ZINGA A FILM GALVANISING SYSTEM

ZINGA NOW AVAILABLE & DISTRIBUTED BY
IGOE INTERNATIONAL LTD

WWW.IGOE.IE
EMAIL : INFO@IGOE .IE



Main characteristics

- Active, cathodic, galvanic protection
  → Very high zinc content (96%)
  ~ Hot-dip, metallisation

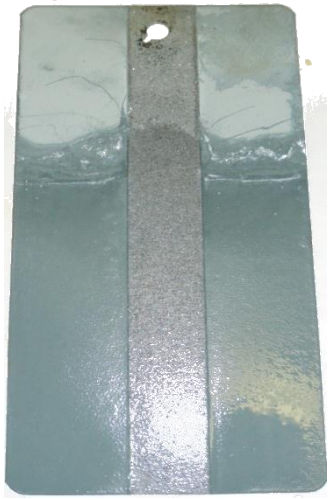
- Passive barrier protection
  → Zinc salts on top of surface
  ~ Protective paints

- One component organic Zinc coating

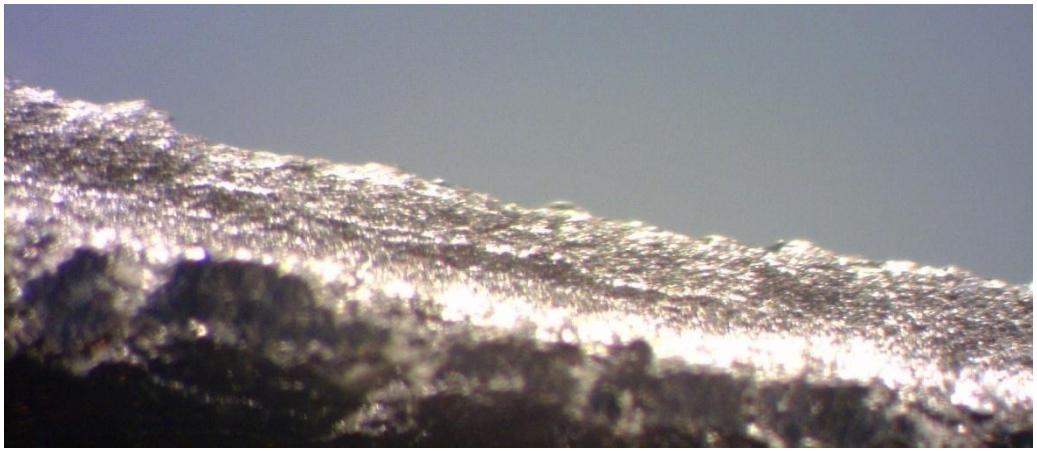
- ZINGA is NOT a paint
  – Does not form a closed film
  – Will never peel off
  – Will never flake

14 days in water immersion

Untreated



Treated except 2cm strip



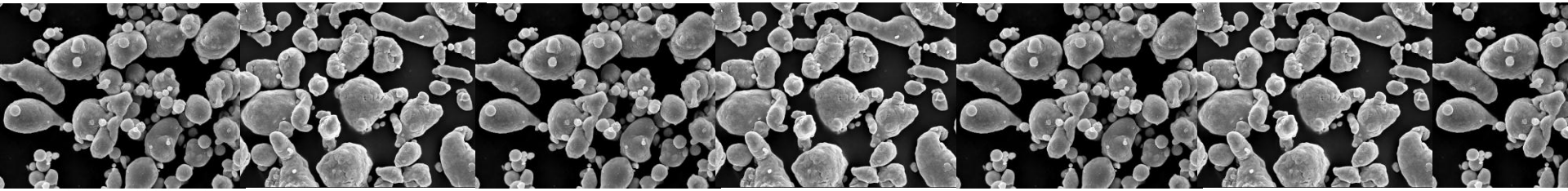
ZINGA layer

Advantages

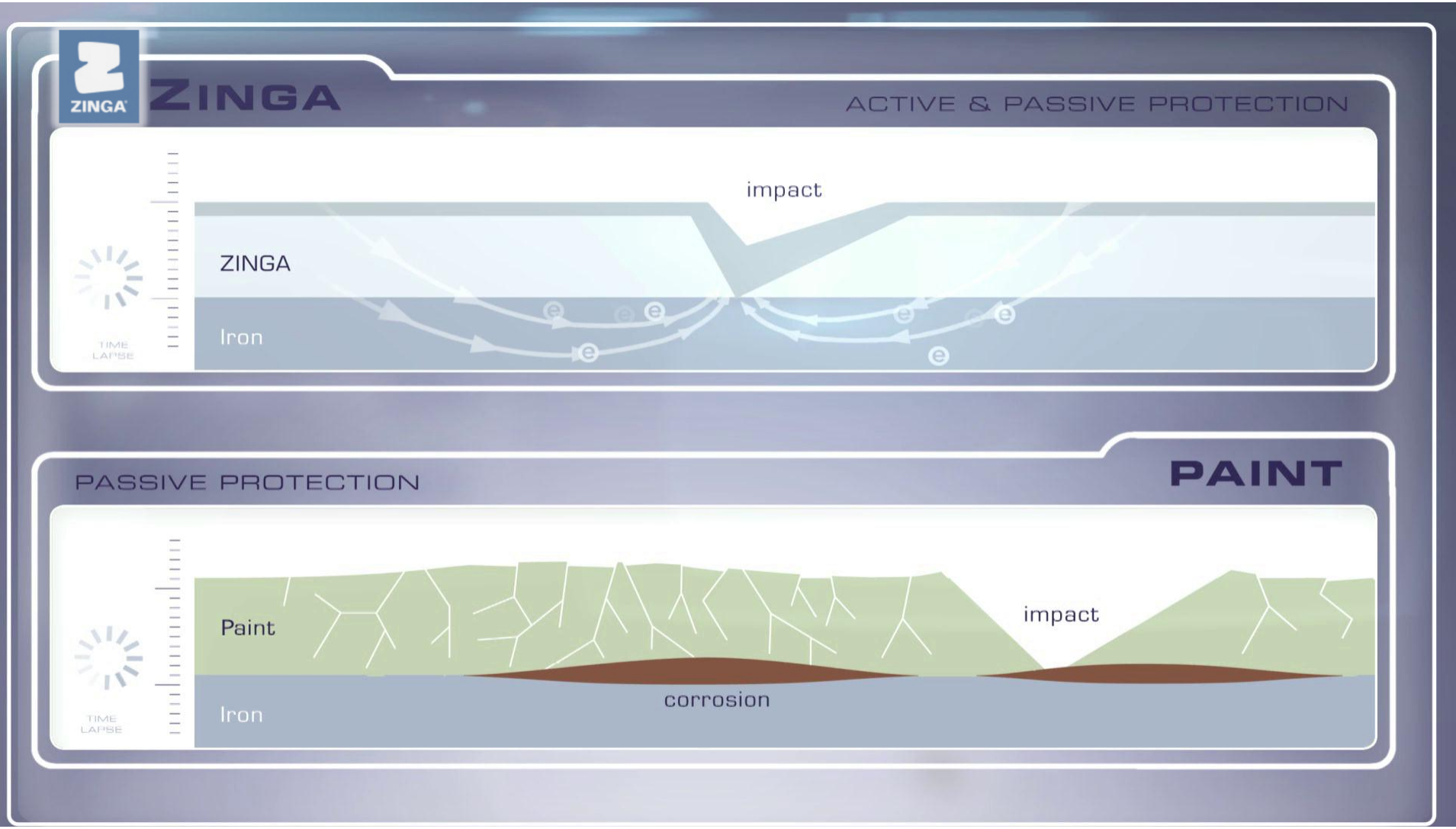
- Based on zinc protected by a special resin
  - Formation of the galvanic couple
  - Additional protection

- Specifications
  - 96% zinc in the dry layer of ZINGA
  - Very high amount of metallic zinc (97%)
  - Very high purity of the zinc granules (99,995%)

- Especially shaped zinc granules
  - Bigger contact surface
  - Better attachment to one another



Working principle



Advantages

- Easy application on site and in workshop (Zinganisation)
  - By brush, roller, painting gloves, spray-application (conventional or airless)
  - Can be applied on site, even by non-professionals

- Application in a wide range of weather conditions
  - Damp surface (no droplets)
  - High or low temperatures

- Application under ambient temperatures
  - No deformation
  - No energy loss

- ZINGA as NEW system
  ZINGA as REPAIR system

Bulgaria : pipe fittings

Advantages

- Quick drying time
  - Touch-dry in 10 min (20° C)
  - ZINGA second layer: 1 hour after touch-dry
  - Other paints: after 6 to 24 hours

- Does not peel off and is not brittle
  - Will be compressed or squashed
  - Will not crack thanks to its flexibility

- Local damages can be repaired easily
  (e.g. after transport or heavy mechanical impact)

Belgium; Wind mill pile

Advantages

- Toxicity
  - Composed of non-toxic elements (green / environmental friendly)
  - Can be used in contact with potable water

    -> Tested according AS-NSZ 4020

- Unlimited shelf life (no financial loss – cost saving)

- ZINGA has very good UV resistance (longer lifetime)

UK, Braithwaite tanks for potable water

Health

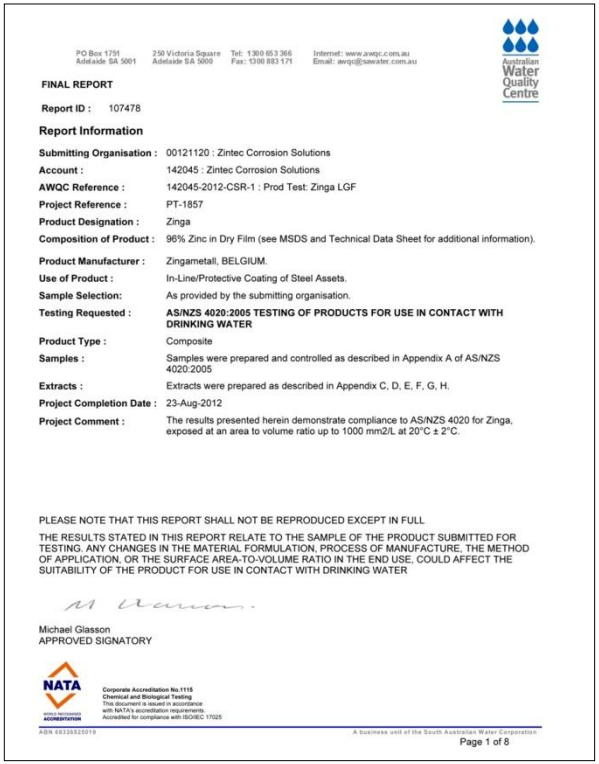
- Water Quality Center (Australia)

  Test ZINGA in contact with potable water (AS/NZS 4020)

The results show compliance to AS/NSZ 4020 for ZINGA

The water in contact with ZINGA was tested on taste and appearance, on growth of aquatic micro-organisms, cytotoxic and mutagenic activity and an analysis of a metal extraction was performed.

+ comparable certificates from other countries (e.g. Iran)



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Australian Water Quality Centre

FINAL REPORT

Report ID : 107478

Report Information

Submitting Organisation :	00121120 : Zintec Corrosion Solutions
Account :	142045 : Zintec Corrosion Solutions
AWQC Reference :	142045-2012-CSR-1 : Prod Test: Zinga LGF
Project Reference :	PT-1857
Product Designation :	Zinga
Composition of Product :	96% Zinc in Dry Film (see MSDS and Technical Data Sheet for additional information).
Product Manufacturer :	Zingametall, BELGIUM.
Use of Product :	In-Line/Protective Coating of Steel Assets.
Sample Selection:	As provided by the submitting organisation.
Testing Requested :	**AS/NZS 4020:2005 TESTING OF PRODUCTS FOR USE IN CONTACT WITH DRINKING WATER**
Product Type :	Composite
Samples :	Samples were prepared and controlled as described in Appendix A of AS/NZS 4020:2005
Extracts :	Extracts were prepared as described in Appendix C, D, E, F, G, H.
Project Completion Date :	23-Aug-2012
Project Comment :	The results presented herein demonstrate compliance to AS/NZS 4020 for Zinga, exposed at an area to volume ratio up to 1000 mm2/L at 20°C ± 2°C.

PLEASE NOTE THAT THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL

THE RESULTS STATED IN THIS REPORT RELATE TO THE SAMPLE OF THE PRODUCT SUBMITTED FOR TESTING. ANY CHANGES IN THE MATERIAL FORMULATION, PROCESS OF MANUFACTURE, THE METHOD OF APPLICATION, OR THE SURFACE AREA-TO-VOLUME RATIO IN THE END USE, COULD AFFECT THE SUITABILITY OF THE PRODUCT FOR USE IN CONTACT WITH DRINKING WATER

Michael Glasson
APPROVED SIGNATORY

NATA
Corporate Accreditation No.1115
Chemical and Biological Testing
This document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025

ABN 69230523018 | A business unit of the South Australian Water Corporation

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AS/NZS 4020 certificate

Summary

ZINGA®	CHARACTERISTICS	HDG	Paint
✓	Active cathodic protection	✓	✗
✓	Easy application on site	✗	✓
✓	Reloadable	✓ With ZINGA	✗
✓	Easily overcoatable	✓ / ✗	✓
✓	Application under extreme circumstances (high & low temperatures and in humid environments)	n/a	✓ / ✗
✓	Unlimited shelf life	n/a	✗
✓	Contact with potable water = OK!	✓	✓ / ✗
✓	Flexible layer, adjusts itself to the metal structure (resistant to temperature variations and mechanical shocks)	✗	✗
✓	Welding on coating / use on welding	✗	✓ / ✗

ZINGA Galvanic Protection

- Det Norske Veritas (Norway)

  Practical ballast tank test

"The results from the performed testing show that Zinga coating has a beneficial corrosion protective performance, probably due to its qualities with regard to cathodic protection related to the high zinc content."

DET NORSKE VERITAS

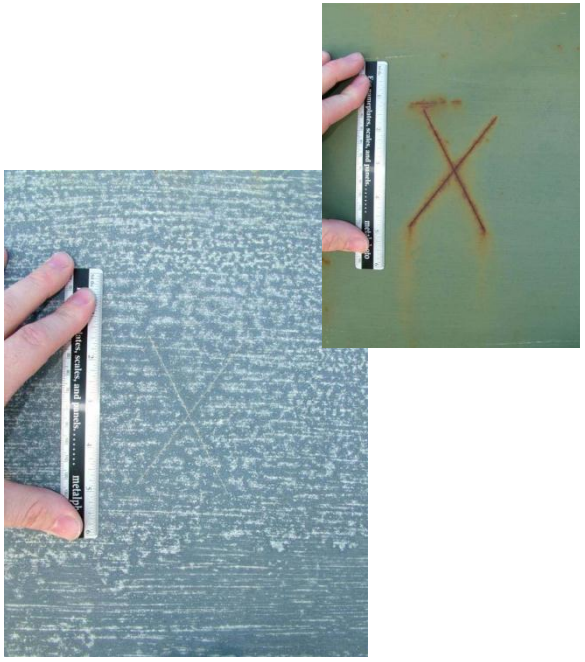
Tests done:
180 days testing in condensation chamber
180 days testing in wave tank
Evaluation of results after testing, including blister detection (when applicable), undercutting from scribe, adhesion and coating flexibility

- Pacific Rim Corrosion Research Program (USA)

  4 year field test at **Kennedy Space Centre**

No sign of corrosion

The pictures have been taken after 4 years. You see no red rust, only the white rust in the scribe where ZINGA has cathodically protected the bare metal.



ZINGA Galvanic Protection

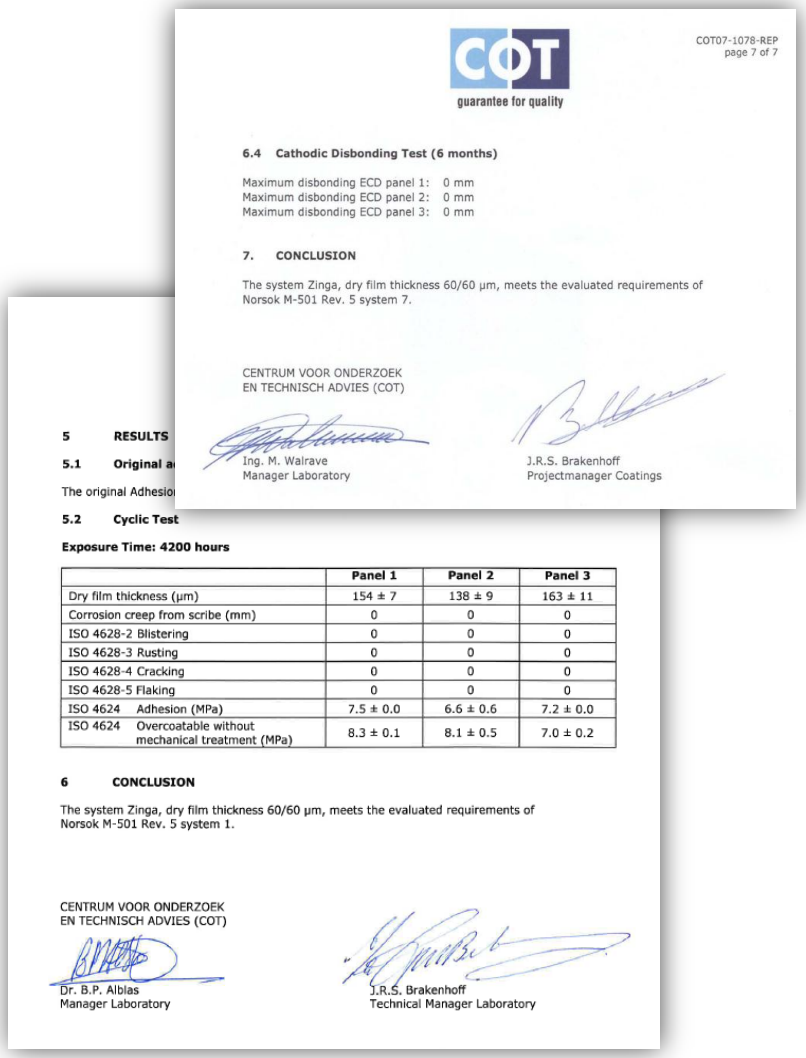
- COT (Netherlands)

  NORSOK M501 Syst 7 ánd Syst 1

“The system Zinga, dry film thickness 60/60 µm DFT, meets the evaluated requirements of Norsok M501 Rev. 5 system 7”

“The system Zinga, dry film thickness 60/60 µm DFT, meets the evaluated requirements of Norsok M501 Rev. 5 system 1”

Tests done:
4200 hours immersion in seawater
4200 hours cyclic test
Pull-off (7MPa)
No cathodic disbondment



COT07-1078-REP
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guarantee for quality

6.4 Cathodic Disbonding Test (6 months)

Maximum disbonding ECD panel 1: 0 mm
Maximum disbonding ECD panel 2: 0 mm
Maximum disbonding ECD panel 3: 0 mm

7. CONCLUSION

The system Zinga, dry film thickness 60/60 µm, meets the evaluated requirements of Norsok M-501 Rev. 5 system 7.

CENTRUM VOOR ONDERZOEK
EN TECHNISCH ADVIES (COT)

Ing. M. Walrave
Manager Laboratory

J.R.S. Brakenhoff
Projectmanager Coatings

5 RESULTS

5.1 Original a

The original Adhesio

5.2 Cyclic Test

Exposure Time: 4200 hours

	Panel 1	Panel 2	Panel 3
Dry film thickness (µm)	154 ± 7	138 ± 9	163 ± 11
Corrosion creep from scribe (mm)	0	0	0
ISO 4628-2 Blistering	0	0	0
ISO 4628-3 Rusting	0	0	0
ISO 4628-4 Cracking	0	0	0
ISO 4628-5 Flaking	0	0	0
ISO 4624 Adhesion (MPa)	7.5 ± 0.0	6.6 ± 0.6	7.2 ± 0.0
ISO 4624 Overcoatable without mechanical treatment (MPa)	8.3 ± 0.1	8.1 ± 0.5	7.0 ± 0.2

6 CONCLUSION

The system Zinga, dry film thickness 60/60 µm, meets the evaluated requirements of Norsok M-501 Rev. 5 system 1.

CENTRUM VOOR ONDERZOEK
EN TECHNISCH ADVIES (COT)

Dr. B.P. Alblas
Manager Laboratory

J.R.S. Brakenhoff
Technical Manager Laboratory

ZINGA Galvanic Protection

- COT (Netherlands)

ISO 12944 on **ZINGA 2 x 60 µm DFT**

Classification: C5I-Medium
(equals to C5M-Medium and C4-High)

ISO 12944 on **ZINGA 2 x 90 µm DFT**

Classification: C5I-High
(equals to C5M-High)

C5I: Industrial zones with high humidity and aggressive environment
(continuous condensation and high pollution, chemical factories on sea side)
C5M: Coastal zones and marine zones with high salinity
(continuous condensation and high pollution)
Medium: Life expectation between 5 and 15 years
High: Life expectation more than 15 years

The phosphate Mine in Togo
(Office Togolais des Phosphates)

ZINGA Galvanic Protection

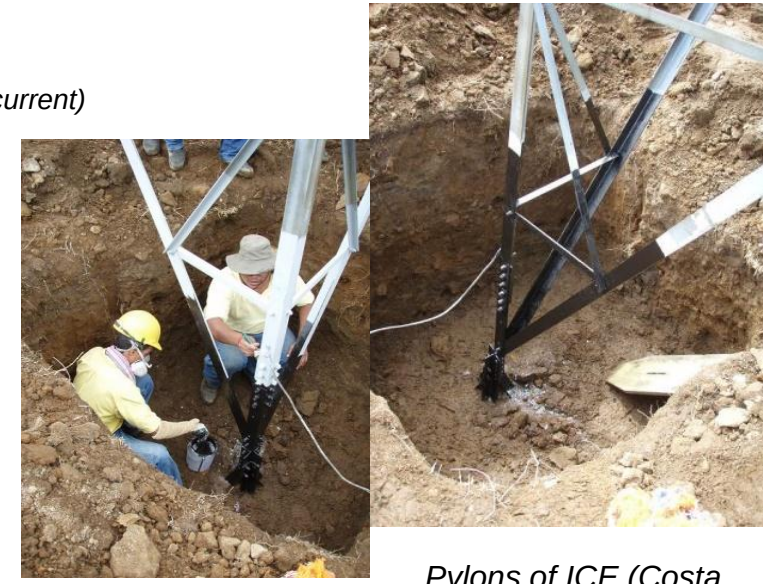
- COT (Netherlands)

  ISO 12944 on **ZINGA 1 x 60-80 µm DFT**
  + Zingatarfree 2 x 100 µm DFT

ZINGA + PU black finish for immersion

Classification: Im2 and Im3-High

Im2: Sea or brackish water
(harbors with locks, jetties, offshore structures; make sure there is no stray current)
Im3: Soil
(underground storage, iron poles)
High: Life expectation more than 15 years



Pylons of ICE (Costa Rica)

ZINGA on rebars

- Amirkabir University (Iran)

  Tests on Zinganised rebars o.a. salt spray test

The zinganised rebars passed the 500 hours salt spray test without formation of rust, peeling or blistering, not even in places where the coating was mechanically damaged.

Tests done:
180 days testing in condensation chamber
180 days testing in wave tank
Evaluation of results after testing, including blister detection (when applicable), undercutting from scribe, adhesion and coating flexibility

- Jadavpur Uni & National Metallurgical Lab (India)

  Salt spray test

ZINGA was best in a comparison to other means of corrosion protection of rebars

The salt spray test pointed out that the zinganised rebars have a corrosion resistance that is about 2 times higher than that of hot-dip galvanised rebars. ZINGA is also least susceptible for stress corrosion cracking. In NACE solution: ZINGA > HDG > FBEC > Stainless steel > Mild steel


2002/ 3/ 4

Reaction to fire

- SGS Yarsley Technical Services (United Kingdom)

  Test on fire propagation on ZINGA (BS 476 part 6 and part 7)

ZINGA obtained best possible result

"In accordance with the Flame Spread Classification given in the Standard and reproduced above, the results show that the material has a Class 0 surface."

- Efectis (The Netherlands)

  Classification of reaction to fire performance on ZINGA (EN 13501-1:2007 + A1:2009)

ZINGA obtained best rating

"The product, ZINGA 2 x 90 µm DFT, coating on steel, in relation to its reaction to fire behaviour is classified:
***Reaction to fire classification: B – s1, d0**"*

efectis nederland
The European experts in fire safety

International

- European Technical Approval

  Biggest approval body in Europe

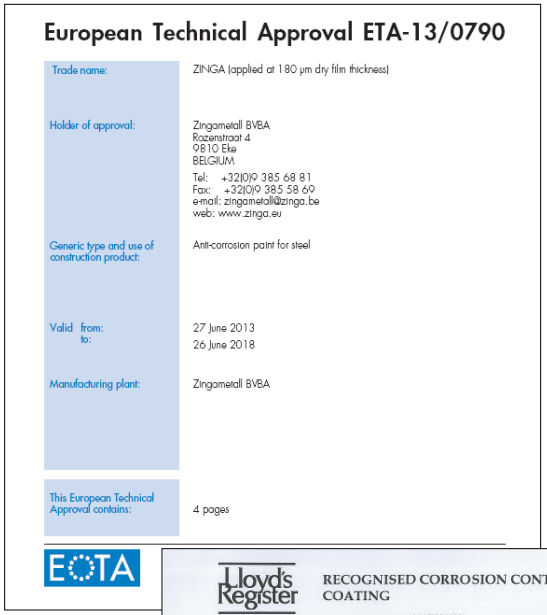
Evaluation of the product specifications:
Adhesion - Contents of metallic zinc - Solid contents by mass -
Flash point – Density
Reaction to fire:
Heat release - Smoke production

- Lloyd's Register

  International Maritime classification society

Based on reports, test certificates and documents from independent research facilities from around the world.

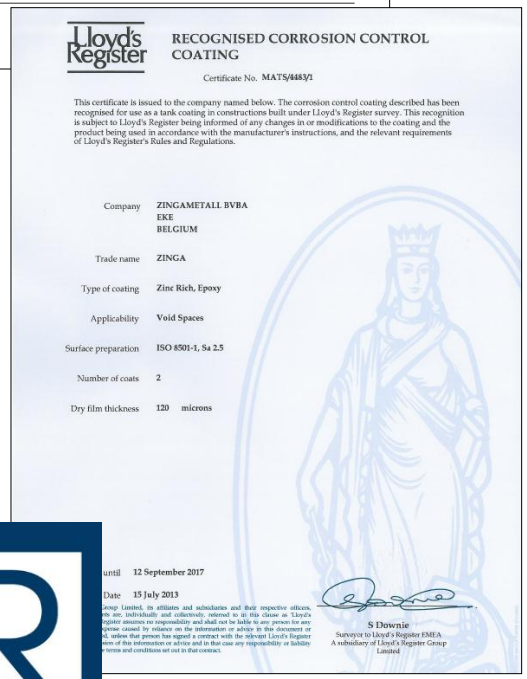
ZINGA has been approved for use in void spaces
(all internal structures except for oil tanks and ballast tanks).



European Technical Approval ETA-13/0790

Trade name:	ZINGA (applied at 180 µm dry film thickness)
Holder of approval:	Zingametall BVBA Rozenstraat 4 9810 Eke BELGIUM Tel: +32(0)9 385 68 81 Fax: +32(0)9 385 58 69 e-mail: zingametall@zinga.be web: www.zinga.eu
Generic type and use of construction product:	Anti-corrosion paint for steel
Valid from: to:	27 June 2013 26 June 2018
Manufacturing plant:	Zingametall BVBA
This European Technical Approval contains:	4 pages

EOTA



Lloyd's Register

RECOGNISED CORROSION CONTROL COATING

Certificate No. MATS/4483/1

This certificate is issued to the company named below. The corrosion control coating described has been recognised for use as a tank coating in constructions built under Lloyd's Register survey. This recognition is subject to Lloyd's Register being informed of any changes in or modifications to the coating and the product being used in accordance with the manufacturer's instructions, and the relevant requirements of Lloyd's Register's Rules and Regulations.

Company	ZINGAMETALL BVBA EKE BELGIUM
Trade name	ZINGA
Type of coating	Zinc Rich, Epoxy
Applicability	Void Spaces
Surface preparation	ISO 8501-1, Sa 2.5
Number of coats	2
Dry film thickness	120 microns

until 12 September 2017

Date 15 July 2013

S Downie
Surveyor to Lloyd's Register EMEA
A subsidiary of Lloyd's Register Group Limited

CE

RECOGNISED LR

Military

- US Army and US NAVY(USA)

  Biggest army force in the world

Zinga conforms to the requirements of CID A-A59745. Additionally, it has successfully undergone additional testing.

- NATO (International)

  Intergovernmental military alliance

In 1989 Zingametall received a Manufacturer's card and a NATO Stock Number for ZINGA. A NATO Stock Number is recognized as a stock number of the armies of the member states. Every product that is accepted by the NATO can be used by all the armies of the NATO member states without the necessity or obligation to test the product again.

NATO Stock Number :		
NATO SUPPLY CLASS:	NATO CODE FOR NCB:	SEQUENCE NUMBER IN THE NATO ITEM IDENTIFICATION NUMBER:
8030	13	1137027

Identification Data -Seg A-

Item Name Code:	16687
Item Identification Guide Number:	T115-E
Item Name:	CORROSION PREVENTIVE COMPOUND
Type of Item Identification Code:	2
Reference or Partial Descriptive Method Reason Code:	9
Nato File Maintenance Sequence Number:	007
NIIN Status Code:	6
Demilitarization Code:	
Date NIIN Assignment:	05/12/89
Modification Date:	13/11/09

Reference Data -Seg C-

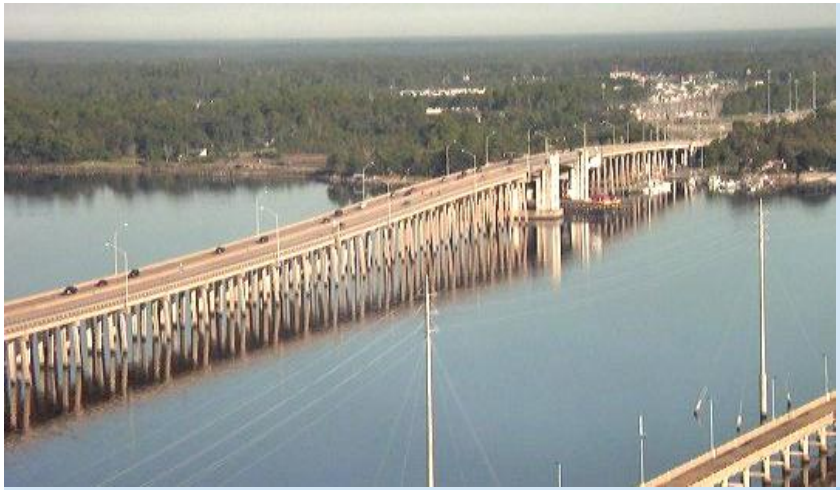
NCAGE Code:	Manufacturer Name	Reference Number	RNFC	RNCC	RNVC	RNSC	DAC	RNAAC	RNJC
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]	

General Data

NCAGE Code:	**B1483**	Name:	ZINGAMETALL BVBA
Country:	BELGIUM	Initials:	
		National Identification N°:	BE0421689088
Type of Organisational Entity Code:	E	Non-US manufacturers	
Status:	A	ACTIVE RECORD: The entity is currently active.	
Registration date:	23/10/1989	Modification date:	17/08/2005

Bridges

Bridges



- MDOT Mississippi bridge (US)
  In 2002
  2500 m²
  ZINGA 2 x 75 µm DFT
  An inspection in 2007 showed no sign of rust.

- Hangzhou Bay Cross-sea Bridge (China)
  In 2005
  37 km long bridge
  On rebars in bridge
  ZINGA 1 x 60 µm DFT

Bridges

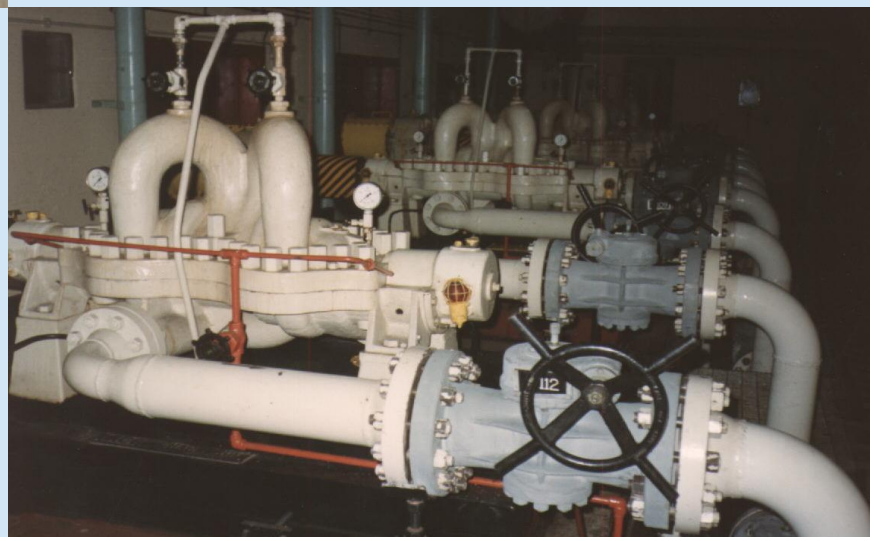
- Izmit Bay Suspension bridge
  On south approach of the viaduct
  Construction started in 2010 and will be finished by 2017
  ZINGA 1 x 60 µm DFT
  Zingalufer 1 x 80 µm DFT
  Zingaceram PU 1 x 60 µm DFT

Offshore

Storage tanks

- Dangote (Ghana)
  In 2009
  In repair of a previous system that failed
  After only 3 years
  On every metal part of the plant
  At 100m of the ocean
  ZINGA 2 x 60 µm DFT

- NATO Pump Stations (Belgium)
  Application in 1986
  ZINGA 2 x 60 µm DFT
  On numerous pump stations all over Belgium
  17 years after application an official
  Inspection showed the pump stations
  in excellent state



Storage tanks

- Quartes (Belgium)
  In 1980
  On previously hot-dipped storage tanks
  4 silos, 20 m in height, 4 m in diameter
  4000 m²
  ZINGA 2 x 60 µm DFT
  30 years after application only minor repairs were required

- Braithwaite Potable Water Tanks (UK)
  Application in 2007
  On the inside of 9 storage tanks for potable water
  ZINGA 2 x 60 µm DFT

Storage tanks

Towers

- Lighting Mast (Singapore)
  Since 2002
  In PSA harbour
  30 lighting masts,45 metres in height
  ZINGA 2 x 60 µm DFT

Pylons

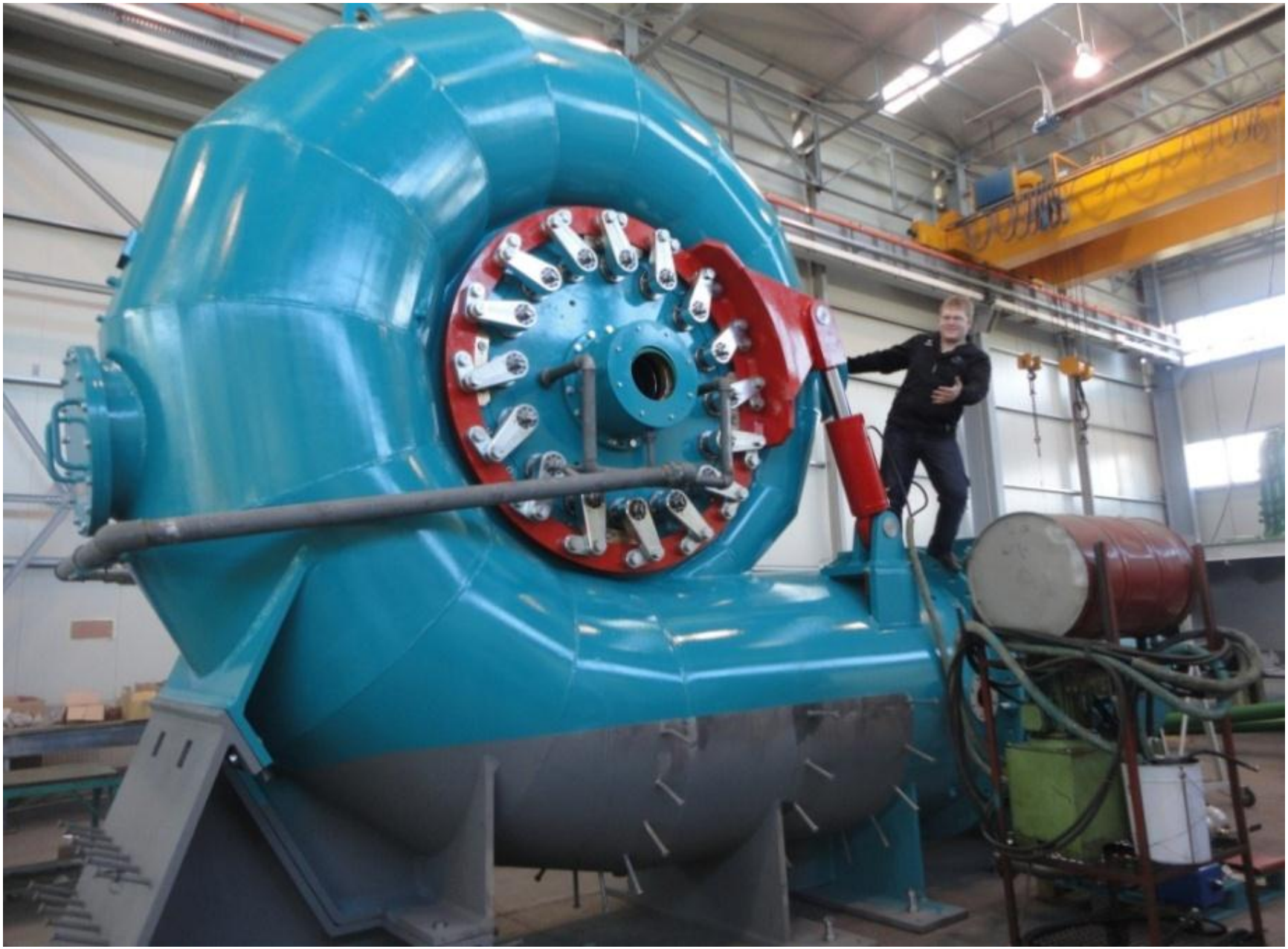
- Transgrid Networks (Australia)
  In 2006
  2 km from the coast line
  On old galvanised pylons
  ZINGA 2 x 60 µm DFT

- EGAT (Thailand)
  Since 2005
  37 high tension pylons in swampy areas
  Above ground: ZINGA 2 x 50 µm DFT
  Under ground: ZINGA 1 x 40 µm DFT
  + Zingatarfree 1 x 100 µm DFT

Power plants

- Kiev Energo (Ukraine)
  In 2003
  Repair of old hot-dipped towers
  (some 45 m high)
  ZINGA 2 x 50 µm DFT

- Akosombo Dam (Ghana)
  In 2013
  10.000 m²
  Recoating of 6 penstocks and 2 cranes
  ZINGA 1 x 60 µm DFT
  Zingaceram ZM EP MIO 1 x 80 µm DFT
  Zingaceram ZM PU 1 x 80 µm DFT



Infrastructure

- Bird’s nest (China)
  In 2006
  On sensitive parts
  ZINGA 2 x 40 µm DFT
  (+ sealer + topcoat)

- National grand theatre Beijing (China)
  In 2005
  ZINGA on underwater structures in aquarium
  ZINGA 2 x 60µm DFT

For more information please visit : WWW.IGOE.IE

Email : INFO@IGOE.IE

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