binder systems, e. g. alkyd resins and physically drying systems, due to the special organic modification.

HEUCOPHOS® ZMP is a basic zinc molybdenum orthophosphate hydrate. Excellent results have been achieved by applying this anticorrosive pigment e. g. in water based coating systems using 1K polyurethanes.

HEUCOPHOS® CMP is a unique zinc-free anticorrosive with universal applicability. It is based on a special calcium phosphate complex which has been modified with an electrochemical active magnesium compound.

KEY BENEFITS OF MODIFIED ORTHOPHOSPHATES

- Compatibility with a wide range of resin types (ZPA, CMP)
- Increased water soluble amount resulting in a better supply of inhibitive ions over a long time
- pH-stabilizing effect due to basic components (ZPO, ZMP)
- Improved pigment structure, particle size distribution and dispersibility
- Improved long-term protection due to an increase of the phosphate content (ZPA, CMP)
- Adhesion promoter function of the organic treatment between metal substrate and organic coating or between inorganic anticorrosive pigment and binder (ZPO)
- Non-hazardous metal complex based on phosphate (CMP)
- Cost-effectiveness (CMP)

TECHNICAL DATA

| | ZPA | ZPO | ZMP | CMP |
|---|-----------|-----------|-----------|-----------|
| Zinc as Zn [%] | 38.5–40.5 | 55.5–58.0 | 53.5–56.5 | – |
| Calcium as CaO [%] | – | – | – | 43.5–47.5 |
| Magnesium as MgO [%] | – | – | – | 2.5–4.5 |
| Aluminum as Al [%] | 4.0–5.5 | – | – | – |
| Molybdenum as MoO ₃ [%] | – | – | 1.2–2.2 | – |
| Phosphorus as PO ₄ ³⁻ [%] | 53.0–56.0 | 37.5–39.5 | 37.0–40.0 | 43.0–47.0 |
| Organic content [typ. %] | – | 0.3 | – | – |
| Loss on ignition 600 °C/1112 °F [%] | 9.0–12.5 | 7.0–11.0 | 6.0–9.0 | 5.5–7.5 |
| Water-soluble chloride [max. %] | 0.025 | 0.025 | 0.025 | 0.025 |
| Water-soluble sulphate [max. %] | 0.05 | 0.05 | 0.05 | 0.05 |
| Conductivity [max. µS/cm] | 300 | 300 | 250 | 1200 |
| pH | 5.5–6.5 | 6.5–7.5 | 5.5–7.5 | 5.5–7.5 |
| Density [typ. g/cm ³] | 2.8 | 3.6 | 3.5 | 2.8 |
| Oil absorption value [typ. g/100 g] | 40 | 20 | 25 | 45 |
| Sieve residue 32 microns [max. %] | 0.01 | 0.01 | 0.01 | 0.01 |
| Average particle size [microns] | 2.0–3.5 | 2.0–3.5 | 2.0–3.5 | max. 3.0 |

SOLVENT-BORNE 2K EPOXY/POLYAMIDOAMINE PRIMER



Control



Zinc phosphate



HEUCOPHOS® ZPA

Due to a controlled increase of inhibiting water soluble phosphate content HEUCOPHOS® ZPA shows improved long-term protection compared to zinc phosphate.

744 h Salt spray (ASTM B 117-19)

DIN EN ISO 9227:2022-02

Substrate: Cold rolled steel panels ST 1205

HIGH SOLID 2K EPOXY/POLYAMIDE PRIMER



Control



Zinc phosphate



HEUCOPHOS® ZPO

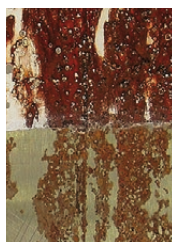
HEUCOPHOS® ZPO shows significantly better performance properties than standard zinc phosphate in many applications. It has a pH-stabilizing effect due to basic ingredients. The organic modification also promotes adhesion between metal substrate and organic coating or anticorrosive pigment and binder.

2218 h Salt spray (ASTM B 117-19)

DIN EN ISO 9227:2022-02

Substrate: Bare aluminum panels

WATER-BORNE ACRYLIC PRIMER



Control



Competition



HEUCOPHOS® ZMP

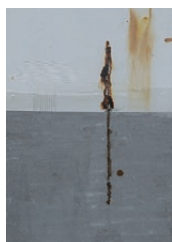
As a result of synergistic effects between molybdenum modification and phosphate ions HEUCOPHOS® ZMP shows excellent protective properties in many binder systems. It is also suitable for economical formulating due to the possibility to reduce the application volume compared with standard zinc phosphate.

864 h Salt spray (ASTM B 117-19)

DIN EN ISO 9227:2022-02

Substrate: Cold rolled steel panels ST 1205

SOLVENT-BORNE 2K EPOXY PRIMER



Control



Zinc phosphate



HEUCOPHOS® CMP

The very effective magnesium-calcium synergy within HEUCOPHOS® CMP helps to improve the overall corrosion resistance in a primer system. In contrast to other zinc-free anticorrosives it is applicable in a wide range of different resin systems with protective properties comparable to zinc containing pigments.

504 h Salt spray (ASTM B 117-19)

DIN EN ISO 9227:2022-02

Substrate: Sand blasted steel panels

HIGH-PERFORMANCE POLYPHOSPHATES

The polyphosphates are products based on acidic aluminum tripolyphosphate modified with zinc, strontium, and calcium compounds. By means of altering the chemical structure it was possible to obtain pigments showing a different electrochemical effectiveness compared to orthophosphates. One key property of most polyphosphate grades is the significantly increased phosphate content.

HEUCOPHOS® ZAPP is a zinc aluminum polyphosphate hydrate with improved electrochemical activity. Due to its pigment characteristics, HEUCOPHOS® ZAPP is an effective anticorrosive pigment for different binder systems.

HEUCOPHOS® SAPP is a strontium aluminum polyphosphate hydrate for application e.g. in 2-part epoxy coating systems. Its electrochemical activity in combination with improved long-term protection offers advantages for high-performance applications.

HEUCOPHOS® SRPP is a controlled adjusted modified strontium aluminum polyphosphate hydrate and a special adjustment of HEUCOPHOS® SAPP providing outstanding performance in coil coatings and aircraft primers.

HEUCOPHOS® CAPP is a calcium aluminum polyphosphate silicate hydrate which exhibits good results in water based 2K epoxy resins and also other waterborne coating systems. HEUCOPHOS® CAPP is suitable for the application in combination with our other polyphosphates.

KEY BENEFITS OF HIGH-PERFORMANCE POLYPHOSPHATES

- High electrochemical effectiveness due to altered chemical structure design
- Higher phosphate content compared to most orthophosphates enables excellent long-term protective behaviour (ZAPP, SAPP, SRPP)
- Suitable for replacement of chromates in high-performance applications

TECHNICAL DATA

| | ZAPP | SAPP | SRPP | CAPP |
|--|-----------|-----------|-----------|-----------|
| Zinc as ZnO [%] | 28.0–31.0 | – | – | – |
| Aluminum as Al ₂ O ₃ [%] | 11.0–13.0 | 10.5–13.5 | 10.5–13.5 | 6.8–8.0 |
| Silicon as SiO ₂ [%] | – | – | – | 28.5–31.5 |
| Phosphorous as P ₂ O ₅ [%] | 46.0–49.0 | 43.5–48.0 | 43.5–48.0 | 24.5–27.5 |
| Calcium as CaO [%] | – | – | – | 26.5–29.5 |
| Strontium as SrO [%] | – | 23.5–30.0 | 23.5–30.0 | – |
| Loss on ignition 600 °C/1112 °F [%] | 8.0–12.0 | 9.5–15.0 | 9.5–15.0 | 6.0–9.0 |
| Water-soluble chloride [max. %] | 0.025 | 0.025 | 0.025 | 0.025 |
| Water-soluble sulphate [max. %] | 0.05 | 0.05 | 0.05 | 0.05 |
| Conductivity [max. µS/cm] | 100 | 1400 | 1500 | 150 |
| pH | 5.5–6.5 | 4.5–6.0 | 4.0–6.0 | 6.0–9.0 |
| Density [typ. g/cm ³] | 2.8 | 2.8 | 2.8 | 2.6 |
| Oil absorption value [typ. g/100 g] | 35 | 40 | 40 | 35 |
| Sieve residue 32 microns [max. %] | 0.01 | 0.01 | 0.01 | 0.01 |
| Average particle size [microns] | 2.0–3.5 | 2.0–3.5 | 2.0–3.5 | 2.5–4.0 |

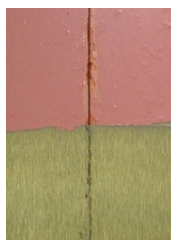
WATER-BORNE EPOXY ESTER PRIMER



Control



Competition



HEUCOPHOS® ZAPP

HEUCOPHOS® ZAPP offers clearly improved pigment properties due to optimized process conditions of the phosphate condensation reaction. It shows excellent protection in a wide range of binder systems.

552 h Salt spray (ASTM B 117-19)

DIN EN ISO 9227:2022-02

Substrate: Cold rolled steel panels ST 1205

HIGH MOLECULAR WEIGHT POLYESTER COIL PRIMER, POLYESTER TOPCOAT



Control



HEUCOPHOS® SAPP



HEUCOPHOS® SRPP

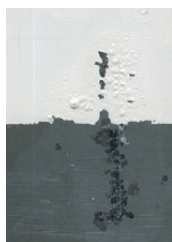
HEUCOPHOS® SAPP and the specially modified HEUCOPHOS® SRPP are both designed for the application in high-performance coatings primarily in coil and aircraft primers.

3360 h Salt spray (ASTM B 117-19)

DIN EN ISO 9227:2022-02

Substrate: Hot dipped galvanized steel panels pretreated with Bonder 1303/NL6800/OE (chromium-free)

SOLVENT-BORNE 2K POLYURETHANE PRIMER



Control



Competition



HEUCOPHOS® ZMP

HEUCOPHOS® CAPP is especially suited for application in systems which are sensitive towards zinc containing pigments, water-borne epoxies and acrylic dispersions. The polyphosphate silicate offers improved long-term protection due to a pH-buffering effect of the calcium compound.

1406 h Salt spray (ASTM B 117-19)

DIN EN ISO 9227:2022-02

Substrate: Galvanized steel panels

WIDE SPECTRUM ANTICORROSIVES

The process of industrial development in the protective coatings world has been closely linked with increased pressure to reduce VOCs. The resin suppliers have developed and introduced new resins, such as high solids, water-borne, powder and UV-cured binders, which accordingly have changed the requirements placed on the anticorrosives.

HEUCOPHOS® ZAM^{PLUS} – an organic modified zinc aluminum molybdenum orthophosphate hydrate: This product was designed to meet the demand of protective coatings based on conventional and modern resin systems. It combines the basic chemistry of HEUCOPHOS® ZPA, ZPO and ZMP within one pigment. Its inhibitive properties are attributed to the utilization of certain substances within one product (synergistic effects) and enable one to formulate protective coatings which are, at least, comparable in performance to chromium containing systems in a vast variety of applications.

HEUCOPHOS® ZCP^{PLUS} – a zinc calcium strontium aluminum orthophosphate silicate hydrate. It has been developed to meet the economical and performance requirements of today and tomorrow. By controlled chemical modifications connected with optimizations of the manufacturing process, it has become possible to improve the electrochemical effectiveness as compared to existing chromate-free anticorrosives on the market for universal applications.

KEY BENEFITS OF WIDE SPECTRUM ANTICORROSIVES

- Universal applicability in many different conventional and modern resin systems
- HEUCOPHOS® ZAM^{PLUS} combines the wellknown benefits of modified orthophosphates within one single pigment
- HEUCOPHOS® ZCP^{PLUS} has been tailored to interact synergistically with HEUCORIN® RZ for excellent performance properties
- Effective at low loading levels compared to standard zinc phosphates
- Replacement options for chromate based anticorrosives

TECHNICAL DATA

| | ZAM ^{PLUS} | ZCP ^{PLUS} |
|--|---------------------|---------------------|
| Zinc as ZnO [%] | 60.5–63.5 | 35.5–39.0 |
| Aluminum as Al ₂ O ₃ [%] | 1.0–2.5 | 2.0–4.0 |
| Silicon as SiO ₂ [%] | – | 14.0–17.0 |
| Phosphorous as P ₂ O ₅ [%] | 25.5–28.5 | 16.5–19.5 |
| Calcium as CaO [%] | – | 13.0–16.0 |
| Strontium as SrO [%] | – | 4.0–6.0 |
| Molybdenum as MoO ₃ [%] | 0.2–0.9 | – |
| Organic content [typ. %] | 0.2 | – |
| Loss on ignition 600 °C/1112 °F [%] | 7.0–11.0 | 5.5–10.0 |
| Water-soluble chloride [max. %] | 0.025 | 0.025 |
| Water-soluble sulphate [max. %] | 0.05 | 0.05 |
| Conductivity [max. µS/cm] | 300 | 100 |
| pH | 6.0–7.5 | 6.5–8.0 |
| Density [typ. g/cm ³] | 3.5 | 3.2 |
| Oil absorption value [typ. g/100 g] | 18.0 | 30.0 |
| Sieve residue 32 microns [max. %] | 0.01 | 0.01 |
| Average particle size [microns] | 2.0–3.5 | 2.0–3.5 |

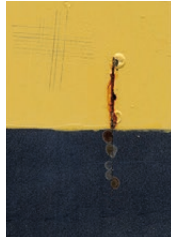
WATER-BORNE ALKYD EMULSION PRIMER



Control



Zinc phosphate



HEUCOPHOS® ZAMP^{PLUS}

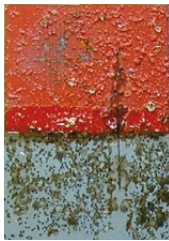
HEUCOPHOS® ZAMP^{PLUS} is specially recommended for water-borne, high solids and even high-gloss applications due to the very low oil absorption of the pigment.

*672 h Salt spray (ASTM B 117-19)
DIN EN ISO 9227:2022-02
Substrate: Cold rolled steel panels ST 1205*

WATER-BORNE ACRYLIC PRIMER



Control



Zinc phosphate



HEUCOPHOS® ZCP^{PLUS}

By controlled chemical modifications connected with optimization of the manufacturing process, it has become possible to improve the electrochemical effectiveness of HEUCOPHOS® ZCP^{PLUS} compared to existing chromate-free anticorrosives on the market for universal applications.

*600 h Salt spray (ASTM B 117-19)
DIN EN ISO 9227:2022-02
Substrate: Cold rolled steel panels ST 1205*

SOLVENT-BORNE ACID CURED EPOXY DTM COATING



Control



HEUCOPHOS® ZCP^{PLUS}



HEUCOPHOS® ZCP^{PLUS} /
HEUCORIN® RZ (9:1)

HEUCOPHOS® ZCP^{PLUS} has been developed to meet the economical, ecological and performance requirements of today and tomorrow. HEUCOPHOS® ZCP^{PLUS} is also intended for use in combination with the organic corrosion inhibitor HEUCORIN® RZ.

*576 h Salt spray (ASTM B 117-19)
DIN EN ISO 9227:2022-02
Substrate: Iron phosphated steel panels*

ORGANIC INHIBITORS

The utilization of modified phosphate pigments together with the organic inhibitors in solvent-borne and especially water-borne protective coatings provides an excellent opportunity to combine the performance characteristics of both worlds in terms of anticorrosion synergy.

These combinations open possibilities to reduce the tendency towards blistering, to improve early substrate protection, adhesion and wet adhesion properties thus resulting in increased long term protection.

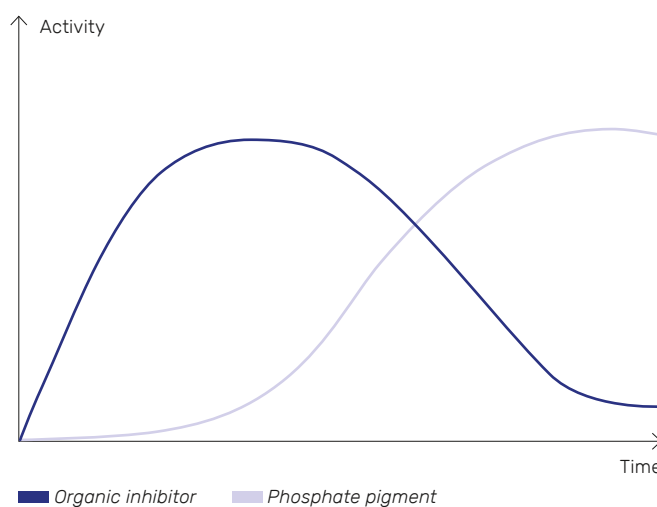
HEUCORIN® RZ – a zinc-5-nitroisophthalate. One major breakthrough in the world of anticorrosives was the discovery of especially one effective organic inhibitor, today well-known under the trade name HEUCORIN® RZ, which is based on a zinc salt of an organic nitro compound. Unique organic/in-organic synergies between HEUCORIN® and HEUCOPHOS® anticorrosives were found, in particular with HEUCOPHOS® ZCP^{PLUS} that prevented corrosion even at low dosages. Adding only very small quantities of HEUCORIN® RZ leads to significant improvements of existing protective coatings.

TECHNICAL DATA

| | RZ |
|-------------------------------------|-----------|
| Zinc as Zn [%] | 43.0–46.0 |
| Organic content [typ. %] | 49.0 |
| Moisture [max. %] | 5.0 |
| Water-soluble chloride [max. %] | 0.025 |
| Water-soluble sulphate [max. %] | 0.05 |
| Conductivity [max. µS/cm] | 500 |
| pH | 6.5–8.0 |
| Density [typ. g/cm ³] | 2.7 |
| Oil absorption value [typ. g/100 g] | 40 |
| Sieve residue 32 microns [max. %] | 0.01 |
| Average particle size [microns] | 2.0–4.5 |

REQUIREMENTS ON ORGANIC INHIBITORS

- High activity at low concentration levels (typ. 0.5–2.0 %)
- Sufficient thermal stability
- High activity in the range of pH 5–9 (preferably pH 2–14)
- Compatibility with a broad variety of resin systems
- Easy to add in
- Low water-solubility



CHEMICAL INVENTORY LISTING STATUS

All substances of HEUCORIN® RZ are listed in the National Chemical Inventories:

EC-List (Europe)
DSL (Canada)
AICIS (Australia)
NZIoC (New Zealand)
KECL (Korea)
PICCS (Philippines)
IECSC [2010] (China)
TCSI (Taiwan)

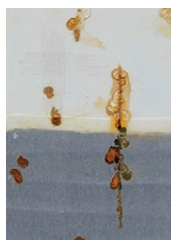
WATER-BORNE ACRYLIC PRIMER



Control



HEUCOPHOS® ZCP^{PLUS}



HEUCOPHOS® ZCP^{PLUS} /
HEUCORIN® RZ (9:1)

Especially if blistering is a major issue in waterborne primer systems, the combination of HEUCOPHOS® ZCP^{PLUS} with HEUCORIN® RZ often helps to solve this problem.

336 h Salt spray (ASTM B 117-19)

DIN EN ISO 9227:2022-02

Substrate: Cold rolled steel panels ST 1205



CALCIUM MODIFIED SILICA PIGMENT

HEUCOSIL™ CTF is a highly effective zinc-free anticorrosive based on a calcium modified silica gel. The utilization of HEUCOSIL™ CTF in primer applications has a positive impact on the permeability of the coating as well as the tendency towards blistering and film breakdown. The result is outstanding long term protection.

Aggressive corrosion stimulating ions which enter the paint film can be neutralized due to the basic components in HEUCOSIL™ CTF which also have a pH-stabilizing effect. The combination of HEUCOSIL™ CTF along with other active pigments provides further advantages in certain applications.

TECHNICAL DATA

| | HEUCOSIL™ CTF |
|-------------------------------------|---------------|
| Calcium as CaO [%] | 3.0–5.0 |
| Loss on ignition 1000 °C [%] | 5.0–8.0 |
| Water-soluble chloride [max. %] | 0.025 |
| Water-soluble sulphate [max. %] | 0.05 |
| Conductivity [max. µS/cm] | 500 |
| pH | 6.5–8.5 |
| Density [typ. g/cm³] | 2.2 |
| Oil absorption value [typ. g/100 g] | 120 |
| Sieve residue 32 microns [max. %] | 0.01 |
| Average particle size [microns] | 2.0–4.0 |

KEY BENEFITS OF HEUCOSIL™ CTF

- Different chemical and physical identity compared to phosphate based pigments
- Low solubility
- Reduces blistering and permeability
- Enhances long term protection
- pH-stabilizing effect due to the presence of basic components
- Low density
- Combination with other active pigments leads to further advantages

HIGH MOLECULAR POLYESTER COIL PRIMER, PVDF TOPCOAT



Control



Strontium chromate



HEUCOSIL™ CTF

Replacement of strontium chromate in coil primer applications is still a serious challenge – HEUCOSIL™ CTF is one option.

2000h Salt spray (ASTM B 117-19)

DIN EN ISO 9227:2022-02

Substrate: Hot dipped galvanized steel panels pre-treated with Bonder 1303/NL6800/OE (chromium-free)

SOLVENT-BORNE 2K EPOXY / POLYAMIDE PRIMER



Control



Competition



HEUCOSIL™ CTF

The utilization of HEUCOSIL™ CTF leads to lower blistering which has been confirmed by evaluations using accelerated and outdoor exposure.

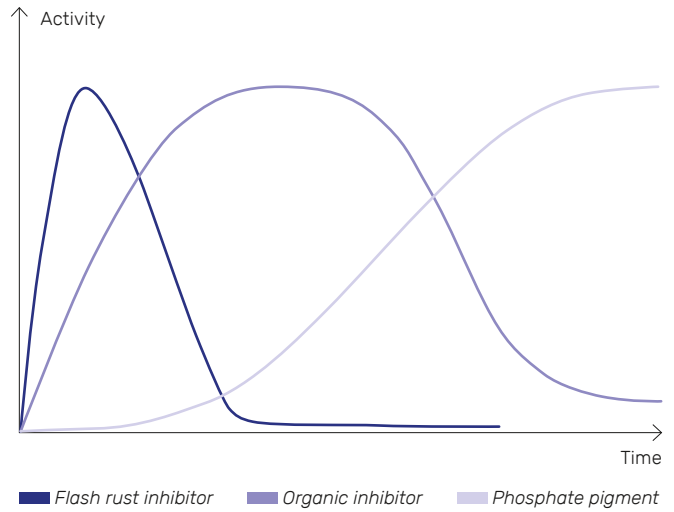
816h Salt spray (ASTM B 117-19)

DIN EN ISO 9227:2022-02

Substrate: Cold rolled steel panels ST 1205

FLASH RUST INHIBITORS

Water-borne coatings can cause corrosion to metallic surfaces in form of flash or early rusting. This flash rust caused by the water migration through the coating during the gelling and drying time forms rust spots visible on the surface and in some cases also on the metal surface itself. This effect can also be observed in cans and on weld seams. The addition of the liquid flash rust inhibitors HEUCOFLASH™ LQ1 and LQ2 to a water based system prevents the formation of the early rust spots. For long term protection they are combined with HEUCOPHOS® pigments. HEUCOFLASH™ LQ1 is a nitrite containing and LQ2 a nitrite free inhibitor.



TECHNICAL DATA

| | HEUCOFLASH™ LQ1 | HEUCOFLASH™ LQ2 |
|----------------------|-----------------|-----------------|
| Density [g/cm³] | typ. 1.1 | typ. 1.1 |
| pH | typ. 7.5 | typ. 8.0 |
| Viscosity [max. cps] | typ. 30 | typ. 30 |

APEO FREE STYRENE ACRYLIC DISPERSION, DTM



Control



HEUCOPHOS® CMP /
HEUCOFLASH™ LQ1

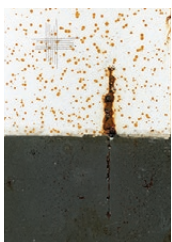


HEUCOPHOS® CMP /
HEUCOFLASH™ LQ2

Addition of HEUCOFLASH™ (0.8% for LQ1 and 0.45% for LQ2) products to a water based system prevents early rust.

Flash rust after drying at RT
Substrate: Sandblasted steel panels

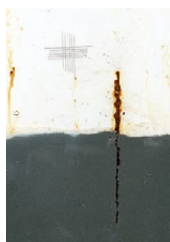
APEO FREE STYRENE ACRYLIC DISPERSION, DTM



Control



HEUCOPHOS® CMP /
HEUCOFLASH™ LQ1



HEUCOPHOS® CMP /
HEUCOFLASH™ LQ2

The combination of HEUCOPHOS® CMP with HEUCOFLASH™ prevents the formation of flash rust and also leads to a good long-term protection.

1224 h Salt spray (ASTM B 117-19)
DIN EN ISO 9227:2022-02
Substrate: Sandblasted steel panels

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