ZINGA®

A FILM GALVANISING SYSTEM WITH CATHODIC PROTECTION

Every year corrosion is costing billions to the industry. This corrosion doesn't merely make the assets appear neglected, more importantly it causes structural instability and consequently poses a serious safety hazard. It also causes severe disruption of the production process and thus profitability. ZINGA® differentiates from other anti-corrosion methods in combining both Passive and Active protection in an easily applied film galvanising system that not only delivers active cathodic protection but also provides a passive physical shield.

EXTREME ENVIRONMENTS DEMAND **SUPERIOR PROTECTION**

WHAT IS ZINGA®?

ZINGA® is a one component Film Galvanising System containing 96% zinc (dust) in its dry film. It is a metallic coating and not a paint. The purity of the zinc used, is so high that dry ZINGA® does not contain any toxic elements.

ACTIVE AND PASSIVE PROTECTION

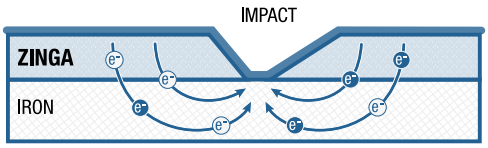
ACTIVE GALVANIC PROTECTION

The zinc in ZINGA® (anode) sacrifices itself, protecting the steel beneath in a comparable way as hot-dip galvanising.
Upon impact, the electron flow resulting from a potential difference between the zinc and the steel will prevent the steel from corroding.

PASSIVE BARRIER PROTECTION

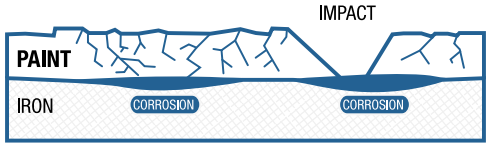
As the ZINGA® oxidises, a layer of zinc corrosion products slowly builds up on the ZINGA® surface, closing the film and enhancing the barrier effect of the coating. Next to this, a supplementary barrier protection is provided by the binder in ZINGA®. This binder reduces the depletion of the zinc, providing a long lasting active protection.

GALVANIC - NO CORROSION



PROTECTING LAYER	ZINC-SYSTEMS = ACTIVE SYSTEMS
REACTION DUE TO AIR AND MOISTURE	
$O_2 + 2H_2O + 4e^- \rightarrow 4OH^-$	$Zn \rightarrow Zn^{2+} + 2e^-$
FORMATION OF:	ZnO

NON GALVANIC - CORROSION



PROTECTING LAYER	PAINT-SYSTEMS = PASSIVE SYSTEMS
REACTION DUE TO AIR AND MOISTURE	
$O_2 + 2H_2O + 4e^- \rightarrow 4OH^-$	$Fe \rightarrow Fe^{2+} + 2e^-$
FORMATION OF:	Fe_2O_3

ZINGA®

IN ZINC WE TRUST FOR FIGHTING RUST

HOW CAN IT BE USED?

STAND-ALONE SYSTEM

ZINGA® provides comparable protection to conventional galvanising without the need for topcoats. Although ZINGA® is only available in grey (the natural colour of zinc), the significant advantage of this form of application is that the ZINGA® layer can be re-coated at any point in the future with a bare minimum of preparation and without compromising the integrity of the coating (see recharging of ZINGA®). ZINGA® is mostly used on its own as a stand-alone system, in order to obtain the maximum efficiency of application and corrosion-protection performance. For optimal protection, ZINGA® should be applied in one or two layers to a total DFT between 80 - 120 µm depending on the environment and on the life expectancy.

AS A PRIMER WITH SUITABLE TOPCOATS

Not everybody likes the colour grey and with the additional protection of a compatible topcoat the coating durability significantly increases. ZINGA® does not start actively working until the topcoat has been compromised or damaged. At that point, ZINGA® will actively prevent underlying corrosion creep and corrosion of the structure. In a duplex system (Active + Passive), ZINGA® should be applied in 1 layer of min. 60 to 80 µm DFT.

AS SHOP PRIMER

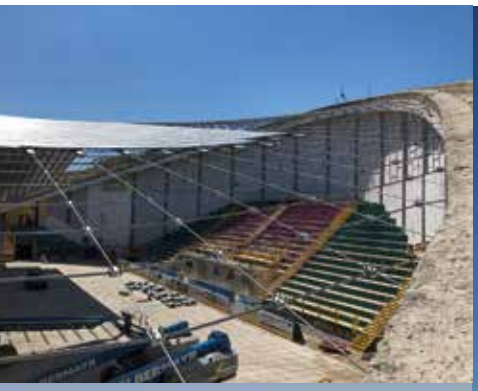
At a thickness of 30-40 µm DFT, ZINGA® can be used as a shop primer. The big benefit is found in the fact that the steel structures do not require reblasting before coating if ZINGA® is applied as a shop primer. The steel structure can be overcoated with ZINGA® to obtain a cathodic protection or with any other paint without the need for reblasting!
Zinganised steel structures can be welded and bent during assembly.

REPAIR FOR WORN OR DAMAGED HOT-DIP GALVANISING OR HOT METAL SPRAY

ZINGA® is ideal for the touch up of worn or damaged HDG as it requires the simplest surface preparation. ZINGA®'s mechanism of protection is so similar to conventional hot dip galvanising that they can work in complete unison, as only their zinc particles differ. Rather than replacing galvanised assets, structures can simply have their protection "re-charged" by applying ZINGA® to the rough surface of the old galvanising after appropriate decontamination and removal of the zinc salts.

ON REBARS

Widely used in countries where the available concrete can be of lower quality, Zinganising the steel rebars before assembly and immersion in concrete ensures vastly increased protection from corrosion without reducing the pull-out strength of the bars. Recent tests in three independent laboratories show that ZINGA® has at least twice the corrosion protection of either galvanised or epoxy coated rebars.





PHYSICAL & CHEMICAL PROPERTIES

- **RELATIVE DENSITY:** 2,67 kg/dm³ at 15°C
- **DRY EXTRACT:** 80% in weight, 58% in volume (ASTM D2697) 96 % zinc, purity 99,995 %
- **TEMPERATURE RESISTANCE:** From -40°C to +120°C with peaks up to 150°C
- **COLOUR:** Grey (zinc)
- **THEORETICAL SPREAD RATE:** 3,62 m²/kg for 60 µm DFT 1,81 m²/kg for 120 µm DFT
- **FLASH POINT:** ≥40°C - 60°C
- **SHELF LIFE:** Unlimited

With hot-dip galvanisation, deformation of thin or light steel structures is possible due to the use of high temperatures of molten zinc (450°C). There is also potential for hydrogen embrittlement within welds.

ZINGA®	CHARACTERISTICS	HOT-DIP GALVANISATION	PAINT
✔	Active galvanic cathodic protection	✔	✖
✔	Stand-alone one layer system	✔	✖
✔	Easy application on site	✖	✔
✔	Reloadable	✔ WITH ZINGA®	✖
✔ WITH ZINGA® OR COMPATIBLE PAINT	Overcoatable	✖ / ✔ WITH ZINGA® OR COMPATIBLE PAINT	✔
✔	Application under extreme circumstances (high & low T°/up to 95 % RH)	-	✖ / ✔ *
✔	Unlimited shelf life / Long pot life after first use	-	✖
✔	Contact with potable water = ok** A fully cured ZINGA® layer is not toxic and can be used in contact with potable water (NSF/ANSI/CAN 61 certified)!	✔	✖ / ✔ *
✔	Flexible layer	✖	✖
✔	Smaller burn-back on welded steel	✖	✖
✔	The structure keeps its form during application.***	✖	✔
✔	No undercreep corrosion when impacted	✔	✖

** Requires special compatible paints.*
*** Authorisation depends on local legislation.*
**** For HDG, thin or light steel structures need consideration before hot-dipping*

HOW TO APPLY ZINGA®?

Once thoroughly mixed, ZINGA® can be applied by using a normal paintbrush, a short-fibre roller (not for the first coat), or a conventional or airless spray-gun. ZINGA® must only be diluted with ZINGASOLV.

ZINGA® can be applied in a wide variety of weather conditions. The application surface temperature range is from -15 °C to max 50 °C, where conditions allow with a maximum humidity of 95% so long as the steel temperature is 3 °C above the dew point. Like all coatings the substrate surface should be free from all types of contamination.

PREPARATION OF THE SURFACE

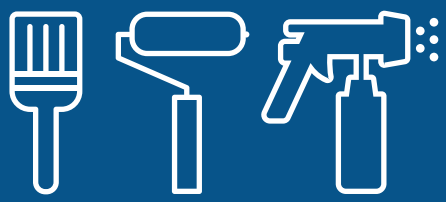
NEW METAL SURFACES:
Steam-clean or high-pressure wash-down all surfaces, followed by a grit or slurry blasting to SA 2.5 to obtain a roughness degree medium G (ISO 8503-1)

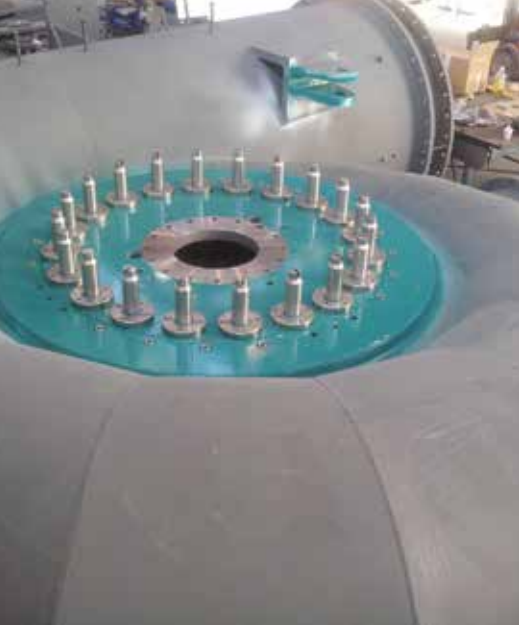
OLD, PREVIOUSLY GALVANISED, PAINTED AND/OR RUSTY SURFACES:
Steam-clean to remove all contamination from porous surfaces. Allow to dry off and blast-clean as normal.

GALVANISED AND ZINGANISED STEEL IN (FAIRLY) GOOD CONDITION:
Steam-clean the surface, followed by a light sweep blast to remove the zinc salt layer.

DRYING TIME

ZINGA® is touch dry and dust-free in about 10 minutes at 20 °C (40 µm DFT).
It can be overcoated with a new layer of ZINGA® 1 hour after touch dry.
ZINGA® can be overcoated with a compatible paint after 4 to 24 hours, depending on drying conditions. To overcoat ZINGA®, use the mist/full coat technique.

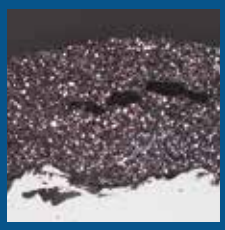




ZINGA® RELOADING

Another of ZINGA®'s unique characteristics is its ability to reliquidise when a new coat of ZINGA® is applied onto an existing ZINGA® layer to form a single homogeneous layer. This ensures a massive cost saving in on-going maintenance, because the old ZINGA® layer does not need to be removed before re-coating with a new ZINGA® layer (a removal of contaminants is required though).

A thin film of copper particles is applied on top of a first dry coating of ZINGA®. The coating is photographed using a strong microscope (µm scale).



Seven days later, a second coating of ZINGA® is applied on top of the copper particles. The copper particles become fully integrated within the two coatings, proving that the homogenisation of the two ZINGA® layers has actually taken place.

The same test has been done with a zinc rich epoxy paint. The layer of copper particles remains intact between the two paint layers. The copper film is clearly visible, demonstrating that the two layers remain separate layers.

INDEPENDENT TEST RESULTS

Over the last 40 years ZINGA® has undergone numerous testing at different certified laboratories all over the world. All testing was according to local and international standards. The most important include:

- ISO 12944-6: ZINGA®: 90 µm DFT - C5 High, 120 µm DFT - C5 Very High
- ISO 12944-9: ZINGA® 120 µm DFT - CX and Im4
- NORSOK M-501- syst. 1 and 7: ZINGA® 2 x 60 µm DFT - succeeded
- ASTM B-117 (salt spray test): ZINGA® resisted to more than 4200 hours
- MIC (Microbial Influenced Corrosion) resistance test - Endures Laboratory, the Netherlands

CERTIFICATIONS AND APPROVALS

In consequence of ZINGA®'s performance (proven by testing), ZINGA® has been approved for use by governments, private companies, armies. The most important include:

- Lloyd's Register (Approval for use in void spaces)
- Approval by APAS (Australia)
- Registration by Petrobras (Brazil)
- Approval by Ministry of Transport (Canada)
- Approval by Czech Railway (Czech Republic)
- Approval by GASCO (Egypt)
- Approval by Engineers India Limited (India)
- Approval by Statoil (Norway)
- Approval by CFE (Mexico)
- Approval by ExxonMobil (EMEPMI) (Malaysia)
- Approval by Agrement Technic (Romania)
- Approval by SWCC (Saudi Arabia)
- Approval by Land Rover (UK)
- Approval by Petronas (Malaysia)
- Certified by NSF/ANSI/CAN 61

The Kalvoya bridge in Norway has been treated with ZINGA® in 1985. After more than 35 years, the bridge is still in good condition.

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