



REFERENCES & DESCRIPTIONS OF ZINGA® APPLICATIONS ON LARGE-SCALE STRUCTURES



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UNIQUE CHARACTERISTICS AND ADVANTAGES OF ZINGA

ZINGA is in fact much more effective than any other existing anti-corrosion system. This efficiency is based on a number of unique characteristics and advantages, as explained in the following summary.

1. ZINGA protects the metal against rust in two ways: an active, cathodic, galvanic protection due to its high zinc content and a passive barrier protection due to the zinc salt on top of the surface, and due to the binder in ZINGA that reduces the disintegration of the zinc.
2. The application of ZINGA is very easy. It can be painted onto the surface with a brush or a roll. It can also be sprayed with a pistol, and it can be applied in a bath. There is no need for sophisticated equipment that can only be found in a workshop. ZINGA can be applied on site, even by non-professionals.
3. ZINGA can be applied in a wide range of weather conditions. ZINGA can be applied on a damp surface (but not on drops of water). Humidity can even intensify the cathodic action and accelerate the formation of the zinc salts on the surfaces that offer the barrier protection. ZINGA can be applied at very high or low temperatures (up to 40° C or 104° F and down to -15° C or 5° F).
4. The surface preparation can be reduced to a minimum: the metal must be clean (free from dirt, grease, oil, salts, paint, and mill scale) and rough. It is not always necessary to grit-blast the metal first.
 - Application on bare metal: Mostly grit-blasting is necessary, but in some cases the substrate already has the required roughness degree due to former grit-blasting or due to corrosion.
 - Application on top of hot-dip galvanisation: Old and corroded hot-dip only needs to be cleaned and already has the required roughness degree. New hot-dip can be treated in order to obtain the required roughness.
 - Application on an old ZINGA layer: When ZINGA is applied on an old ZINGA layer, then the surface just needs to be cleaned.
5. ZINGA is always applied under ambient temperatures, so that delicate metal structures cannot be deformed. Even dipping is done in ambient temperature. No energy is wasted to warm up ZINGA, which is necessary for hot-dip galvanisation wherefore you need temperatures up to 460 °C.
6. ZINGA has a quick drying time. A new layer of ZINGA can be applied after 1 hour. Topcoats can be applied after 6 to 24 hours, depending on layer thickness and atmospheric conditions.
7. ZINGA does not peel off and is not brittle. In case of mechanical damage the ZINGA layer will be compressed or squashed, but it will not crack due to its flexibility.
8. One of the most decisive advantages of using ZINGA is that the zingalisation system can be recharged. Each new layer of ZINGA blends perfectly with the previous one. Additional layers all blend to one single, homogeneous ZINGA layer. There is no risk for accumulation of layers that are different in structure, which could cause peeling off. You cannot distinct different layers, as is the case with galvanising by hot-dip. Moreover, this capacity of recharging reduces the surface preparation to an absolute minimum. Other coating systems, for instance with paints, demand an elaborate and often expensive surface preparation before the application of a new layer.



9. This property of recharging can be of use if you still have to do some drilling or welding on the surface, or if the structures still have to be transported. In that case the first layer is meant as a primer. It can intercept possible damages. Even welding is possible on top of ZINGA. Afterwards, the final layer of ZINGA can be applied and local damages can be repaired. The new layer makes the former layer liquid again and the result is one homogeneous ZINGA layer. When there is no need to recoat the whole structure, you can apply a small quantity of ZINGA on the damaged spots and the whole structure is free from rust again. Repairs will be invisible after a certain time.
10. Structures that have been metallised or galvanised by hot-dip will begin to rust after a certain period. Such worn-out and damaged structures can also be recharged by ZINGA.
11. ZINGA has a zinc content of 96 % in the dry layer. The zinc is pure to 99.995 %. In order to obtain a real cathodic protection you need at least 92 % of zinc in the dry layer. That is scientifically proven. The so-called zinc-rich paints do not meet this condition.
12. Moreover ZINGA is based on protected zinc. The zinc particles are protected by a special resin that allows the formation of the galvanic couple, but that also gives an additional protection. Therefore protection with ZINGA is a superior alternative for galvanisation by hot-dip.
13. The zinc granules have been specially shaped so that they have a bigger contact surface through which they can attach to one another. For your information: the zinc used in ZINGA is made by the Belgian company Umicore, well-known all over the world, since they are the number 1 manufacturer in the world of these atomised zinc dust pigments, further electronically prepared for Zingametall. This atomisation process provides unique qualities and a very high zinc purity. This is also one of the reasons why ZINGA does not have one single true competitor in the world.
14. ZINGA is uniquely characterised by the fact that it sacrifices itself or that it is “consumed”. Together with the quality of not peeling off, this results in the depletion of each applied layer: between 2 – 15 µm per year depending on the environmental conditions. This is an important factor in monitoring the application and the evaluation of the lifetime of the system. Hence, it is a true benefit in terms of maintenance and budget scheduling.
15. With ZINGA, a customized and personal solution can be offered. Customers are not always in need of a long term corrosion protection or don't have the budget for it. In case of a limited budget and desired protection time of for instance only 5 – 7 years, the layer thickness can be reduced and this will have an effect on the price per m². In other words: ZINGA is the most “flexible” customized solution.
16. ZINGA can be topcoated by a large number of compatible paints. Such duplex systems will more than double the lifetime of ZINGA. In order to reinforce the duplex qualities of the ZINGA system a topcoat can be applied. We can supply you with different compatible paints: acryl, epoxy, polyurethane; with or without micaceous iron oxides, the so-called MIO's. These paints can be applied directly on ZINGA (using the mist/full coat technique).
17. These topcoats can be bought from the same supplier. You just need to speak to one contact person and only that one company can be held responsible for the total application.
18. ZINGA is composed of non-toxic elements according to European Standards and can be used in contact with potable water (BS 6920).
19. ZINGA is heat resistant up to 120° C. ZINGA can also intercept occasional and short thermal shocks up to 150° C.
20. a) ZINGA has an unlimited pot and shelf life.
b) ZINGA is a one component coating.



OVERVIEW OF MAIN REPORTS OF TESTS PERFORMED WITH ZINGA

to download the actual reports, please visit www.zinga.eu

ZINGA quality label

SGS Systems & Services Certification (Belgium)

Certificate ISO 9001 for quality management

The company Zingametall has implemented a quality management system that is based on the standard ISO 9001. Hereby we commit ourselves to strive for continuous improvement and customers' satisfaction.

(http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=46486)

British Board of Agrément (BBA) (United Kingdom)

BBA certificate n° 03/4047

After thorough evaluation (effect on water quality, fire propagation, surface spread of flame, welding, resistance to abrasion, weathering, etc.) ZINGA received the approval from the BBA, which is the UK's major approval body for new construction products and installers. The BBA, in collaboration with SGS Coating Services, carries out regular inspections of the manufacturing process of ZINGA. This includes all the procedures involved with the production and the control of the delivered raw materials as well as of the quality of the final product. Traceability of the delivered product is assured by means of a specimen of each production batch.

(<http://www.bbacerts.co.uk/>)

Australian Paint Approval Scheme (APAS) (Australia)

APAS certificate n° 0180

After a thorough research of test reports, applications in Australia and a visit to the factory in Belgium, Zingametall BVBA was acknowledged as a recognized manufacturer by the APAS.

"APAS (Australian Paint Approval Scheme) is the largest and most widely recognized paint scheme in the world".

(<http://www.apas.gov.au/index.asp>)

NATO Approval (International)

Manufacturer's n°: BE0421689088; NSN for ZINGA: 8030131137027

In 1989 Zingametall received a Manufacturer's card and a NATO Stock Number for ZINGA. A NATO Stock Number is recognised 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.

(http://www.nato.int/structur/ac/135/ncs_guide/english/e_1-6-5.htm)

Engineers India Limited (India)

Based on reports, test certificates from independent European and Chinese test organisations combined with other information documents, the 'Engineers India Limited' sees ZINGA as an effective protective coating system in various corrosive environments.

They state that ZINGA would be a 'better replacement' for inorganic zinc silicates and hot dip galvanisation.

(<http://engineersindia.eil.co.in/>)

London Underground (United Kingdom)

ZINGA has been accepted by the 'London Underground' for use as a protective system on ferrous metals and as alternative to hot-dip galvanisation or metallisation. They sent us this Certificate after extensive study of existing documents in combination with doing tests on ZINGA's behaviour in contact with fire themselves.

(<http://www.tfl.gov.uk/corporate/modesoftransport/1574.aspx>)



ZINGA galvanic protection

ISO 12944-6 (COT bv) (Netherlands)

Test according to the ISO 12944-6 standard

ZINGA applied in 2 layers of each 90µm DFT got the classification:

C5I-High/C5M-High

and Im2-Medium/Im3-Medium.

ZINGA applied in 2 layers of each 60µm DFT got the classification:

C5I-Medium/C5M-Medium or C4-High.

and Im2-Medium/Im3-Medium.

ZINGA applied in 1 layer of 60µm DFT + Alufer N applied in 1 layer of 80µm DFT got the classification:

C5I-High/C5M-High

NORSOK Certificate (COT bv) (Netherlands)

Test according to the NORSOK standard M-501, rev. 5, system 7

ZINGA has passed the 4200 hours seawater immersion test and the 4200 hours cyclic test without any formation of rust, blisters, cracks, flakes or cathodic disbondment. The pull-off adhesion test on ZINGA resulted in values of more than 7MPa.

Det Norske Veritas (DNV) (Norway)

Ballast Tank test

ZINGA was applied on blast-cleaned test panels that were placed in a ballast tank filled with sea water with wave movement and cyclic heating. Other test panels were placed in a condensation chamber.

No corrosion of the steel substrate could be demonstrated. Based on the results of the testing, ZINGA meets the requirements of a B3 classification. In the report is stated that ZINGA has a beneficial corrosion protective performance.

Field test (Sintef) (Norway)

ZINGA duplex system compared to TSZ/TSA

This report gives the field test results of visual inspection of the panels after 5 years marine atmospheric exposure started in September 2002 and terminated in May 2008. The system that was tested was ZINGA + Alufer N + Alufer WR and performed excellently compared to systems based on TSZ/TSA (metallisation).

Bodycote Materials Testing (United Kingdom)

Cathodic Disbondment test

ZINGA applied at 60 µm DFT was exposed during 26 weeks at -1,0 volt. The results was no cathodic disbondment at all.

Potential Performance Test (COT bv) (Netherlands)

Determining the galvanic protection

The results showed active behavior of this film (-1110mV using Ag/AgCl). This means that it will provide cathodic protection to damaged, uncoated or improperly coated metal surfaces.

Trial protection of Crevices on Młyńskie bridges in Wrocław (Poland)

Crevice Corrosion field test

On the basis of an agreement between IBDiM in Warsaw and The Administration of Roads and Local Services in Wrocław trial application tests of various systems for the protection of crevices on Młyńskie Bridges in Wrocław were conducted.

Upon this test ZINGA was approved for use on bridges in Poland.



ZINGA in comparison with hot-dip galvanisation

University of Ghent (RUG) (Belgium)

Measurement of the short circuit current flow of ZINGA in comparison to hot-dip

In this test (based on electro-chemical measurements) is demonstrated that ZINGA offers cathodic protection equal to that of hot-dip.

BNF Fulmer Research Centre (United Kingdom)

Electrochemical tests on ZINGA in comparison to hot-dip

The open circuit voltage and galvanic current between the galvanising layers and the bare steel were measured. The conclusion of the report is that ZINGA offers galvanic protection to steel comparable to that offered by hot-dip galvanisation. In other words: a layer of ZINGA is a completely metallic layer exactly like a hot-dip galvanising layer, and will behave as such in all aspects. Moreover, this test demonstrated that the corrosion rate of ZINGA is 1/3 of the corrosion rate of hot-dip galvanising under similar (immersion) conditions.

Forschungs- und Materialprüfungsanstalt Baden-Württemberg (FMPA) (Germany)

Different tests on the efficiency of ZINGA in comparison to hot-dip: potential measurement and short circuit current measurement

In this test is demonstrated that the electrochemical behaviour of ZINGA is similar to that of a hot-dip layer.

South African Bureau of Standards (SABS) (South Africa)

Salt spray test on ZINGA in comparison to hot-dip (loss in weight)

In this test is demonstrated that the loss in weight of ZINGA is 1/10 of the loss in weight of hot-dip galvanising after a 400 hours salt spray test. The layer thickness of ZINGA diminishes because ZINGA is being consumed, contrary to a paint that will start to peel off after a certain period of time. This illustrates the fundamental difference between a paint and a galvanising system.

Direction Départementale de l'Équipement – Service Maritime de la Vendée (France)

Field test on the efficiency of ZINGA in comparison with hot-dip on sea buoys

Two buoys (one treated with ZINGA, the other one hot-dip galvanised) have floated in the Atlantic Ocean for four years. After those four years, the buoy treated with ZINGA showed no trace of rust while the hot-dip galvanised buoy was severely corroded in several places.

ZINGA on rebars

Steel Authority of India (India)

Measurement of corrosion rate by salt spray and immersion tests

A comparison was made between uncoated steel rebars, fusion bonded epoxy coated rebars (FBEC), hot-dip galvanised rebars (HDG) and zinganised rebars (ZINGA). The corrosion rate per year was measured after immersion and salt spray. This test demonstrated several advantages of ZINGA: the greater degree of galvanic protection, the lower sacrificial zinc consumption due to the dispersion of zinc dust in the binder and the additional barrier protection created by the binder.

→ ZINGA > FBEC > HDG > Uncoated

Jadavpur University (India)

Different tests on the efficiency of ZINGA in comparison with other coatings on rebars

A comparison was made between uncoated steel (Mild steel and Stainless steel) rebars, fusion bonded epoxy coated rebars (FBEC), hot-dip galvanised rebars (HDG) and zinganised rebars (ZINGA). 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



Amirkabir University Poly Technic Tehran (Iran)

Different tests on the efficiency of ZINGA in comparison with uncoated rebars

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. The rebars that were not zinganised were heavily corroded.

Bend test (COT bv) (Netherlands)

Bend test of ZINGA in layer thickness of 50µm DFT over 12 mm

ZINGA, dry film thickness about 50 µm, shows no cracks when bending on a cylindrical mandrel with a diameter of 12 mm.

University of Ghent (Belgium)

Pull-out test on zinganised rebars

A pull-out test was performed to evaluate the influence of a ZINGA layer on the bond strength of the rebar with the concrete. The conclusion was that coating with ZINGA does not negatively affect this.

Adherence of concrete to zinganised rebars at B-Holding (Belgian Railways)

Adherence of concrete to zinganised rebars

The conclusion of the report is:

It is clearly more difficult to cleave the rebar bloc containing the steel rod protected by Zinga. The adherence of the concrete to the steel rod is better. The actual cleavage happens in the concrete.

Other tests on ZINGA

❖ Reports concerning health

National Institute of Public Health (Poland)

Use of ZINGA on the inside of potable water storage tanks

Conclusion is:

ZINGA is approved for covering the inner surfaces of steel containers designed to store potable water.

Water regulations Advisory Scheme (United Kingdom)

Test on the influence of ZINGA on water quality

These tests were performed according to the standard BS 6920 to determine whether or not the quality of potable water is affected when it is in contact with a ZINGA layer. The water was analysed on taste, appearance, growth of micro organisms, extraction of harmful substances and extraction of metals. The obtained results complied with the requirements and ZINGA was found suitable for contact with potable water.

EDF - Gaz De France (France)

Toxicological advise

A positive toxicological advise was written and distributed in the company EDF-Gaz De France concerning the national use of ZINGA.

❖ Reports concerning reliquification

University of Ghent (Belgium)

Test on how successive ZINGA layers blend with each other

This test demonstrates that a newly applied ZINGA layer makes the former layer liquid again so that both layers blend together to one single homogeneous layer. The new layer recharges the old one. The ZINGA film galvanising system is very easy to maintain and to recharge: there is no need for grit-blasting, contrary to the surface preparation that is required when a traditional paint has been used.

Stangers Consulting Engineers and Scientists (United Kingdom)

Tests a.o. how successive ZINGA layers blend with each other

ZINGA is easy to apply by brush and resoftens caked Zinga or dry Zinga films as claimed by the manufacturer. This property enables ZINGA to be built up into thick composite layers avoiding the discrete films achieved with conventional coatings.

Their end conclusion was: It is evident that the product has special properties which place it, as far as we know, into a unique category.

❖ Report on the surface spread of flames

SGS Yarsley Technical Services (United Kingdom)

Test on the fire propagation on ZINGA

The results of the test according to the BS 476: part 6 show that ZINGA has a class 0 surface. ZINGA did not ignite during exposure to heating.

❖ Reports concerning friction coefficient

KTA-TATOR (United States of America)

Test on the friction coefficient of ZINGA

The slip coefficient of ZINGA applied at 100µm DFT is 0,52.

China National Construction Steel Quality Supervision and Test Center (China)

Test on the friction coefficient of ZINGA

The slip coefficient of ZINGA applied on steel plates and bolts, ranges from 0,54 to 0,67.

❖ Report concerning weldability

University of Ghent (Belgium)

Test on the influence of ZINGA on welding steel

A set of 3 x 2 plates, covered with a layer of Zinga, the thickness of which was respectively 15µm DFT, 40µm DFT and 60 µm DFT.

After a polymerisation period of seven days the two plates covered with the same coating thickness were welded together by hand.

The conclusion was:

None of the 3 specimens shows any deficiency, neither in the welding seams nor in the steel itself.



OVERVIEW AVAILABLE REFERENCES

Please find hereafter an overview of our references. Some of the references are enclosed. All other mentioned references can be obtained upon request.

Reference structure:

First letter: ISO letter of the country of the ZINGA application
Following letters: Theme references

Example: FI-AG-FO- Cattle and Pigfarm

FI: Finland (country)
AG: Agriculture (theme)
FO: Food (theme)
Cattle and Pigfarm: Title of the reference

AG: Agriculture

1. MARTENS DIRK – AGRICULTURAL MACHINERY - BELGIUM	BE-AG-OL-TE-Martens
2. COW SHED BEAMS - BELARUS	BY-AG-Cow Shed
3. DAIRY FARM VITEBSK - BELARUS	BY-AG-Dairy farm
4. CATTLE- AND PIGFARM - FINLAND	FI-AG-FO-HD-Cattle and Pigfarm
5. GRAIN SILOS NADOR CEREALES – MOROCCO	MA-AG-HD-TA-Grain Silos Nador Cereales
6. YUZHNY GREENHOUSE FARM - RUSSIA	RU-AG-HD-Yuzhny
7. KENSINGTON PALACE SUNKEN GARDENS – UNITED KINGDOM	UK-AG-AM-CI-TP-Kensington Palace Sunken Gardens
8. EDEN GREENHOUSE DOME – UNITED KINGDOM	UK-AG-HD-HT-TP-Eden

AL: Alu ZM

1. FENCE SUNNY EUROPE – BELGIUM	BE-AL-CR-HD-Fence Sunny Europe
2. RENOVATION SCHOOL SAINT-JOSEPH – LEVIS QUEBEC	CA-AL-AM-HD-Saint-Joseph
3. INTERNATIONAL AIRPORT JEAN LESAGE QUEBEC - CANADA	CA-AL-AR-Quebec
4. SEOUL AIR CONDITIONING – SOUTH KOREA	KR-AL-PI-Seoul Air Conditioning
5. HIGHWAY DEPARTMENT - THAILAND	TH-AL-Highway Department

AM: Historical and recreational buildings

1. GENT - KIOSK – BELGIUM	BE-AM-CO-OL-Gent Kiosk
2. METRO – MINSK – BELARUS	BY-AM-LT-TC-Metro
3. RENOVATION SCHOOL SAINT-JOSEPH – LEVIS QUEBEC	CA-AL-AM-HD-Saint-Joseph
4. MUSEUM HOTEL IN WENDAKE - QUEBEC	CA-AM-CO-Wendake
5. EGLISE SAINTE THERESE – CHURCH – CANADA	CA-AM-Eglise Sainte Thérèse
6. BIRD'S NEST - CHINA	CN-AM-Bird's Nest
7.	CN-AM-MA-Theatre Beijing
8. WALT DISNEY – HONG KONG	CN-AM-TE-Walt Disney HK
9. NATIONAL GRAND THEATRE BEIJING - CHINA	CN-AM-MA-Theatre Beijing
10. OHENE DJAN SPORT STADIUM LIGHT POLES - GHANA	GH-AM-HD-PY-OheneDjanStadium
11. KENSINGTON PALACE SUNKEN GARDENS – UNITED KINGDOM	UK-AG-AM-CI-TP-Kensington Palace Sunken Gardens
12. ROYAL TRAIN SHED – UNITED KINGDOM	UK-AM-CI-RoyalTrainShed
13. ZIMBALI CONDOMINIUM – WORK OF ART – SOUTH AFRICA	ZA-AM-Zim Condomin

AP: Airports

1. GUANGZOU NEW BAIYUN AIRPORT - CHINA	CN-AP-HD-Baiyun
2. DÜSSELDORF - AIRPORT - GERMANY	DE-AP-CO-HD-OL-TE-Düss.Airport
3. MUMBAI DOMESTIC AIRPORT - INDIA	IN-AP-Mumbai Domestic airport
4. SUVARNABHUMI – AIRPORT - THAILAND	TH-AP-DI-SuvarnabhumiAirport

**AR: Armies and military organisations**

1.	NATO – NATO PUMP STATIONS - BELGIUM	BE-AR-OL-PI-TE-NATO
2.	BELGIAN ARMY - NAVY SHIPS AND ANTENNA - BELGIUM	BE-AR-OL-PY-SH-Belgian Army
3.	INTERNATIONAL AIRPORT JEAN LESAGE QUEBEC - CANADA	CA-AL-AR-Quebec
4.	USNS ZEUS CABLESHIP - USA	CA-AR-MA-HD-SH-USNS Zeus Cableship
5.	POLES ARMY TENTS - UNITED KINGDOM	UK-AR-DI-Poles Army Tents
6.	MISSISSIPPI DEPARTMENT OF TRANSPORTATION BILOXI BRIDGE – UNITED STATES OF AMERICA	US-AR-BR-TE-MDOT
7.	US ARMY - ARMY VEHICLES - UNITED STATES OF AMERICA	US-AR-HD-OL-TE-TR-US Army
8.	NEXRAD TOWER – UNITED STATES OF AMERICA	US-AR-PY-Nexrad Tower

AS: Automatic spraying lines

9.	REBAR SPRAYING INSTALLATION TEHRAN HARA - IRAN	IR-AS-RE-AutomSprayLine
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AZ: Aquazinga

1.	J.M. INDUSTRIAL – RACKS, METAL EQUIPMENT AND STRUCTURES IN BRICK MANUFACTURING FACTORIES- BELGIUM	BE-AZ-CE-HU-OL-TE-JM Ind
2.	FLOREAC – COAL FUNNEL – BELGIUM	BE-AZ-HT-OL-Floreac
3.	CARSID - BELGIUM	BE-AZ-HT-OL-TE-Carsid
4.	YUEHAI PASSAGE TRAIN FERRY PIER TERMINAL - CHINA	CN-AZ-MA-RW-YuehaiTrainFerry
5.	SULTAM – CHIMNEY - ISRAEL	IL-AZ-HT-OL-Sultam
6.	DERBY – TURBINE EXHAUST STACKS - UNITED KINGDOM	UK-AZ-HT-OL-TE-Derby
7.	PORT ELISABETH ELECTRICITY DEPARTMENT - FUEL TANKS AND EXHAUST – SOUTH AFRICA	ZA-AZ-HT-TA-Port.El

BR: Bridges

1.	BURDEKIN RIVER BRIDGE – AUSTRALIA	AU-BR-Burdekin River Bridge
2.	MOLISSON STREET BRIDGE- AUSTRALIA	AU-BR-Molisson Street Bridge
3.	QUEENSLAND RAILWAY BRIDGES - AUSTRALIA	AU-BR-RW-QR Railway Bridges
4.	TARWIN RIVER BRIDGE - AUSTRALIA	AU-BR-Tarwin River Bridge
5.	REYNELLA BRIDGE - AUSTRALIA	AU-BR-TC-Reynella Bridge
6.	GENT - KEIZER BRIDGE - BELGIUM	BE-BR-CR-OL-Keizer Bridge
7.	DE BRANDT – FENDER CONSTRUCTIONS - BELGIUM	BE-BR-IM-OL-De Brandt
8.	MELLE BRIDGE - BELGIUM	BE-BR-OL-TC-Melle Bridge
9.	EUROPEAN TECHNICAL ASSOCIATION FOR PROTECTIVE COATINGS - BELGIUM	BE-BR-OL-TE-ETAPC
10.	WEGENFONDS BRIDGE - BELGIUM	BE-BR-OL-Wegenfonds
11.	RUMST BRIDGE – BELGIUM	BE-BR-Rumst Bridge
12.	RAILWAY OFFICE - BENIN	BJ-BR-OL-RW-Chemins Fer
13.	DR QUESNELL BRIDGE EDMONTON CANADA	CA-BR-Dr Quesnell Bridge Edmonton
14.	BC FERRY TERMINALS - CANADA	CA-BR-MA-OL-TE-BC Ferry
15.	CONFEDERATION BRIDGE - CANADA	CA-BR-OL-Confederatie
16.	OVERLANDER BRIDGE - CANADA	CA-BR-OL-TE-Overlander
17.	HANGZHOU BAY BRIDGE - CHINA	CN-BR-RE-Hangzou Bay
18.	BLANICE RIVER BRIDGE – CZECH REPUBLIC	CZ-BR-OL-Blanice
19.	EL SALAAM BRIDGE - EGYPT	EG-BR-MA-PI-TE-Salaam
20.	AUTOMATED PARKING SYSTEMS SILODAM AMSTERDAM – NETHERLANDS	NL-BR-CO-Automated Parking Systems Silodam Amsterdam
21.	FINNMARK BRIDGE – NORWAY	NO-BR-MA-OL-Finnmark Bridge
22.	HELL BRIDGE – NORWAY	NO-BR-MA-OL-Hell Bridge
23.	KALVOYA BRIDGE - NORWAY	NO-BR-MA-OL-TE-Kalvoja



24.	BRIDGE GIRDERS – POLAND	PL-BR-Girders
25.	FOOTBRIDGES AND PROTECTION BARRIERS BYDGOSZCZ - POLAND	PL-BR-CR-Bydgoszcz
26.	RENOVATION OF THE SIERKIERKOWSKI BRIDGE IN WARSAW, NATIONAL ROAD- POLAND	PL-BR-CR-Sierkierkowski Bridge
27.	ST PAUL – JETTY – REUNION	RE-BR-MA-St. Paul
28.	TEMVAR BRASOV BRIDGE – ROMANIA	RO-BR-PI-Temvar Brasov Bridge
29.	NEWARK MARINA BRIDGE - UNITED KINGDOM	UK-BR-OL-Newark Mar.
30.	TAXI BERTH BRIDGE IN CARDIFF BAY - UNITED KINGDOM	UK-BR-Taxi Berth
31.	MISSISSIPPI DEPARTMENT OF TRANSPORTATION BILOXI BRIDGE – UNITED STATES OF AMERICA	US-AR-BR-TE-MDOT

BW: Breweries

1.	KBL LTD – BREWERY - BOTSWANA	BW-BW-KBL
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CE: Cement factories and brick manufacturing companies

1.	J.M. INDUSTRIAL – RACKS, METAL EQUIPMENT AND STRUCTURES IN BRICK MANUFACTURING FACTORIES- BELGIUM	BE-AZ-CE-HU-OL-TE-JM Ind.
2.	HOLCIM GRANULATS - CEMENT FACTORY - BELGIUM	BE-CE-OL-TE-Holcim
3.	PAESEN - CONCRETE MILL - BELGIUM	BE-CE-TA-Paesen
4.	SCHWENK – CEMENT FACTORY - GERMANY	DE-CE-OL-TE-Schwenk
5.	SIAM CEMENT - THAILAND	TH-CE-SiamCement
6.	THE INFRASTRUCTURE OF THE COMPANY LAFARGE – SOUTH AFRICA	ZA-CE-OL-Lafarge

CI: Cast iron

1.	DE GIEY – THE FENCE OF THE CASTLE - BELGIUM	BE-CI-CR-OL-De Giey
2.	KLEIN KASTEELKEN – CAST IRON FENCE - BELGIUM	BE-CI-CR-OL-TC-Klein Kasteelken
3.	DULLE GRIET - CANNON – BELGIUM	BE-CI-TC-Dulle Griet
4.	TEATRO MUNICIPAL - BRAZIL	BR-CI-CO-TC-Teatro
5.	FOUNTAINS IN PEOPLE'S PARK - DUBLIN – IRELAND	IE-CI-Fountains
6.	KENSINGTON PALACE SUNKEN GARDENS – UNITED KINGDOM	UK-AG-AM-CI-TP-Kensington Palace Sunken Gardens
7.	ROYAL TRAIN SHED – UNITED KINGDOM	UK-AM-CI-RoyalTrainShed

CN: Cranes

1.	MENGE – THE TOWER CRANE OF THE COMPANY MENGE, SPECIALISED IN RENOVATION OF CHIMNEYS - BELGIUM	BE-CN-Menge
2.	ANTWERP - PORT CRANES – BELGIUM	BE-CN-OL-Antwerp Port Cranes
3.	HARBOUR OF GENK – BELGIUM	BE-CN-OL-TE-KHG
4.	PACIFIC GRAIN ELEVATOR - CANADA	CA-CN-MA-Pacific Grain Elevator
5.	OFFICE TOGOLAIS DES PHOSPHATES PHOSPHATE MINE OFFSHORE - CHARGING CRANES - TOGO	TG-CN-MA-OL-PE-Off.Togolais

CO: Construction and engineering

1.	GENT - KIOSK – BELGIUM	BE-AM-CO-OL-Gent Kiosk
2.	BLANKENBERGE - PARAVENT – BELGIUM	BE-CO-CR-MA-OL-Paravent
3.	DUFERCO – A SHELTER – BELGIUM	BE-CO-Duferco
4.	TRACTEBEL – POWER STATION - BELGIUM	BE-CO-EL-OL-TE-Tractebel
5.	LAFAUT – PRIVATE HOME FAMILY JOY – BELGIUM	BE-CO-Lafaut
6.	DENDERMONDE - BACOB BANK – BELGIUM	BE-CO-OL-Bacob
7.	CNO – A COOLING TOWER - BELGIUM	BE-CO-OL-CNO
8.	SE INDUSTRIES - CONSTRUCTION AND ENGINEERING – BELGIUM	BE-CO-OL-SE Industries



9.	OPMETAAL - CHASSIS - BELGIUM	BE-CO-Opmetaal
10.	METAL CONSTRUCTIONS – VAN HEE - BELGIUM	BE-CO-Van Hee
11.	TEATRO MUNICIPAL - BRAZIL	BR-CI-CO-TC-Teatro
12.	ROHR – BUILDING INDUSTRY (SCAFFOLDING, TUBES, ...) - BRAZIL	BR-CO-Rohr
13.	TECHNICAL FAIR - BULGARIA	BG-CO-TE-TechnFair
14.	MUSEUM HOTEL IN WENDAKE - QUEBEC	CA-AM-CO-Wendake
15.	METRO VANCOUVER SKYTRAIN – CANADA	CA-CO-Metro Vancouver Skytrain
16.	DÜSSELDORF - AIRPORT - GERMANY	DE-AP-CO-HD-OL-TE-Düss.Airport
17.	SCHALKE 04 – FOOTBALL STADION - GERMANY	DE-CO-Schalke
18.	ZDF TELEVISION BROADCASTING STATION – CONSTRUCTION -GERMANY	DE-CO-OL-ZDF
19.	JEAN D'HUART - STEEL SUPPLIER AND APPLICATOR - FRANCE	FR-CO-D'Huart
20.	LE MANS CENTRE OF SPORTS AND CULTURE STEEL CONSTRUCTION FRANCE	FR-CO-OL-Le Mans
21.	RENAULT - CAR MANUFACTURING COMPANY - FRANCE	FR-CO-OL-TE-TR-Renault
22.	DUBLIN HOME – IRELAND	IE-CO-DublinHome
23.	MINISTRY OF PUBLIC WORKS – KUWAIT	KW-CO-Ministry of Public Works
24.	VENTILATION PIPES - MOROCCO	MA-CO-Ventilation shaft
25.	AUTOMATED PARKING SYSTEMS SILODAM AMSTERDAM - NETHERLANDS	NL-BR-CO-Automated Parking Systems Silodam Amsterdam
26.	CONTAINERS AND METAL GIRDERS - POLAND	PL-CO-TA-ZREMB
27.	LONDON – CARDINAL PLACE - UNITED KINGDOM	UK-CO-Cardinal Place
28.	EXXARO KUMBA GROOTGELUK COALMINE – SOUTH AFRICA	ZA-CO-TE-UN-Kumba Mine

CR: Crash barriers, metal sheet walls, railings and fences

1.	FENCE SUNNY EUROPE – BELGIUM	BE-AL-CR-HD-Fence Sunny Europe
2.	GENT - KEIZER BRIDGE - BELGIUM	BE-BR-CR-OL-Keizer Bridge
3.	DE GIEY – THE FENCE OF THE CASSTLE - BELGIUM	BE-CI-CR-OL-De Giey
4.	KLEIN KASTEELKEN – CAST IRON FENCE - BELGIUM	BE-CI-CR-OL-TC-Klein Kasteelken
5.	BLANKENBERGE - PARAVENT – BELGIUM	BE-CO-CR-MA-OL-Paravent
6.	ANTWERP - CRASH BARRIERS – BELGIUM	BE-CR-Antwerp Crash Barriers
7.	CALLUWAERTS - FENCE – BELGIUM	BE-CR-Calluwaerts
8.	CHIMAY – SIGN OVER THE HIGHWAY - BELGIUM	BE-CR-Chimay
9.	SLAUGHTERHOUSE CHARLEROI - BELGIUM	BE-CR-FO-HD-LT-OL-TE-Abattoir Charleroi
10.	HERAS – A FENCE – BELGIUM	BE-CR-OL-Heras
11.	INTERCOMMUNALE E3 - METAL CONSTRUCTIONS - BELGIUM	BE-CR-OL-TE-Intercomm.
12.	ZEEBRUGGE - UNDERGROUND CROSSING - BELGIUM	BE-CR-OL-Zeebrugge
13.	NO-PARKING POSTS BRUSSELS	BE-CR-TC-Amsterdammertjes Stad Brussel
14.	ECOVIAS – CRASH BARRIERS - BRAZIL	BR-CR-Ecovias
15.	DÜSSELDORF HIGHWAY - CRASH BARRIERS - GERMANY	DE-CR-OL-TE-Düss.Highway
16.	CRASHBARRIERS ON OUM RABII BRIDGE - MOROCCO	MA-CR-Bridge D'Oum Rabii
17.	CRASH BARRIERS - TROST – THE NETHERLANDS	NL-CR-Trost
18.	FOOTBRIDGES AND PROTECTION BARRIERS BYDGOSZEZ - POLAND	PL-BR-CR-Bydgoszez
19.	RENOVATION OF THE SIERKIERKOWSKI BRIDGE IN WARSAW, NATIONAL ROAD- POLAND	PL-BR-CR-Sierkierkowski Bridge
20.	LAND TRANSPORT AUTHORITY - GUARD RAIL PANELS - SINGAPORE	SG-CR-OL-Land Transport Authority

DI: Dipping

1.	CAMPA – STEEL PANELS - BELGIUM	BE-DI-Campa
2.	SUARNABHUMI – AIRPORT - THAILAND	TH-AP-DI-Suarnabhumiairport
3.	POLES ARMY TENTS - UNITED KINGDOM	UK-AR-DI-Poles Army Tents
4.	DURAPIPE STEEL PRODUCTION - SOUTH AFRICA	ZA-DI-OL-Durapipe steel production

**DS: Do-it Yourself****EL: Electricity, Power stations**

1.	ALCOA LTD - AUSTRALIA	AU-EL-HD-LT-PY-Alcoa
2.	TRANSEND NETWORKS - AUSTRALIA	AU-EL-PY-TE-Transend Networks
3.	TRANSGRID NETWORKS – NEW SOUTH WALES	AU-EL-PY-Transgrid Networks
4.	TRACTEBEL – POWER STATION - BELGIUM	BE-CO-EL-OL-TE-Tractebel
5.	FURNAS – ELECTRICITY PYLONS - BRAZIL	BR-EL-PY-TE-Furnas
6.	CONTRACTOR – TURBINES - CHINA	CN-EL-CWTW
7.	KRASIKOV TRANSFORMER STATION - CZECH REPUBLIC	CZ-EL-OL-PY-Krasikov
8.	TEMELIN NUCLEAR POWER PLANT - CZECH REPUBLIC	CZ-EL-OL-Temelin
9.	SLAVETICE TRANSFORMER STATION – CZECH REPUBLIC	CZ-EL-PY-Slavetice
10.	RWE - AG – ELECTRICITY COMPANY - GERMANY	DE-EL-OL-TE-RWE
11.	PLN HIGH TENSION PYLONS – INDONESIA	ID-EL-HD-PY-PLN High Tension Pylons
12.	TRANSFORMERS – SOUTH KOREA	KR-EL-Transformers
13.	TRASH RACKS POWER PLANT – SOUTH KOREA	KR-EL-IM-MA-TC-Trash rack
14.	MINISTRY OF ELECTRICITY AND WATER – KUWAIT	KW-EL-OL-TE-Ministry of Electricity and Water
15.	NATIONAL GRID CORPORATION PHILIPPINES – PHILIPPINES	PH-EL-HD-PY-National Grid Corporation Philippines
16.	SANTA RITA BALFOUR BEATTY – PHILIPPINES	PH-EL-HD-PY-Santa Rita Balfour Beatty
17.	REDE ELECTICA NACIONAL POWER STATIONS AND SUPPLY LINES - PORTUGAL	PT-EL-OL-PY-TE-REN
18.	ENERGOPROJECT – TRANSMISSION TOWERS - QATAR	QA-EL-OL-PY-TE-Energoproject
19.	ELECTRICA - NATIONAL ELECTRICITY SUPPLIER - ROMANIA	RO-EL-OL-TE-Electricia
20.	ARAD POWER STATION - ROMANIA	RO-EL-PY-Arad
21.	GLOW ENERGY PUBLIC COMPANY MONOPOLES - THAILAND	TH-EL-HD-PY-Glow Energy Public Company Monopoles
22.	FORMOSA PLASTICS COMPANY TRANSMISSION TOWERS - TAIWAN	TW-EL-HD-PY-TE-Formosa
23.	POWER COMPANY – POWER PYLONS - TAIWAN	TW-EL-HD-OL-PY-TE-TPC
24.	POWER PLANTS - TAIWAN	TW-EL-TC-ZC-Power Plants
25.	CHERNOBYL NUCLEAR POWER STATION - UKRAINE	UA-EL-Chernobyl
26.	KIEV ENERGO POWER PLANT - UKRAINE	UA-EL-HD-PY-Kiev Energo
27.	ZUYEVSKAYA THERMAL POWER PLANT - UKRAINE	UA-EL-Zuyevskaya

FO: Food

1.	SLAUGHTERHOUSE CHARLEROI - BELGIUM	BE-CR-FO-HD-LT-OL-TE-Abattoir Charleroi
2.	QUARTES CATTLE FEED COMPANY - BELGIUM	BE-FO-HD-OL-TA-TE-Quartes
3.	IGLO OLA – METAL STRUCTURES - BELGIUM	BE-FO-Iglo Ola
4.	SLAUGHTERHOUSES - BELGIUM	BE-FO-OL-Goossens
5.	DOSSCHE – CATTLE FEED TANKS - BELGIUM	BE-FO-TA-Dossche
6.	VERDEGEM CATTLE FEED COMPANY - BELGIUM	BE-FO-TE-Verdegem
7.	CATTLE- AND PIGFARM - FINLAND	FI-AG-FO-HD-Cattle and Pig farm
8.	SLAUGHTERHOUSE NÎMES MARCHÉ GARE - FRANCE	FR-FO-Nîmes

HD: Applications on Hot-Dip

1.	ALCOA LTD - AUSTRALIA	AU-EL-HD-LT-PY-Alcoa
2.	CULVERTS - AUSTRALIA	AU-HD-HU-IM-UN-Culverts
3.	FENCE SUNNY EUROPE – BELGIUM	BE-AL-CR-HD-Fence Sunny Europe
4.	SLAUGHTERHOUSE CHARLEROI – BELGIUM	BE-CR-FO-HD-LT-OL-TE-AbattoirCharleroi
5.	QUARTES CATTLE FEED COMPANY - BELGIUM	BE-FO-HD-OL-TA-TE-Quartes



6.	DE LIJN – PYLONS – BELGIUM	BE-HD-OL-PY-RW-De Lijn
7.	SILOS DE COCK – BELGIUM	BE-HD-TA-De Cock
8.	SILO'S DUBO DEUREN – ERPE-MERE	BE-HD-TA-Silo's Dubo Deuren
9.	RENOVATION SCHOOL SAINT-JOSEPH – LEVIS QUEBEC	CA-AL-AM-HD-Saint-Joseph
10.	USNS ZEUS CABLESHIP - USA	CA-AR-MA-HD-SH-USNS Zeus Cableship
11.	MINISTRY OF TRANSPORT - QUEBEC	CA-HD-TE-Ministry of transport
12.	EWOS STORAGE TANKS - CHILE	CL-HD-TA-Ewos Storage Tanks
13.	GUANGZOU NEW BAIYUN AIRPORT - CHINA	CN-AP-HD-Baiyun
14.	CHONGQING BROADCASTING COMPANY - CHINA	CN-HD-PY-Chong Broad
15.	ICE HIGH TENSION PYLONS – COSTA RICA	CR-HD-PY-TC-ICE High Tension Pylons
16.	ICE TEST APPLICATION – COSTA RICA	CR-HD-PY-TC-ICE Test Application
17.	DÜSSELDORF AIRPORT - GERMANY	DE-AP-CO-HD-OL-TE-Düss. Airport
18.	CATTLE- AND PIGFARM - FINLAND	FI-AG-FO-HD-Cattle and Pigfarm
19.	DIRECTION DEPARTEMENTALE DE L'EQUIPEMENT, VENDEE SEA BUOYS – FRANCE	FR-HD-IM-MA-OL-TE-Sea Buoys
20.	ZINGA ANTICORROSION DISTRIBUTOR - FRANCE	FR-HD-TE-Guerin
21.	OHENE DJAN SPORT STADIUM LIGHT POLES - GHANA	GH-AM-HD-PY-OheneDjanstadium
22.	PLN HIGH TENSION PYLONS – INDONESIA	ID-EL-HD-PY-PLN High Tension Pylons
23.	GRAIN SILOS NADOR CEREALES – MOROCCO	MA-AG-HD-TA-Grain Silos Nador Cereales
24.	TENAGA NASIONAL BERHAD - PYLONS - MALAYSIA	MY-HD-PY-Tenaga Nasional Berhad
25.	PHCN - POWER HOLDING COMPANY OF NIGERIA - NIGERIA	NG-HD-PY-PHCN
26.	NATIONAL GRID CORPORATION PHILIPPINES – PHILIPPINES	PH-EL-HD-PY-National Grid Corporation Philippines
27.	SANTA RITA BALFOUR BEATTY – PHILIPPINES	PH-EL-HD-PY-Santa Rita Balfour Beatty
28.	YUZHNY GREENHOUSE FARM - RUSSIA	RU-AG-HD-Yuzhny
29.	GLOW ENERGY PUBLIC COMPANY MONOPOLES - THAILAND	TH-EL-HD-PY-Glow Energy Public Company Monopoles
30.	LIGHT POLES – DON MUANG TOLL WAY – THAILAND	TH-HD-PY-Don Muang Toll
31.	FORMOSA PLASTICS COMPANY TRANSMISSION TOWERS - TAIWAN	TW-EL-HD-PY-Formosa
32.	POWER COMPANY – POWER PYLONS - TAIWAN	TW-EL-HD-OL-PY-TE-TPC
33.	EDEN GREENHOUSE DOME – UNITED KINGDOM	UK-AG-HD-HT-TP-Eden
34.	CULVERTS – UNITED KINGDOM	UK-HD-HU-IM-UN-Culverts
35.	KIEV ENERGO POWER PLANT - UKRAINE	UA-EL-HD-PY-Kiev Energo
36.	US ARMY -UNITED STATES OF AMERICA	US-AR-HD-OL-TE-TR-US Army
37.	LIGHT POLES, TERMINAL CUENCA DEL PLATA, PORT OF MONTEVIDEO, URUGUAY	UY-HD-PY-Katoennatie Light Pole

HT: High temperatures

1.	FLOREAC – COAL FUNNEL – BELGIUM	BE-AZ-HT-OL-Floreac
2.	CARSID - BELGIUM	BE-AZ-HT-OL-TE-Carsid
3.	SULTAM – CHIMNEY - ISRAEL	IL-AZ-HT-OL-Sultam
4.	DERBY – TURBINE EXHAUST STACKS - UNITED KINGDOM	UK-AZ-HT-OL-TE-Derby
5.	EDEN GREENHOUSE DOME – UNITED KINGDOM	UK-AG-HD-HT-TP-Eden
6.	PORT ELISABETH ELECTRICITY DEPARTMENT - FUEL TANKS AND EXHAUST – SOUTH AFRICA	ZA-AZ-HT-TA-Port.El.

HU: Humidity and vapour

1.	CULVERTS - AUSTRALIA	AU-HD-HU-IM-UN-Culverts
2.	J.M. INDUSTRIAL – RACKS, METAL EQUIPMENT AND STRUCTURES IN BRICK MANUFACTURING FACTORIES - BELGIUM	BE-AZ-CE-HU-OL-TE-JM Ind.
3.	BASF – CHEMICAL COMPANY - BELGIUM	BE-HU-PE-TA-TE-BASF
4.	GREENHOUSE - FINLAND	FI-HU-TP-Greenhouse

5.	ARMCE TUBES – FRANCE/FINLAND/NORWAY	FR.FI.NO-HU-IM-UN-Armco tubes
6.	CULVERTS - UNITED KINGDOM	UK-HD-HU-IM-UN-Culverts

IM: Immersion

1.	CULVERTS - AUSTRALIA	AU-HD-HU-IM-UN-Culverts
2.	DE BRANDT – FENDER CONSTRUCTIONS - BELGIUM	BE-BR-IM-OL-De Brandt
3.	ARMCE TUBES – FRANCE/FINLAND/NORWAY	FR.FI.NO-HU-IM-UN-Armco tubes
4.	DIRECTION DEPARTEMENTALE DE L'EQUIPEMENT, VENDEE SEA BUOYS – FRANCE	FR-HD-IM-MA-OL-TE-Sea Buoys
5.	BANGOR PIER – IMMERSED PILES - IRELAND	IE-IM-MA-Bangor
6.	KILLYBEGS FISHING PIER - IMMERSED PIER LEGS - IRELAND	IE-IM-MA-TE-Killybegs pier
7.	SLUICE GATES WEST BENGAL – INDIA	IN-IM-Sluice gates West Bengal
8.	TRASH RACKS POWER PLANT – SOUTH KOREA	KR-EL-IM-MA-TC-Trash rack
9.	SUBIC WATER SLUICE GATE – PHILIPPINES	PH-IM-TP-Subic sluice gate
10.	SEA BUOYS - SENEGAL	SN-IM-MA-Sea Buoy
11.	CULVERTS - UNITED KINGDOM	UK-HD-HU-IM-UN-Culverts

LT: Low temperatures

1.	ALCOA LTD - AUSTRALIA	AU-EL-HD-LT-PY-Alcoa
2.	SLAUGHTERHOUSE CHARLEROI - BELGIUM	BE-CR-FO-HD-LT-OL-TE-Abattoir Charleroi
3.	BONNETS OF SRC BUNDLES - BELGIUM	BE-LT-TE-SPX Cooling Technologies
4.	METRO – MINSK – BELARUS	BY-AM-LT-TC-Metro

MA: Marine environments and offshore

1.	SIGNAGE GANTRIES BRIBIE ISLAND - AUSTRALIA	AU-MA-PY- Sign Posts Bribie Island
2.	BLANKENBERGE - PARAVENT – BELGIUM	BE-CO-CR-MA-OL-Paravent
3.	DECLOEDT – DREDGING COMPANY - BELGIUM	BE-MA-OL-TE-Decloedt
4.	SCHEIRENS FISHING VESSEL - BELGIUM	BE-MA-Sheirens
5.	BLOMMAERT - SHIP HATCHES - BELGIUM	BE-MA-SH-BlommaertHatches
6.	DRILLING PLATFORM - BRAZIL	BR-MA-PE-Polvo
7.	USNS ZEUS CABLESHIP - USA	CA-AR-MA-HD-SH-USNS Zeus Cableship
8.	BC FERRY TERMINALS - CANADA	CA-BR-MA-OL-TE-BC Ferry
9.	PACIFIC GRAIN ELEVATOR - CANADA	CA-CN-MA-Pacific Grain Elevator
10.	CITY OF BURNABY – A SLOPE - CANADA	CA-MA-TE-CityOfBurnaby
11.	NATIONAL GRAND THEATRE BEIJING - CHINA	CN-AM-MA-Theatre Beijing
12.	YUEHAI PASSAGE TRAIN FERRY PIER TERMINAL - CHINA	CN-AZ-MA-RW-YuehaiTrainFerry
13.	EL SALAAM BRIDGE - EGYPT	EG-BR-MA-PI-TE-Salaam
14.	DIRECTION DEPARTEMENTALE DE L'EQUIPEMENT, VENDEE SEA BUOYS – FRANCE	FR-HD-IM-MA-OL-TE-Sea Buoys
15.	TRANSOCEAN SEDCO FOREX – OFFSHORE DRILLING COMPANY INDONESIA	ID-MA-PE-TransSedcoForex
16.	BANGOR PIER – IMMERSED PILES - IRELAND	IE-IM-MA-Bangor
17.	KILLYBEGS FISHING PIER - IMMERSED PIER LEGS - IRELAND	IE-IM-MA-TE-Killybegs pier
18.	TRASH RACKS POWER PLANT – SOUTH KOREA	KR-EL-IM-MA-TC-Trash rack
19.	SHELL TANK - MOROCCO	MA-MA-PE-TA-Shell
20.	NATIONAL ELECTRICITY COMPANY - MOROCCO	MA-MA-PI-ONE
21.	SHELL - PETROCHEMICAL COMPANY - NETHERLANDS	NL-MA-PE-TE-Shell
22.	FINNMARK BRIDGE – NORWAY	NO-BR-MA-OL-Finnmark Bridge
23.	HELL BRIDGE – NORWAY	NO-BR-MA-OL-Hell Bridge
24.	KALVOYA BRIDGE - NORWAY	NO-BR-MA-OL-TE-Kalvoja
25.	ST. PAUL – JETTY – REUNION	RE-BR-MA-St. Paul



26.	SEA BUOYS - SENEGAL	SN-IM-MA-Sea Buoy
27.	STATIONARY DOCK - SENEGAL	SN-MA-Dry Dock
28.	OFFICE TOGOLAIS DES PHOSPHATES PHOSPHATE MINE OFFSHORE CHARGING CRANES - TOGO	TG-CN-MA-OL-PE-Off. Togolais
29.	YACHT WATER TANKS - UNITED KINGDOM	UK-MA-OL-Adela
30.	OFFSHORE COMPANIES – UNITED KINGDOM	UK-MA-Offshore
31.	SHIPS – UNITED KINGDOM	UK-MA-SH-Ships
32.	VECTOR INTERNATIONAL – OFFSHORE NUTS AND BOLTS – UNITED KINGDOM	UK-MA-NB-PE-TE-Vector

NB: Nuts and bolts

1.	VECTOR INTERNATIONAL – OFFSHORE NUTS AND BOLTS – UNITED KINGDOM	UK-MA-NB-PE-TE-Vector
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OL: Applications ≥ 10 years

1.	DIRK – AGRICULTURAL MACHINERY– BELGIUM	BE-AG-OL-TE-Martens
2.	GENT KIOSK - BELGIUM	BE-AM-CO-OL-GentKiosk
3.	NATO – NATO PUMP STATIONS - BELGIUM	BE-AR-OL-PI-TE-NATO
4.	BELGIAN ARMY - NAVY SHIPS AND ANTENNA - BELGIUM	BE-AR-OL-PY-SH-Belgian Army
5.	J.M. INDUSTRIAL - BELGIUM	BE-AZ-CE-HU-OL- TE-JM-Ind
6.	FLOREAC – COAL FUNNEL - BELGIUM	BE-AZ-HT-OL-Floreac
7.	CARSID - BELGIUM	BE-AZ-HT-OL-TE-Carsid
8.	KEIZER BRIDGE GHENT - BELGIUM	BE-BR-CR-OL-Keizer Bridge
9.	DE BRANDT - BELGIUM	BE-BR-IM-OL-DeBrandt
10.	MELLE BRIDGE - BELGIUM	BE-BR-OL-TC-Melle Bridge
11.	EUROPEAN TECHNICAL ASSOCIATION FOR PROTECTIVE COATINGS - BELGIUM	BE-BR-OL-TE-Etapc
12.	WEGENFONDS BRIDGE - BELGIUM	BE-BR-OL-Wegenfonds
13.	HOLCIM GRANULATS - CEMENT FACTORY - BELGIUM	BE-CE-OL-TE-Holcim
14.	DE GIEY - BELGIUM	BE-CI-CR-OL-De Giey
15.	KLEIN KASTEELKEN – CAST IRON FENCE - BELGIUM	BE-CI-CR-OL-TC-Klein Kast.
16.	ANTWERP PORT CRANES - BELGIUM	BE-CN-OL-AntwerpPortCranes
17.	HARBOUR OF GENK - BELGIUM	BE-CN-OL-TE-KHG
18.	BLANKENBERGE PARAVENT – BELGIUM	BE-CO-CR-MA-OL-Paravent
19.	TRACTEBEL – POWER STATION - BELGIUM	BE-CO-EL-OL-TE-Tractebel
20.	BACOB BANK DENDERMONDE - BELGIUM	BE-CO-OL-Bacob
21.	CNO - A COOLING TOWER - BELGIUM	BE-CO-OL-CNO
22.	SE INDUSTRIES - BELGIUM	BE-CO-OL-SE Industries
23.	SLAUGHTERHOUSE CHARLEROI - BELGIUM	BE-CR-FO-HD-LT-OL-TE-AbattoirCharleroi
24.	HERAS - A FENCE - BELGIUM	BE-CR-OL-Heras
25.	INTERCOMMUNALE E3 - METAL CONSTRUCTIONS - BELGIUM	BE-CR-OL-TE-Intercomm
26.	ZEEBRUGGE UNDERGROUND CROSSING - BELGIUM	BE-CR-OL-Zeebrugge
27.	CATTLE FEED COMPANY - BELGIUM	BE-FO-HD-OL-TA-TE-Quartes
28.	SLAUGHTERHOUSES - BELGIUM	BE-FO-OL-Goossens
29.	DE LIJN – PYLONS - BELGIUM	BE-HD-OL-PY-RW-De Lijn
30.	DECLOEDT – DREDGING COMPANY - BELGIUM	BE-MA-OL-TE-Decloedt
31.	TOTAL PETROCHEMICAL FELUY - PIPELINES - BELGIUM	BE-OL-PE-PI-TE-Fina
32.	WOLF OIL CORPORATION - BELGIUM	BE-OL-PE-TA-Wolf oil
33.	KLUIZEN WATER PURIFICATION STATION - BELGIUM	BE-OL-PI-TC-Kluizen
34.	ASSOCIATION COMPANY OF PRODUCTION OF ELECTRICITY - S.P.E.- BELGIUM	BE-OL-PI-TE-SPE
35.	PIT COAL MINE - BELGIUM	BE-OL-PI-TE-UN-Kemp.Steenk



36.	STORA ENSO PAPER MILL - BELGIUM	BE-OL-PP-TE-Stora Enso
37.	PUBLIC FOUNTAIN IN GHENT - BELGIUM	BE-OL-PW-TC-TE-Gent fount.
38.	ELECTRABEL - BELGIUM	BE-OL-PY-Electrabel
39.	CITA – RAILWAY WAGON - BELGIUM	BE-OL-RW-TE-CITA
40.	MERCATOR – SAILING SHIP - BELGIUM	BE-OL-SH-TC-Mercator
41.	DE GRAEVE SHIPYARDS - BELGIUM	BE-OL-SH-TC-TE-De Graeve
42.	WESTHINDER – LIGHTSHIP - BELGIUM	BE-OL-SH-TC-Westhinder
43.	DREDGING COMPANIES DECLOEDT - BELGIUM	BE-OL-SH-TE-Dredging
44.	NARAI – SAILING SHIP - BELGIUM	BE-OL-SH-TE-Narai
45.	RAILWAY OFFICE - BENIN	BJ-BR-OL-RW-Chemins Fer
46.	BC FERRY TERMINALS - CANADA	CA-BR-MA-OL-TE-BC Ferry
47.	CONFEDERATION BRIDGE - CANADA	CA-BR-OL-Confederation
48.	OVERLANDER BRIDGE - CANADA	CA-BR-OL-TE-Overlander
49.	BLANICE RIVER BRIDGE - CZECH REPUBLIC	CZ-BR-OL-Blanice
50.	KRASIKOV TRANSFORMER STATION - CZECH REPUBLIC	CZ-EL-OL-PY-Krasikov
51.	TEMELIN NUCLEAR POWER PLANT - CZECH REPUBLIC	CZ-EL-OL-Temelin
52.	DÜSSELDORF AIRPORT - GERMANY	DE-AP-CO-HD-OL-TE-Düss.Airport
53.	SCHWENK – CEMENT FACTORY - GERMANY	DE-CE-OL-TE-Schwenk
54.	ZDF TELEVISION BROADCASTING STATION - GERMANY	DE-CO-OL-ZDF
55.	DÜSSELDORF HIGHWAY - CRASH BARRIERS - GERMANY	DE-CR-OL-TE-Düss. Highway
56.	RWE - AG – ELECTRICITY COMPANY - GERMANY	DE-EL-OL-TE-RWE
57.	STROM UND HAUFENBAU HAMBURG HARBOUR COMPAGNY - GERMANY	DE-OL-PE-TA-TE-Strom
58.	LE MANS CENTRE OF SPORTS AND CULTURE STEEL CONSTRUCTION - FRANCE	FR-CO-OL-Le Mans
59.	RENAULT - CAR MANUFACTURING COMPANY - FRANCE	FR-CO-OL-TE-TR-Renault
60.	DIRECTION DEPARTEMENTALE DE L'EQUIPEMENT - FRANCE	FR-HD-IM-MA-OL-TE-Sea Buoys
61.	SOCIETE NATIONALE DE CHEMINS DE FER - FRANCE	FR-OL-RW-TE-SNCF
62.	SULTAM – CHIMEY - ISRAEL	IL-AZ-HT-OL-Sultam
63.	ABADAN & SHIRAZ REFINERIES - IRAN	IR-OL-PE-TE-Abadan Shiraz
64.	MINISTRY OF PUBLIC WORKS - KUWAIT	KW-CO-OL-TE-Ministry of Public Works
65.	MINISTRY OF ELECTRICITY AND WATER - KUWAIT	KW-EL-OL-TE-Ministry of Electricity and Water
66.	FINNMARK BRIDGE – NORWAY	NO-BR-MA-OL-Finnmark Bridge
67.	HELL BRIDGE – NORWAY	NO-BR-MA-OL-Hell Bridge
68.	KALVOYA BRIDGE - NORWAY	NO-BR-MA-OL-TE-Kalvoja
69.	RYSTRAUM MOTOR SHIP - NORWAY	NO-OL-SH-TE-Rystraum
70.	REDE ELECTICA NACIONAL - PORTUGAL	PT-EL-OL-PY-TE-REN
71.	ENERGOPROJECT – TRANSMISSION TOWERS - QATAR	QA-EL-OL-PY-TE-Energo
72.	ELECTRICA - NATIONAL ELECTRICITY SUPPLIER - ROMANIA	RO-EL-OL-TE-Electrica
73.	SNCFR - ROMANIAN RAILWAYS - ROMANIA	RO-OL-RW-TE-SNCFR
74.	LAND TRANSPORT AUTHORITY GUARD RAIL PANELS - SINGAPORE	SG-CR-OL-Land Transp. Auth.
75.	PHOSPHATE MINE OFFSHORE CHARGING CRANES - TOGO	TG-CN-MA-OL-PE-Off. Togolais
76.	POWER COMPANY – POWER PYLONS - TAIWAN	TW-EL-HD-OL-PY-TE-TPC
77.	DERBY – TURBINE EXHAUST STACKS - UNITED KINGDOM	UK-AZ-HT-OL-TE-Derby
78.	NEWARK MARINA BRIDGE - UNITED KINGDOM	UK-BR-OL-Newark Mar.
79.	YACHT WATER TANKS - UNITED KINGDOM	UK-MA-OL-Adela
80.	LONDON UNDERGROUND - UNITED KINGDOM	UK-OL-RW-TE-UN-London Underground
81.	US ARMY - UNITED STATES OF AMERICA	US-AR-HD-OL-TE-TR-US Army
82.	LAFARGE - SOUTH AFRICA	ZA-CE-OL-Lafarge



83. DURAPIPE STEEL PRODUCTION - SOUTH AFRICA

ZA-DI-OL-Durapipe steel production

PE: Chemical, Petrochemicals

1.	BASF – CHEMICAL COMPANY - BELGIUM	BE-HU-PE-TA-TE-BASF
2.	FINA CHEMICALS - PIPELINES - BELGIUM	BE-OL-PE-PI-TE-Fina
3.	WOLF OIL CORPORATION - BELGIUM	BE-OL-PE-TA-Wolf oil
4.	VAN BROEKHOVENS - DIESEL STORAGE TANKS – BELGIUM	BE-PE-TA-TE-Van Broekhoven
5.	FLUXYS - BELGIAN LARGEST GAS SUPPLIER - BELGIUM	BE-PE-TE-Fluxys
6.	DRILLING PLATFORM - BRAZIL	BR-MA-PE-Polvo
7.	KOBRIN OIL PUMPING STATION - BELARUS	BY-PE-TA-TC-Kobrin
8.	SHANGHAI PRAXAIR YIDIAN - GAS PROCESSING COMPANY - CHINA	CN-PE-Praxair
9.	SHANGHAI DOVECHEM BOMTA TERMINAL - CHINA	CN-PE-TA-Bomta
10.	STROM UND HAUFENBAU HAMBURG HARBOUR COMPAGNY - GERMANY	DE-OL-PE-TA-TE-Strom
11.	ABU QIR FERTILIZERS - EGYPT	EG-PE-AbuQirFert.
12.	TRANSOCEAN SEDCO FOREX – OFFSHORE DRILLING COMPANY INDONESIA	ID-MA-PE-TransSedcoForex
13.	ABADAN & SHIRAZ REFINERIES - IRAN	IR-OL-PE-TE-Abadan Shiraz
14.	NATIONAL IRANIAN GAS COMPANY - REBARS - IRAN	IR-PE-RE-NIGC
15.	KUWAIT OIL COMPANY - KUWAIT	KW-PE-TE-KOC
16.	PETROCHEMICAL COMPANY - NETHERLANDS	NL-MA-PE-TE-Shell
17.	SHELL TANK - MOROCCO	MA-MA-PE-TA-Shell
18.	OFFICE TOGOLAIS DES PHOSPHATES PHOSPHATE MINE OFFSHORE CHARGING CRANES - TOGO	TG-CN-MA-OL-PE-Off.Togolais
19.	VECTOR INTERNATIONAL – OFFSHORE NUTS AND BOLTS – UNITED KINGDOM	UK-MA-NB-PE-TE-Vector
20.	CLAMPS CCS – UNITED KINGDOM	UK-PE-PI-Clamps CCS
21.	OIL STORAGE TANK - EXXON MOBILE - UNITED KINGDOM	UK-PE-TA-Exxon Mobile

PI: Pipelines

1.	NATO – NATO PUMP STATIONS - BELGIUM	BE-AR-OL-PI-NATO
2.	FINA CHEMICALS - PIPELINES - BELGIUM	BE-OL-PE-PI-TE-Fina
3.	KLUIZEN WATER PURIFICATION STATION – BELGIUM	BE-OL-PI-TC-Kluizen
4.	ASSOCIATION COMPANY OF PRODUCTION OF ELECTRICITY S.P.E – BELGIUM	BE-OL-PI-TE-SPE
5.	KEMPENSE STEENKOOLMIJNEN – PIT COAL MINE - BELGIUM	BE-OL-PI-TE-UN-Kemp.Steenk.
6.	EL SALAAM BRIDGE - EGYPT	EG-BR-MA-PI-TE-Salaam
7.	GASCO COMPANY UNDERGROUND PIPELINES - EGYPT	EG-PI-UN-Gasco
8.	METRONCO – PIPELINES - GHANA	GH-PI-Metronco
9.	SEOUL AIR CONDITIONING – SOUTH KOREA	KR-AL-PI-Seoul Air Conditioning
10.	NATIONAL ELECTRICITY COMPANY - MOROCCO	MA-MA-PI-ONE
11.	GAS PIPELINES - POLAND	PL-PI-Wtoctawek
12.	TEMVAR BRASOV BRIDGE – ROMANIA	RO-BR-PI-Temvar Brasov Bridge
13.	MOSVODOKANAL – WATER SUPPLIER - RUSSIA	RU-PI-Mosvodo
14.	CLAMPS CCS – UNITED KINGDOM	UK-PE-PI-Clamps CCS

PP: Pulp and paper mills

1.	STORA ENSO PAPER MILL – BELGIUM	BE-OL-PP-TE-Stora Enso
2.	PULP AND PAPER INDUSTRY - CANADA	CA-PP-Pulp and Paper Industry

PW: Potable water

1.	GHENT - PUBLIC FOUNTAIN – BELGIUM	BE-OL-PW-TC-TE-Gent fount.
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2.	RUBLEVO WATER INTAKE PLANT - RUSSIA	RU-PW-RE-Rublevo
3.	FURMANITE – A REFERENCE LETTER - UNITED KINGDOM	UK-PW-TE-Furmanite
4.	BRAITHWAITE TANK – UNITED KINGDOM	UK-PW-TA-Braithwaite tank

PY: Pylons, light poles, towers and wind mills

1.	ALCOA LTD - AUSTRALIA	AU-EL-HD-LT-PY-Alcoa
2.	TRANSEND NETWORKS - AUSTRALIA	AU-EL-PY-TE-Transend Networks
3.	TRANSGRID NETWORKS – NEW SOUTH WALES	AU-EL-PY-Transgrid Networks
4.	SIGNAGE GANTRIES BRIBIE ISLAND - AUSTRALIA	AU-MA-PY-Sign Posts Bribie Island
5.	ENERGEX - PYLONS - AUSTRALIA	AU-PY-Energex
6.	BAKCELL COMMUNICATION TOWER - AZERBAIJAN	AZ-PY-TE-Bakcell Communication Tower
7.	BELGIAN ARMY - NAVY SHIPS AND ANTENNA - BELGIUM	BE-AR-OL-PY-SH-Belgian Army
8.	DE LIJN – PYLONS – BELGIUM	BE-HD-OL-PY-RW-De Lijn
9.	ELECTRABEL – ELECTRICITY COMPANY - BELGIUM	BE-OL-PY-Electrabel
10.	MULLEM WIND MILL – BELGIUM	BE-PY-Mullem Mill
11.	FURNAS – ELECTRICITY PYLONS - BRAZIL	BR-EL-PY-TE-Furnas
12.	MOBIMETAL – TELECOMMUNICATION PYLONS - CONGO	CD-PY-TE-Mobimetal
13.	PYLONS SONEL - CAMEROON	CM-PY-Sonel
14.	CHONGQING BROADCASTING COMPANY - CHINA	CN-HD-PY-Chong Broad
15.	GUANGZHOU TV TOWER - CHINA	CN-PY-Guangzhou TV tower
16.	ICE HIGH TENSION PYLONS – COSTA RICA	CR-HD-PY-TC-ICE High Tension Pylons
17.	ICE TEST APPLICATION – COSTA RICA	CR-HD-PY-TC-ICE Test Application
18.	KRASIKOV TRANSFORMER STATION - CZECH REPUBLIC	CZ-EL-OL-PY-Krasikov
19.	SLAVETICE TRANSFORMER STATION – CZECH REPUBLIC	CZ-EL-PY-Slavitice
20.	KECHABIA - ALGERIA	DZ-PY-Kechabia
21.	OHENE DJAN SPORT STADIUM LIGHT POLES - GHANA	GH-AM-HD-PY-OheneDjanStadium
22.	PLN HIGH TENSION PYLONS – INDONESIA	ID-EL-HD-PY-PLN High Tension Pylons
23.	LIGHT POLES OF THE ANFA AVENUE - MOROCCO	MA-PY-Anfa
24.	TENAGA NASIONAL BERHAD - PYLONS - MALAYSIA	MY-HD-PY-Tenaga Nasional Berhad
25.	PHCN - POWER HOLDING COMPANY OF NIGERIA - NIGERIA	NG-HD-PY-PHCN
26.	NATIONAL GRID CORPORATION PHILIPPINES – PHILIPPINES	PH-EL-HD-PY-National Grid Corporation Philippines
27.	SANTA RITA BALFOUR BEATTY – PHILIPPINES	PH-EL-HD-PY-Santa Rita Balfour Beatty
28.	REDE ELECTICA NACIONAL POWER STATIONS AND SUPPLY LINES - PORTUGAL	PT-EL-PY-TE-REN
29.	ENERGOPROJECT – TRANSMISSION TOWERS - QATAR	QA-EL-OL-PY-TE-Energ
30.	ARAD POWER STATION - ROMANIA	RO-EL-PY-Arad
31.	MUNTENIA – PYLONS - ROMANIA	RO-PY-TE-Muntenia
32.	PSA LIGHTING MASTS	SG-PY-PSA Lighting Masts
33.	GLOW ENERGY PUBLIC COMPANY MONOPOLES - THAILAND	TH-EL-HD-PY-Glow Energy Public Company Monopoles
34.	LIGHT POLES – DON MUANG TOLL WAY – THAILAND	TH-HD-PY-Don Muang Toll
35.	FORMOSA PLASTICS COMPANY TRANSMISSION TOWERS - TAIWAN	TW-EL-HD-PY-TE-Formosa
36.	POWER COMPANY – POWER PYLONS - TAIWAN	TW-EL-HD-OL-PY-TE-TPC
37.	TAIWAN POWER COMPANY - ZEPHYROS WIND MILLS - TAIWAN	TW-PY-ZC-Zephyros
38.	KIEV ENERGO POWER PLANT - UKRAINE	UA-EL-HD-PY-Kiev Energo
39.	KIEV ROAD ADMINISTRATION - UKRAINE	UA-PY-Kiev Road Administration
40.	NEXRAD TOWER – UNITED STATES OF AMERICA	US-AR-PY-Nexrad Tower
41.	LIGHT POLES, TERMINAL CUENCA DEL PLATA, PORT OF MONTEVIDEO, URUGUAY	UY-HD-PY-Katoennatie Light Pole
42.	HAI PHONG TOWER - PYLONS - VIETNAM	VN-PY-Hai Phong Tower

**RE: Rebars**

1.	TRANSFO ZWEVEGEM - BELGIUM	BE-RE-Transfo
2.	HANGZHOU BAY BRIDGE - CHINA	CN-BR-RE-Hangzhou Bay
3.	CONTRACTOR – TURBINES - CHINA	CN-RE-RW-CWTW
4.	NATIONAL IRANIAN GAS COMPANY - REBARS - IRAN	IR-PE-RE-NIGC
5.	REBAR SPRAYING INSTALLATION TEHRAN HARA - IRAN	IR-AS-RE-AutomSprayLine
6.	CHABAHAR PORT – REBARS - IRAN	IR-RE-TE-Chabahar
7.	OMRAN SAHEL INSTITUTE – REBARS - IRAN	IR-RE-TE-OmranSahellnst.
8.	PERLITE CONSTRUCTION - SULFUR EXPORT WHARF - IRAN	IR-RE-TE-PerliteConstr
9.	RAHE SAHEL INSTITUTE – REBARS - IRAN	IR-RE-TE-RaheSahellnst.
10.	PARS OIL & GAS CO. – REBARS - IRAN	IR-RE-TE-Pars Oil & Gas Co.
11.	RUBLEVO WATER INTAKE PLANT - RUSSIA	RU-PW-RE-Rublevo
12.	BUILDING WITH REBARS - RUSSIA	RU-RE-Building

RW: Railway

1.	QUEENSLAND RAILWAY BRIDGES - AUSTRALIA	AU-BR-RW-QR Railway Bridges
2.	DE LIJN – PYLONS – BELGIUM	BE-HD-OL-PY-RW-De Lijn
3.	CITA – RAILWAY WAGON - BELGIUM	BE-OL-RW-TE-Cita
4.	RAILWAY OFFICE - BENIN	BJ-BR-OL-RW-Chemins Fer
5.	DORBRAS RAILWAY COMPANY - BRAZIL	BR-RW-TE-Dorbras
6.	CAMRAIL – RAILWAY - CAMEROON	CM-RW-Camrail
7.	YUEHAI PASSAGE TRAIN FERRY PIER TERMINAL - CHINA	CN-AZ-MA-RW-YuehaiTrainFerry
8.	CONTRACTOR – TURBINES - CHINA	CN-RE-RW-CWTW
9.	MAGLEV TRANSRAPIP RAILWAY - CHINA	CN-RW-Maglev
10.	SOCIETE NATIONALE DE CHEMINS DE FER - FRANCE	FR-OL-RW-TE-SNCF
11.	SNCFR - ROMANIAN RAILWAYS - ROMANIA	RO-RW-OL-TE-SNCFR
12.	TELEGONDOLA – ROMANIA	RO-RW-TE-Telegondola
13.	TRAIN CARRIAGE TRANSRAIL - SENEGAL	SN-RW-TA-Train Wagon
14.	LONDON UNDERGROUND – UNITED KINGDOM	UK-OL-RW-TE-UN-London Underground
15.	LONDON UNDERGROUND – UNITED KINGDOM	UK-OL-RW-TE-Underground

SH: Ships

1.	BELGIAN ARMY - NAVY SHIPS AND ANTENNA - BELGIUM	BE-AR-OL-PY-SH-Belgian Army
2.	BLOMMAERT SHIP HATCHES - BELGIUM	BE-MA-SH-BlommaertHatches
3.	MERCATOR – SAILING SHIP - BELGIUM	BE-OL-SH-TC-Mercator
4.	DE GRAEVE SHIPYARDS - BELGIUM	BE-OL-SH-TC-TE-De Graeve
5.	WESTHINDER – LIGHTSHIP - BELGIUM	BE-OL-SH-TC-Westhinder
6.	DREDGING COMPANIES DECLOEDT, JAN DE NUL & DREDGING INTERNATIONAL - BELGIUM	BE-OL-SH-TE-Dredging
7.	NARAI – SAILING SHIP - BELGIUM	BE-OL-SH-TE-Narai
8.	COBBAERT SHIP - BELGIUM	BE-SH-Cobbaert
9.	DUPON BOAT - BELGIUM	BE-SH-Dupon
10.	FULTON MARINE - BELGIUM	BE-SH-Fulton
11.	BONNE INDUSTRIAL - SHIPS - BELGIUM	BE-SH-TC-Bonne Industrial
12.	SHIP - BELGIUM	BE-SH-TE-West-Vl.
13.	WALTZING MATHILDE SHIP - BELGIUM	BE-SH-Waltzing
14.	USNS ZEUS CABLESHIP - USA	CA-AR-MA-HD-SH-USNS Zeus Cableship
15.	EXXON MOBIL PLATFORM - MALAYSIA	MY-SH-ExxonMobil
16.	RYSTRAUM MOTOR SHIP - NORWAY	NO-OL-SH-TE-Rystraum



17.	COAL TRANSPORT SHIP - TAIWAN	TW-SH-TC-Coal Tr Ship
18.	SHIPS – UNITED KINGDOM	UK-MA-SH-Ships
19.	ITCHEN MARINE – UNITED KINGDOM	UK-SH-Itchen

TA: Tanks, containers and silos

1.	PAESEN - CONCRETE MILL - BELGIUM	BE-CE-TA-Paesen
2.	QUARTES CATTLE FEED COMPANY - BELGIUM	BE-FO-HD-OL-TA-TE-Quartes
3.	DOSSCHE – CATTLE FEED TANKS - BELGIUM	BE-FO-TA-Dossche
4.		
5.	SILOS DE COCK – BELGIUM	BE-HD-TA-De Cock
6.	SILO'S DUBO DEUREN – ERPE-MERE	BE-HD-TA-Silo's Dubo Deuren
7.	BASF – CHEMICAL COMPANY - BELGIUM	BE-HU-PE-TA-TE-BASF
8.	WOLF OIL CORPORATION - BELGIUM	BE-OL-PE-TA-Wolf oil
9.	VAN BROEKHOVENS - DIESEL STORAGE TANKS – BELGIUM	BE-PE-TA-TE-Van Broekhoven
10.	COCA COLA - BELGIUM	BE-TA-Coca Cola
11.	DUMON AGRO - CONTAINER - BELGIUM	BE-TA-Dumon
12.	GENT PUBLIC WORKS – SALT FUNNELS - BELGIUM	BE-TA-Gent Pub.
13.	MAKRO – A TANK - BELGIUM	BE-TA-Makro
14.	SNACK FOODS VEURNE - BELGIUM	BE-TA-SnackFoods
15.	SILOS VANDENBERGHE - BELGIUM	BE-TA-Vandenberghe
16.	KOBRIN OIL PUMPING STATION - BELARUS	BY-PE-TA-TC-Kobrin
17.	SHANGHAI DOVECHEM BOMTA TERMINAL - CHINA	CN-PE-TA-Bomta
18.	STROM UND HAUFENBAU HAMBURG HARBOUR COMPAGNY - GERMANY	DE-OL-PE-TA-TE-Strom
19.	GRILLO WERKE AG GAS CYLINDERS GERMANY	DE-TA-Grillo Werke AG
20.	WATER STORAGE TANKS ROURKELA – INDIA	IN-TA-Water Storage Tanks
21.	GRAIN SILOS NADOR CEREALES – MOROCCO	MA-AG-HD-TA-Grain Silos Nador Cereales
22.	HYDRO-TANK - MAROC	MA-TA-Hydro-tank
23.	SHELL TANK - MOROCCO	MA-MA-PE-TA-Shell
24.	TANK - MOROCCO	MA-TA-Kettle construct
25.	STORAGE TANKS - NORWAY	NO-TA-Storage tanks
26.	TANKS – NEW PLYMOUTH – NEW ZEALAND	NZ-TA-New Plymouth
27.	CONTAINERS AND METAL GIRDERS - POLAND	PL-CO-TA-ZREMB
28.	TRAIN CARRIAGE TRANSRAIL - SENEGAL	SN-RW-TA-Train Wagon
29.	MAERSK CONTAINERS - TAIWAN	TW-TA-TE-Maersk
30.	OIL STORAGE TANK - EXXON MOBILE - UNITED KINGDOM	UK-PE-TA-Exxon Mobile
31.	BRAITHWAITE TANK – UNITED KINGDOM	UK-PW-TA-Braithwaite tank
32.	PORT ELISABETH ELECTRICITY DEPARTMENT - FUEL TANKS AND EXHAUST – SOUTH AFRICA	ZA-AZ-HT-TA-Port.EL

TC: Topcoats

1.	REYNELLA BRIDGE - AUSTRALIA	AU-BR-TC-Reynella Bridge
2.	MELLE BRIDGE - BELGIUM	BE-BR-OL-TC-Melle Bridge
3.	KLEIN KASTEELKEN – CAST IRON FENCE - BELGIUM	BE-CI-CR-OL-TC-Klein Kast.
4.	DULLE GRIET - CANNON – BELGIUM	BE-CI-TC-Dulle Griet
5.	NO-PARKING POSTS BRUSSELS	BE-CR-TC-Amsterdammertjes Stad Brussel
6.	WATER PURIFICATION STATION – BELGIUM	BE-OL-PI-TC-Kluizen
7.	PUBLIC FOUNTAIN IN GHENT – BELGIUM	BE-OL-PW-TC-TE-Gent fount.
8.	MERCATOR – SAILING SHIP - BELGIUM	BE-OL-SH-TC-Mercator
9.	DE GRAEVE SHIPYARDS - BELGIUM	BE-OL-SH-TC-TE-De Graeve



10.	WESTHINDER – LIGHTSHIP - BELGIUM	BE-OL-SH-TC-Westhinder
11.	BONNE INDUSTRIAL - SHIPS - BELGIUM	BE-SH-TC-Bonne Industrial
12.	TEATRO MUNICIPAL - BRAZIL	BR-CI-CO-TC-Teatro
13.	METRO – MINSK – BELARUS	BY-AM-LT-TC-Metro
14.	KOBRIN OIL PUMPING STATION - BELARUS	BY-PE-TA-TC-Kobrin
15.	ICE HIGH TENSION PYLONS – COSTA RICA	CR-HD-PY-TC-ICE High Tension Pylons
16.	ICE TEST APPLICATION – COSTA RICA	CR-HD-PY-TC-ICE Test Application
17.	TRASH RACKS POWER PLANT – SOUTH KOREA	KR-EL-IM-MA-TC-Trash rack
18.	POWER PLANTS - TAIWAN	TW-EL-TC-ZC-Power Plants
19.	COAL TRANSPORT SHIP - TAIWAN	TW-SH-TC-Coal Tr Ship

TE: Testimonials

1.	TRANSEND NETWORKS - AUSTRALIA	AU-EL-PY-TE-Transend Networks
2.	BAKCELL COMMUNICATION TOWER - AZERBAIJAN	AZ-PY-TE-Bakcell Communication Tower
3.	MARTENS DIRK – AGRICULTURAL MACHINERY	BE-AG-OL-TE-Martens
4.	NATO – NATO PUMP STATIONS – BELGIUM	BE-AR-OL-PI-TE-NATO
5.	J.M. INDUSTRIAL – BELGIUM	BE-AZ-CE-HU-OL-TE-JM-Ind
6.	CARSID – BELGIUM	BE-AZ-HT-OL-TE-Carsid
7.	EUROPEAN TECHNICAL ASSOCIATION FOR PROTECTIVE COATINGS – BELGIUM	BE-BR-OL-TE-Etapc
8.	HOLCIM GRANULATS - CEMENT FACTORY - BELGIUM	BE-CE-OL-TE-Holcim
9.	HARBOUR OF GENK – BELGIUM	BE-CN-OL-TE-KHG
10.	TRACTEBEL – POWER STATION – BELGIUM	BE-CO-EL-OL-TE-Tractebel
11.	SLAUGHTERHOUSE CHARLEROI – BELGIUM	BE-CR-FO-HD-LT-OL-TE-AbattoirCharleroi
12.	INTERCOMMUNALE E3 – METAL CONSTRUCTIONS - BELGIUM	BE-CR-OL-TE-Intercomm
13.	QUARTES CATTLE FEED COMPANY - BELGIUM	BE-FO-HD-OL-TA-TE-Quartes
14.	VERDEGEM CATTLE FEED COMPANY – BELGIUM	BE-FO-TE-Verdegem
15.	BASF – CHEMICAL COMPANY – BELGIUM	BE-HU-PE-TA-TE-BASF
16.	SPX COOLING TECHNOLOGIES – BONNETS OF SRC BUNDLES – BELGIUM	BE-LT-TE-SPX Cooling Technologies
17.	DECLOEDT – DREDGING COMPANY – BELGIUM	BE-MA-OL--TE-Decloedt
18.	TOTAL PETROCHEMICAL FELUY – PIPELINES – BELGIUM	BE-OL-PE-PI-TE-Fina
19.	ASSOCIATION COMPANY OF PRODUCTION OF ELECTRICITY – S.P.E. – BELGIUM	BE-OL-PI-TE-SPE
20.	PIT COAL MINE – BELGIUM	BE-OL-PI-TE-UN-Kemp.Steenk
21.	STORA ENSO PAPER MILL – BELGIUM	BE-OL-PP-TE-Stora Enso
22.	PUBLIC FOUNTAIN IN GHENT – BELGIUM	BE-OL-PW-TC-TE-Gent fount.
23.	CITY – RAILWAY WAGON – BELGIUM	BE-OL-RW-TE-CITA
24.	DE GRAEVE SHIPYARDS – BELGIUM	BE-OL-SH-TC-TE-De Graeve
25.	DREDGING COMPANIES DECLOEDT – BELGIUM	BE-OL-SH-TE-Dredging
26.	NARAI – SAILING SHIP – BELGIUM	BE-OL-SH-TE-Narai
27.	VAN BROEKHOVENS – DIESEL STORAGE TANKS – BELGIUM	BE-PE-TA-TE-VanBroekkh
28.	FLUXYS (BELGIAN LARGEST GAS SUPPLIER) – BELGIUM	BE-PE-TE-Fluxys
29.	WEST-VLAANDEREN SCHEEPSWERF – BELGIUM	BE-SH-TE-West-VL
30.	FURNAS – ELECTRICITY PYLONS - BRAZIL	BR-EL-PY-TE-Furnas
31.	DORBRAS RAILWAY COMPANY – BRAZIL	BR-RW-TE-Dorbras
32.	TECHNICAL FAIR – BULGARIA	BG-CO-TE-TechnFair
33.	BC FERRY TERMINALS – CANADA	CA-BR-MA-OL-TE-BC Ferry
34.	OVERLANDER BRIDGE – CANADA	CA-BR-OL-TE-Overlander
35.	MINISTRY OF TRANSPORT - QUEBEC	CA-HD-TE-Ministry of transport
36.	CITY OF BURNABY – CANADA	CA-MA-TE-CityofBurnaby

37.	WALT DISNEY – HONG KONG – CHINA	CN-AM-TE-Walt Disney HK
38.	MOBIMETAL – TELECOMMUNICATION PYLONS - CONGO	CD-PY-TE-Mobimetal
39.	EL SALAAM BRIDGE - EGYPT	EG-BR-MA-PI-TE-Salaam
40.	SOCIETE NATIONALE DE CHEMINS DE FER - FRANCE	FR-OL-RW-TE-SNCF
41.	RENAULT - CAR MANUFACTURING COMPANY - FRANCE	FR-CO-OL-TE-TR-Renault
42.	DIRECTION DEPARTEMENTALE DE L'EQUIPEMENT - FRANCE	FR-HD-IM-MA-OL-TE-Sea Buoys
43.	ZINGA ANTICORROSION DISTRIBUTOR - FRANCE	FR-HD-TE-Guerin
44.	DÜSSELDORF HIGHWAY - CRASH BARRIERS - GERMANY	DE-CR-OL-TE-Düss.Highway
45.	STROM UND HAUFENBAU HAMBURG HARBOUR COMPAGNY - GERMANY	DE-OL-PE-TA-TE-Strom
46.	DÜSSELDORF AIRPORT - GERMANY	DE-AP-CO-HD-OL-TE-Düss.Airport
47.	RWE - AG – ELECTRICITY COMPANY - GERMANY	DE-EL-OL-TE-RWE
48.	SCHWENK – CEMENT FACTORY - GERMANY	DE-CE-OL-TE-Schwenk
49.	ABADAN & SHIRAZ REFINERIES - IRAN	IR-OL-PE-TE-Abadan Shiraz
50.	OMRAN SAHEL INSTITUTE – REBARS - IRAN	IR-RE-TE-OmranSahelInst
51.	PARS OIL & GAS CO. – REBARS - IRAN	IR-RE-PE-TE-Pars Oil & Gas
52.	PERLITE CONSTRUCTION SULFUR EXPORT WHARF - IRAN	IR-RE-TE-PerliteConstr
53.	RAHE SAHEL INSTITUTE – REBARS - IRAN	IR-RE-TE-RaheSahelInst.
54.	CHABAHAR PORT – REBARS - IRAN	IR-RE-TE-Chabahar
55.	KILLYBEGS FISHING PIER IMMERSED PIER LEGS - IRELAND	IE-IM-MA-TE-Killybegs pier
56.	MINISTRY OF PUBLIC WORKS - KUWAIT	KW-CO-OL-TE-Ministry of Public Works
57.	MINISTRY OF ELECTRICITY AND WATER - KUWAIT	KW-EL-OL-TE-Ministry of Electricity and Water
58.	KUWAIT OIL COMPANY - KUWAIT	KW-PE-TE-KOC
59.	RYSTRAUM MOTOR SHIP - NORWAY	NO-OL-SH-TE-Rystraum
60.	KALVOYA BRIDGE - NORWAY	NO-BR-MA-OL-TE-Kalvoya
61.	REDE ELECTICA NACIONAL - PORTUGAL	PT-EL-OL-PY-TE-REN
62.	ENERGOPROJECT – TRANSMISSION TOWERS - QATAR	QA-EL-OL-PY-TE-Energoproject
63.	ELECTRICA - NATIONAL ELECTRICITY SUPPLIER - ROMANIA	RO-EL-OL-TE-Electrica
64.	SNCFR - ROMANIAN RAILWAYS - ROMANIA	RO-OL-RW-TE-SNCFR
65.	SERVSPEC - ROMANIA	RO-TE-Servspec
66.	MUNTENIA – PYLONS - ROMANIA	RO-PY-TE-Muntenia
67.	TELEGONDOLA - ROMANIA	RO-RW-TE-Telegondola
68.	EXXARO KUMBA GROOTGELUK COALMINE – SOUTH AFRICA	ZA-CO-TE-UN-Kumba Mine
69.	FORMOSA PLASTICS COMPANY TRANSMISSION TOWERS - TAIWAN	TW-EL-HD-PY-TE-Formosa
70.	MAERSK CONTAINERS - TAIWAN	TW-TA-TE-Maersk
71.	SHELL PETROCHEMICAL COMPANY - THE NETHERLANDS	NL-MA-PE-TE-Shell
72.	LONDON UNDERGROUND – UNITED KINGDOM	UK-OL-RW-TE-UN-London Underground
73.	DERBY – TURBINE EXHAUST STACKS – UNITED KINGDOM	UK-AZ-HT-OL-TE-Derby
74.	VECTOR INTERNATIONAL – UNITED KINGDOM	UK-MA-NB-PE-TE-Vector
75.	FURMANITE – UNITED KINGDOM	UK-PW-TE-Furmanite
76.	LONDON UNDERGROUND – UNITED KINGDOM	UK-OL-RW-TE-UN-London Underground
77.	MISSISSIPPI DEPARTMENT OF TRANSPORTATION BILOXI BRIDGE – UNITED STATES OF AMERICA	US-AR-BR-TE-MDOT
78.	US ARMY -UNITED STATES OF AMERICA	US-AR-HD-OL-TE-TR-US Army

TP: Tropical environments

1.	TROPICAL ISLAND DOME - GERMANY	DE-TP-Trop Islands
2.	GREENHOUSE - FINLAND	FI-HU-TP-Greenhouse
3.	SUBIC WATER SLUICE GATE – PHILIPPINES	PH-IM-TP-Subic sluice gate

4.	KENSINGTON PALACE SUNKEN GARDENS – UNITED KINGDOM	UK-AG-AM-CI-TP-Kensington Palace Sunken Gardens
5.	EDEN GREENHOUSE DOME – UNITED KINGDOM	UK-AG-HD-HT-TP-Eden

TR: Trucks and trailers

1.	DANZAS –TRUCK - BELGIUM	BE-TR-Danzas
2.	ICC - TRUCK CHASSIS - BELGIUM	BE-TR-ICC
3.	LAMBREGT - TRUCK CHASSIS - BELGIUM	BE-TR-Lambregt
4.	OLDTIMER RILEY - BELGIUM	BE-TR-Riley
5.	RENAULT - CAR MANUFACTURING COMPANY - FRANCE	FR-CO-OL-TE-TR-Renault
6.	CARTS TO CONVEY STONES - MOROCCO	MA-TR-Transit trailer
7.	CHASSIS – UNITED KINGDOM	UK-TR-Chassis
8.	US ARMY – UNITED STATES OF AMERICA	US-AR-HD-OL-TE-TR-US Army

UN: Underground

1.	CULVERTS - AUSTRALIA	AU-HD-HU-IM-UN-Culverts
2.	KEMPENSE STEENKOOLMIJNEN – PIT COAL MINE - BELGIUM	BE –OL-PI-TE-UN-Kemp.Steenk.
3.	GASCO COMPANY UNDERGROUND PIPELINES - EGYPT	EG-PI-UN-Gasco
4.	ARMCE TUBES – FRANCE/FINLAND/NORWAY	FR.FI.NO-HU-IM-UN-Armco tubes
5.	LONDON UNDERGROUND – UNITED KINGDOM	UK-OL-RW-TE-UN-London Underground
6.	CULVERTS - UNITED KINGDOM	UK-HD-HU-IM-UN-Culverts
7.	EXXARO KUMBA GROOTGELUK COALMINE – SOUTH AFRICA	ZA-CO-TE-UN-Kumba Mine

WE: Welding

ZC: Zingaceram

1.	POWER PLANTS - TAIWAN	TW-EL-TC-ZC-Power Plants
2.	TAIWAN POWER COMPANY - ZEPHYROS WIND MILLS - TAIWAN	TW-PY-ZC-Zephyros



QUEENSLAND BRIDGES - AUSTRALIA

Customer:

Queensland Main Roads, Queensland Rail
Department of Infrastructure, Energy & Resources

Queensland Rail has specified and used ZINGA since 2001.
All Queensland Rail Bridges re-coats since that date have been specified ZINGA Liquid Galvanising. The bridges were in poor condition.



The Burdekin River Bridge



Pre-treatment: SA 2,5

System:

ZINGA

2 x 60 µm



Queensland Railway Corduroy Bridge



System:
ZINGA 2 x 60 µm





TRACTEBEL – POWER STATION - BELGIUM

The engineering office Tractebel prescribed ZINGA for the coating of the heavy metal frame of the new power station in Langerlo.

In 1997 ZINGA was applied on a total surface of 7500 m².

System :

ZINGA 2 x 60 µm



Tractebel Engineering

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B-1200 Bruxelles

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Tx. +46.21.852 tract b

Management R. Matagne

Empl. 3000

Activity Consultancy engineering services in the following fields : electrical power generation, transmission and distribution; gas storage, transmission and distribution; buildings and infrastructural works; urban and regional development; environment; industry; healthcare; computer systems for engineering; consultancy.

Activités Services d'Ingénieur Conseil dans les domaines suivants : production, transmission et distribution d'énergie électrique; stockage; transmission et distribution de gaz; bâtiments et infrastructure; développements urbains et régionaux; environnement; industrie; santé; ingénierie informatique; consultance. *



Tractebel
business profile

B - Technische Bepalingen en Waarderingswijzen

Blz. 5 van 8

	Hoofdstuk 73 : BESCHERMING TEGEN CORROSIE	Fiche n° 73 S/C
	SPECIFICATIES	
	Lijst van de fiches	
PROJECT : LANGERLO 2000		Overeenkomst n° 70076/13

FILMVERZINKINGSPROCEDE

1) Samenstelling van de galvanische film

De coating is een één component systeem dat bestaat uit :

- zinkstof (elektrolytische zink);
- vluchtige stoffen;
- bindmiddelen (onverzadigde koolwaterstoffen).

De droge film heeft een zinkgehalte van 96 %;

De zink bevat een zuiverheidsgraad van minimum 99,995 %;

Specifications issued by Tractebel, prescribing ZINGA for the anti-corrosion protection of the metal structures at the plant in Langerlo.



DRILLING PLATFORM - BRAZIL

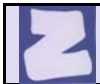
Pictures of a drilling platform in the South Atlantic Ocean, Brazil.
ZINGA was used for different repairs.

Surface preparation: cleaning high-pressure
 sand blasting to Sa 2.5;

Two layers of ZINGA were applied:
 total DFT = 120 micron.



System:
ZINGA 2 x 60 µm



BC FERRY TERMINALS - CANADA

BC Ferries is one of the largest ferry operators in the world, providing year-round vehicle and passenger service on 25 routes to 47 terminals, with a fleet of 35 vessels. We are an essential transportation link that connects coastal communities and facilitates the movement of people, goods and services.

The ferry ramps of the BC Ferry terminals in Tsawwassen, Schwarz Bay and Horseshoe Bay (in aggressive marine environment), were coated with ZINGA between 1988 and 1992.



VILLHOLTH JENSEN & ASSOCIATES LTD.
ENGINEERING CONSULTING ENGINEERS

PACIFIC EVERGREEN INDUSTRIES LTD.
1480 14th Street
West Vancouver, B.C.
V7T 2S3

May 22, 1998

Attention: Mr. Maurits Vander Cruyssen

Subject: The ZINGA Cold Galvanizing System

Dear Sirs:

This is to confirm that we have specified the use of ZINGA on numerous projects since 1989.

We have used the system on ferry ramps and structural steel in industrial plants.

Our experience is that the system should not be used on structures to be submerged in salt water without a protective top coat. The system is excellent for use on all types of steel structures. We rate the system as good as hot dip galvanizing.

When the surface preparation and application are done to the specifications, we have had no complaints. And repair work after construction is never required even when chains and hooks are used during installation of the structures.

We have just completed a major project for a local grain elevator involving approximately 200 tonnes of steel structures. The ZINGA system was used on all major parts of the structures and hot dip galvanizing was used on the smaller components. It takes an expert to define which part has the ZINGA surface or the hot dip galvanizing surface.

Yours truly,

Villholth Jensen & Associates Ltd.

[Signature]
M. Jensen, P.Eng.
President

3965 Sunset Blvd., North Vancouver, British Columbia V7R 3Y4
Telephone (604) 985-0781 (604) 522-4897 Telefax (604) 985-7921

This is a testimonial, dated 22/05/1998, from the engineering office 'Villholth Jensen & Associates'.

Since then, inspections in 2002 and 2005, showed the ZINGA in good condition.

The dry film thickness had hardly diminished in 2011, thanks to the formation of a passive barrier on top of the active zinc in ZINGA.

System:

ZINGA 2 x 40 µm DFT

BIRD'S NEST - CHINA



The stadium was designed for use throughout the 2008 Summer Olympics and Paralympics. Located in the Olympic Green, the \$ 423 million stadium is the world's largest steel structure.

The client (project owner) was the National Stadium Steel Structure Office of CITIC International Contracting Inc., a joint venture of CITIC (China International Trust & Investment Corporation) and BUCG (Beijing Urban Construction Group), two of China's largest state owned enterprises.

The main contractor was BUCG Jinggong Steel Construction Engineering Co., Ltd.

ZINGA was used on special critical areas (such as complex joints, gutters, and ETFE membrane mounted sections) of the Bird's Nest steel structure which could not be metallised (spray zinc) after welding.

Date of ZINGA application: September ~ December 2006.

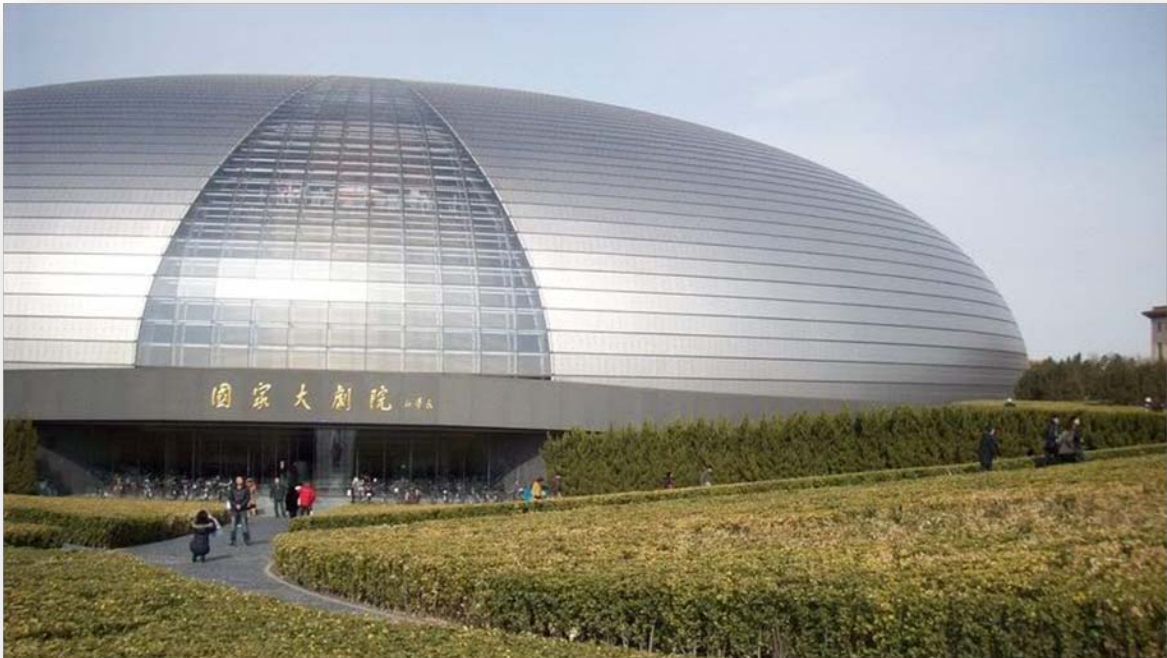
**System:***Surface preparation:*

sand blasting to SA 3 and Rz 60-70 μm
Zinga 2 x 40 μm DFT
Epoxy MIO 1 x 100 μm DFT
Fluorocarbon finish (Metallic grey)
1 x 60 μm DFT

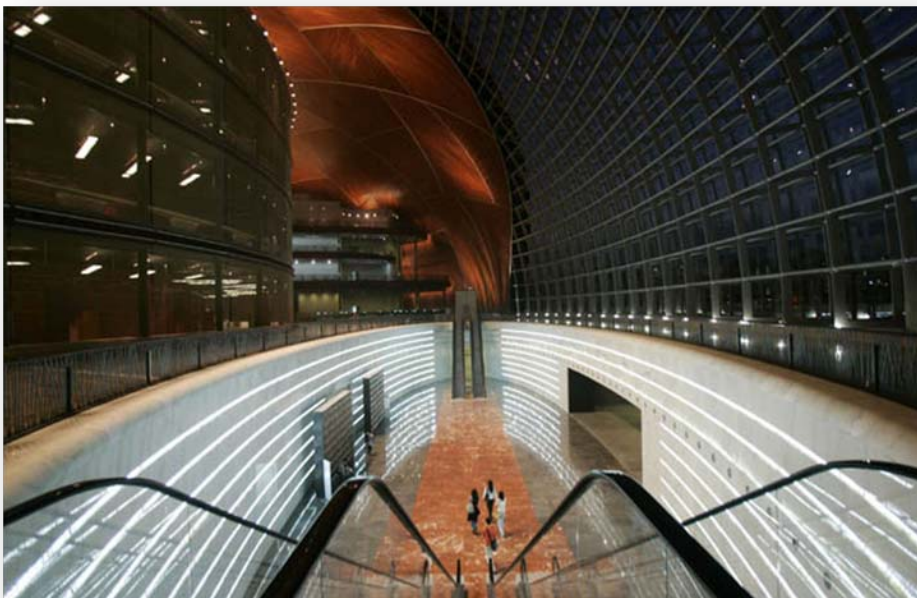


NATIONAL GRAND THEATRE BEIJING - CHINA

The National Grand Theatre of China in Beijing by architect Paul Andreu is one of the most talked-about architectural projects for years, both because of Andreu's audacious and innovative design, and for the grand scope of the project itself; the Theatre will be Beijing's foremost cultural center, situated in the heart of the capital, symbolizing all that is exciting about the new China. It will be, in the architect's words: "A new district of spectacles and dreams open to one and all."



In the entrance hall the visitors are surrounded by an enormous aquarium.
ZINGA was used to treat the under water structures.



System:
ZINGA 2 x 60 µm



GUANGZHOU BAIYUN INTERNATIONAL AIRPORT TERMINAL EXTENSION- CHINA

In February 2002 Zinga was applied on the passengers' terminals of the Guangzhou New Baiyun Airport. The construction of the passengers' terminals consists of hollow metal elements, that have been previously hot-dip galvanised.



For better acoustics, the metal was perforated. Afterwards, the surface with the little holes had to be repaired again with Zinga. The surface was sprayed with Zinga in an angle of 45° from both sides.



System:

Touch-up of new hot-dip
ZINGA 1 x 60 µm



HANGZHOU BAY BRIDGE - CHINA

The Hangzhou Bay Bridge is located in the bay of Hangzhou and connects the harbours of Shanghai and Ningbo. In May 2005, ZINGA was applied on the rebars used for this project.

A supplementary extension to the project (emergency platform) prescribes ZINGA on the entire construction.



System:

ZINGA

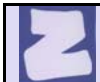
1 x 60 μm



Brush application with ZINGA



Rebars treated with ZINGA

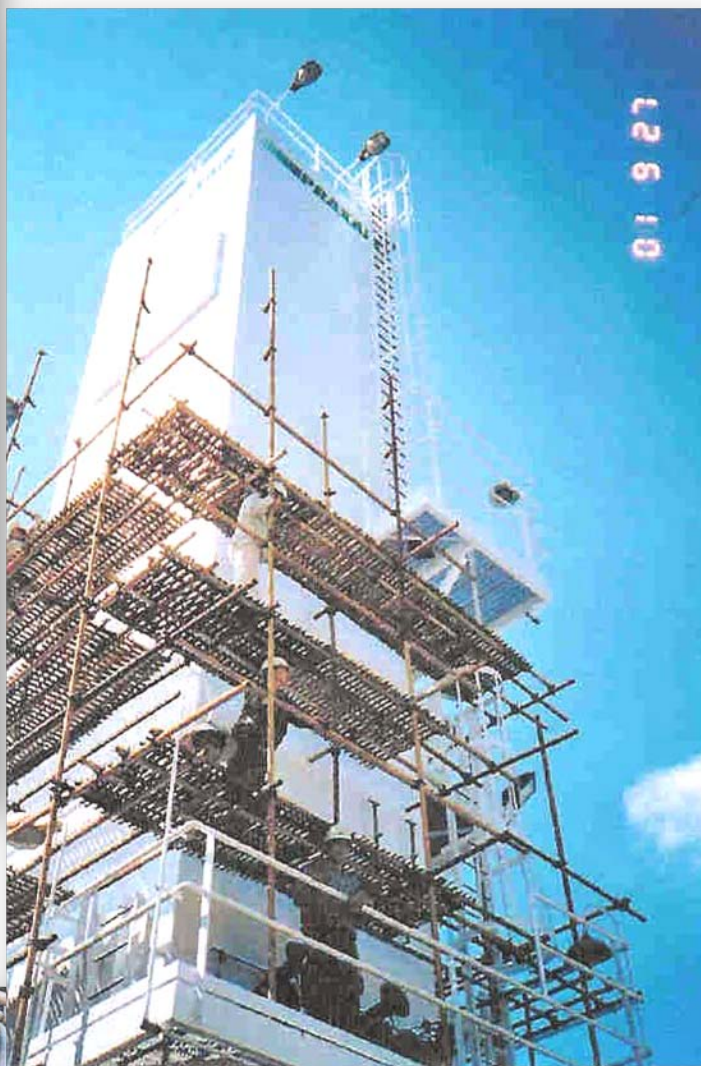


SHANGHAI PRAXAIR YIDIAN - GAS PROCESSING COMPANY - CHINA



Praxair Yidian is a large gas processing company in Shanghai, with enormous corrosion problems.

The air separation cooling tower was coated with ZINGA as primer in a duplex system in September 2001.

**System :**

ZINGA	1 x 60 μ m
Topcoat	unknown





GUANGZHOU TV TOWER - CHINA

Guangzhou TV Tower (Canton Tower) is a 610m high lattice telecommunication tower built in the Chinese city of Guangzhou. On top of the tower is an observation deck and in the building several restaurants are incorporated.

The tower is built up out of 24 tubular pipes each measuring 2 metres in diameter and 10 metres in length. Total tonnage of steel to be used is approximately 50.000 tons.



ZINGA was applied on the welds of the piles (approximately 10.000 m²).

The tower has been finished at the end of 2009, before the start of the Asian Games in 2010.



Surface preparation:

- Cleaning with degreaser of the areas to be coated
- Roughening of weld by needle gun
- Grinding of remaining surface
- Cleaning with Zingasolv

System:

ZINGA 1 x 80 µm



CHONGQING WATER TURBINE WORKS COMPANY – CONTRACTOR OF THE CHONGQING MONORAIL - CHINA

**System :**

Rebars :

ZINGA 1 x 40 μ m

Other structures :

ZINGA 2 x 50 μ m

The company Chongqing Water Turbine Works (CWTW) is one of the main contractors for the construction of the Chongqing Monorail.

The CWTW has applied ZINGA with satisfactory results on the rebars of the beam supports, directing splitter tracks and connecting plates.

These pictures were taken on 16/04/02.



MAGLEV TRANSPRAPID RAILWAY - CHINA

The ZINGA was applied on several parts of the Maglev (magnetic levitation) Transrapid ultra high speed train that is connecting the city centre of Shanghai with the Pudong area. The Transrapid is the fastest land vehicle. For distances up to 800 km, the trip does not take longer than with fan aeroplane.



ZINGA was applied on joints and crucial steel components. The rest of the train was treated with a 3 layer paint system, as it was too late to replace the existing specifications by the zinganisation system.

The application started in October 2001. The construction parts were manufactured 100 km away from Shanghai. During transport, the pieces that were treated with ZINGA were exposed to an enormous degree of pollution. A piece that had not been coated with ZINGA had turned completely rusty during the transport. On the ZINGA itself, there was only strong formation of zinc salts, which created an additional barrier protection. This illustrates how corrosive the atmosphere is in and around Shanghai.

System:

ZINGA 2 x 40 µm



KRASIKOV TRANSFORMER STATION CZECH REPUBLIC



The pylons and other structures of the Krasikov Transformer Station were treated with ZINGA in the summer of '94. The application was done by brush and roll. ZINGA was used as primer on the grit-blasted surface in one layer of approx. 50 μm . The total amount of ZINGA used at this site was approx. 1.5 ton. ZINGA was topcoated with Jotun Conceal (without sealer) at a layer thickness of 80 μm applied in one coat, also by brush and roll.

System :

ZINGA

1 x 50 μm

Jotun Conceal

1 x 80 μm

These pictures were taken in 1994, just after the application.



These pictures were taken in January 2003, almost 10 years after the application, when an inspection was carried out by Mr. Stavar from the company Grane. The ZINGA and topcoat were still in perfect condition.





DÜSSELDORF AIRPORT - GERMANY

ZINGA was applied on steel structures of the Airport of Düsseldorf in 1990, namely on a hangar, with a height of more than 30 m, that serves as testing area for the engines of large commercial airplanes and of which the interior side has been insulated with panels. There is a metal structure between the insulation panels and the concrete building. The entire metal structure has been protected with ZINGA as unique system. The applied ZINGA layer thickness was 120 µm. The company Dillinger Stahlbau executed the job.

After 4 years the first inspection took place. There was no formation of rust and the loss of layer thickness was measured to be no more than 5 µm. The new hot-dip galvanisation on the contrary already showed traces of oxidation and rust.



AGESO **KORROSIONSSCHUTZ**
... die elegante, vernünftige Alternative

Mitglied der GfKORR e.V.

Dipl.-Ing. Helmut Schwarz
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D-41748 Viersen
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Dipl.-Ing. H. Schwarz · Agnes-van-Brakel-Straße 34 · D-41748 Viersen

ZINGA METALL S.P.A.
Industriepark VENECO
Rozenstraat 4
B-9810 EKE (Nez.)

Ihr Zeichen Unser Zeichen Ihre Nachricht vom Datum

zm.hs.ddf-airport Oct. 27th., 1999

Ref: Airport Düsseldorf-Application/ Alternative to hot-dip-galvanisation & repair / ZINGA / KALTZINK HS 300
Guarantee period 10 years/ Assembly 1990/ Layer thickness of 150 microns totally/ No additional passive coating (paints) / DSD Dillinger Stahlbau GmbH

Dear Sirs,

upon your request we like to inform you that above ZINGA/ KALTZINK HS 300 application reaches the age of 10 years within the next couple of month.

Although the airport environment is very corrosive, we have had not one single quality complaint at all. Interim thickness measurements have shown very little decrease of thickness, as reported in 1995.

We believe, that the surface of ZINGA/ KALTZINK HS 300 has created an additional protective patina by itself and therefore the decrease of thickness will be very slow and delayed.

We may suggest, that you contact the Technical Director of the airport, Mr. WAASER or his department (Technische Abteilung) under phone 0211-421-2301 (direct dialing) for further opinions.

Yours faithfully

AGESO (P) - KORROSIONSSCHUTZ

Dipl.-Ing. H. Schwarz

Member of GfKORR-Gesellschaft für Korrosionsschutz e.V.

This is a letter from Ir. Helmut Schwarz to Zingametall, dated 27/10/1999, stating that 10 years after the application, there has been no quality complaint at all. The decrease of the ZINGA layer thickness is very slow, thanks to the zinc salts on the surface that form an extra barrier protection or patina.

System:

ZINGA

2 x 60 µm





The following additional information concerning the application of ZINGA in the airport of Düsseldorf was transmitted to us by Mr. Schwarz on **17/10/00**:

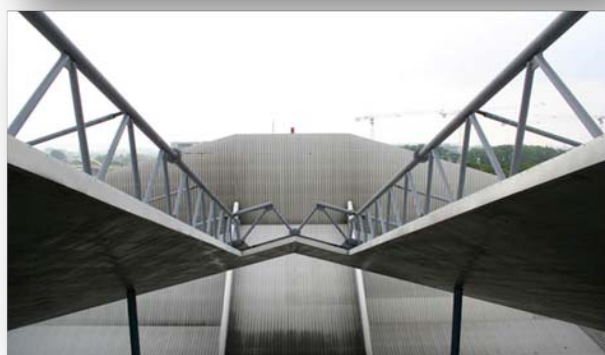
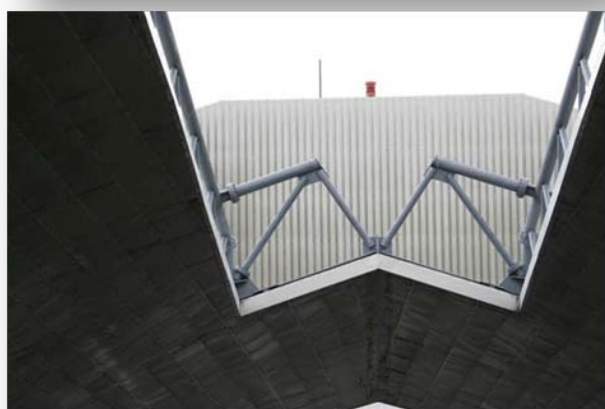
The protection of the welding seams was carried out very soon after the welding seams had cooled down to temperatures below 40 to 35 °C and after they had been properly cleaned. Since welding seams usually do not have a rough surface, the coating began with a thin layer. Afterwards, the coating was built up to the required thickness of approx. 150 µm which complied with the layer thickness of the steel construction as specified by the customer. No further passive coatings such as paints were applied at that time.

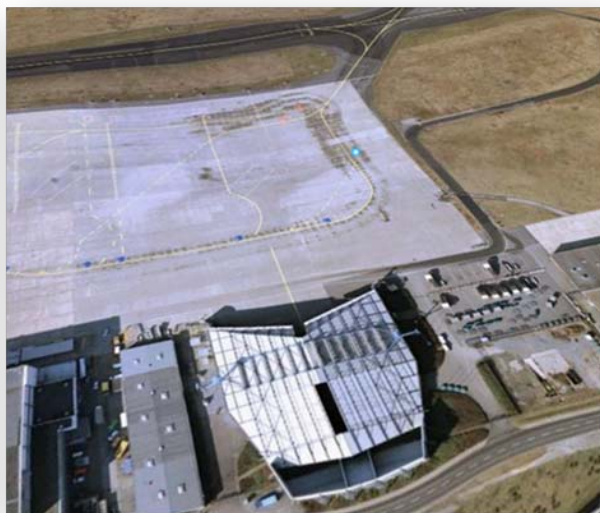
The application was carried out inside the workshops. The welding seams were checked by ultra-sound equipment by an officially recognised institution before the final assembly on site.

Some time before checking the structure's condition in presence of the airport authority in **May 2008**: the steel structures on the outside of the building and on the roof have been over coated after the 10-years guarantee-period, despite the fact that there were no complaints or traces of corrosion. This was done for aesthetic reasons and given the aggressive environmental circumstances on the outside of the building.

The topcoat consisted partly of a blue colour paint and partly of a MIO based paint

System 2008:
ZINGA 2 x 75 µm
Local Micaceous Iron Topcoat
2 x 130 µm







SCHWENK – CEMENT FACTORY - GERMANY

In 1992 the new plant of the cement factory Schwenk was treated with ZINGA.

Application technique: airless spraying.

These pictures were taken during construction.
30 tons of ZINGA were used for this application.



In February 2003, the condition of the ZINGA layer was inspected. On the pictures you can see that the ZINGA is still in perfect condition and shows no trace of rust after more than 10 years. The customer is very satisfied with ZINGA.

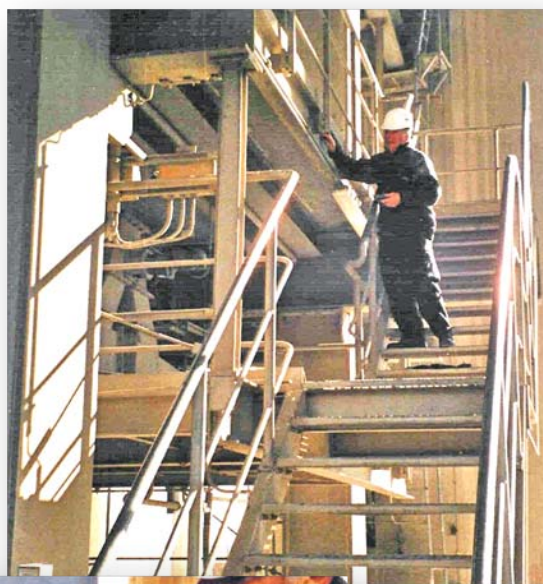
At this moment there is no need for touch-ups. Later on, the ZINGA could be very easily recharged simply by applying a new layer on top of a cleaned surface !



System :

ZINGA 2 x 60 µm

On the weathered side of the plant, where abrasive media and rain wash the surface clean, the ZINGA layer thickness has decreased from 120 μm to 70 μm . This comes down to 5 μm a year, which is surprisingly good under these hard environmental conditions.



**Layer thickness
decrease : 0,5 μm per
year !!!**

On the other side of the plant however, where a thick layer of dust has attached itself to the ZINGA, the layer thickness has only decreased from 120 μm to 115 μm . This is merely 0,5 μm per year : almost unbelievable !

→ On this picture the dust is being removed and the intact ZINGA layer becomes visible.



KILLYBEGS FISHING PIER IMMERSED PIER LEGS - IRELAND

The application of ZINGA on the pier legs at Killybegs Harbour was done in the summer of 2000.

The customer, the Irish Department of Marine and Natural Resources, and the contractor, SAR Marine & General, waited a full year before giving any official comment on the performance of the ZINGA coating.

Based on regular controls, they confirmed that the ZINGA is performing very well.

These pictures of the pier legs were taken in August 2001: one year after the application.

The ZINGA is holding perfectly with no rust showing. Any marking on the legs is either seaweed or harbour contaminants.

**System:**

ZINGA 1 x 25 µm + 3 x 40 µm

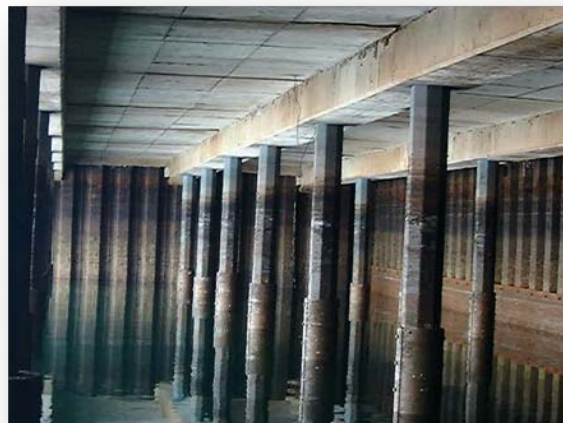


The fishing pier, which supports the factory buildings, is held up by 309 mild-steel hexagonal shaped legs, all approx. 600 mm in diameter.

These pier legs have been in the sea for 25 years and due to the salt and the sulphate reducing bacteria present in the sea water, they were losing up to 2 mm per year of their thickness. The waters around Killybegs are unique because they have the highest rate of corrosion in Europe.

The height from the concrete deck to the water level at low tide is approx. 3 to 4 meter. At high tide, 1,5 to 2 meter of each pile is totally submersed in seawater.

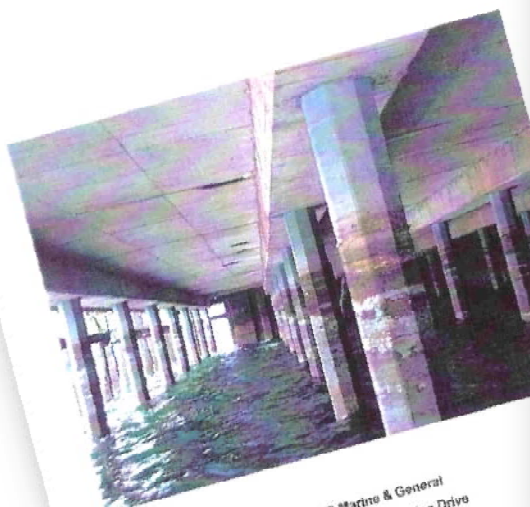
The piles were prepared by UHP water-jetting and blasting to SA 2.5 with Rz 40 to 60 μm . The application happened under severe surveillance of SGS Axa-Med, because it was a very difficult and delicate application as they had to take into account the tidal movement of the water and the constant contact with sea water. SGS Axa-Med had prescribed a dry film thickness of ZINGA of $25 + 40 + 40 + 40 \mu\text{m} = 145 \mu\text{m}$, but in the end an average of 300 μm was measured.



An adhesion test by SGS Axa-Med, performed in August 2000 gave an average result of 3.5 N/mm², which is very good.

Hereafter you will find an extract from the final inspection report, issued by SAR Marine & General for the Department of the Marine and Natural Resources, dated 15/06/01, that describes the excellent condition of the piles 12 months after the application.

Department of the Marine and
 Natural Resources
 Killybegs FHC
 Refurbishment of Piles in Landing Pier
 and Blackrock Pier
 Post Maintenance Inspection



SAR Marine & General
 Marine House, Marine Drive
 West Bank
 Lancaster, UK
 LA2 6HH

Department of the Marine and Natural Resources
 Killybegs FHC – Refurbishment of Piles in Landing Pier and Blackrock Pier

Dive inspections of the collars were then carried out by both Dr M Shaw and Mr W A Wilcox, with the fixings being checked and an assessment made of the general condition of the collars. Surface supply equipment was used for all diving inspections.

3.0 RESULTS

3.1 Coating works to the tops of the existing piles.

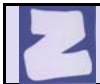
When the DFT readings taken during the inspection of the Zinga coating, see appendix A, are compared to those take at completion of the works no significant change can be seen.



Plate 1. Area of pile cleaned for inspection

The general condition of the Zinga coating was found to be good with only small amounts of rusting found in areas where very limited access had prevented proper preparation and

application, i.e. to the bottom of the piles to row A, that are surrounded by rocks and the tops of the piles to row Z which are surrounded in steel work. The hardness of the coating was



In July 2003 SGS Axa-Med has done the first official inspection of the pier legs after 3 years of service. There was no significant change in the layer thickness of the ZINGA. Some minor repair work had to be done on piles that had received an insufficient surface preparation at the time of the application on areas that were difficult to reach. Hereafter you can read an extract of the inspection report and view the pictures that were taken.

SGS**REPORT**

Mr. JOHN CAMPBELL
DEPARTMENT OF THE MARINE AND
NATURAL RESSOURCES
Upper Main Street
BALLYSHANNON, CO. DONEGAL
IRELAND

Date:
14/08/2003

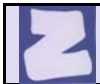
Our reference:
1127-N-1519-2003

Your reference:
AFIP ref. 086-B-2000 dd. 11/07/00

Type of intervention	INSPECTION
Object	Piles of Landing Pier and Blackrock Pier
Location	Killybegs Harbour, Ireland
Date inspection	14/07/2003
Re-inspection	First inspection after 3 years of service.

Brief conclusion	See paragraph
Some minor repair work has to be done on piles with areas difficult to reach. The cleaning of the reference piles with HP (warm) water didn't give any problem. The all-over dry film thickness hasn't change significantly.	





In July 2006, a second inspection took place, 6 years after the application and 3 years after the first inspection. The results are again promising.

SGS**REPORT**

Mr. John Campbell
Department of the Marine & Natural Resources
Upper Main Street
BALLYSHANNON CO. DONEGAL
IRELAND

Date:
02/08/2006

Our reference:
1127-N-0047-2006

Your reference:
AFIP ref. 086-B-2000 dd. 11/07/2000

Type of intervention	3-YEARLY INSPECTION
Object	Piles of Landing Pier and Blackrock Pier
Location	Killybegs Harbour, Ireland
Date inspection	15/07/2006
Re-inspection	Second inspection after 6 years of service

Brief conclusion	See paragraph
The piles do not show any significant changes although the repair works after 3 years have just started recently. Only on some piles we find some corrosion on the upper 0,5 till 1 m. Touch-up is going on. The cleaning of the piles with nylon brushes and water doesn't cause any problem. The all-over dry film thickness has increased with another 11%.	

Department of the Marine and Natural Resources
Roinn na Mara agus Aerhainní Náidíortha

LEENIN LANE
DUBLIN 2
TELEPHONE 9260
INSPECTOR & ENGINEER G. J. PARRELL M.E.M. Eng.Sc. P.M.D. C.Eng. F.I.E.E.

LÁNA CHILL MOCHARGAN
BAILE ATHA CLIAITH 2
FAX 91666790

**KILLYBEGS F.H.C. PILE
REFURBISHMENT**

CONSULTING
ENGINEERS KIRK McCLURE MORTON

CONSTRUCTION SAR MARINE & GENERAL Ltd.

Project Funding Department of the Marine and
Natural Resources

Tá an Tionscadal seo á Pháirtímháoiniú ag an Aontas Eorpach
Ciste Reifreachtas Bliantúil na hEorpa

THIS PROJECT IS BEING PART-FINANCED
BY THE EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND



In July 2009, a third inspection took place, 9 years after the application and the results are very good. ZINGA protects the metal of the pier piles very well, even in these very harsh conditions.

This is a short conclusion from the 2009 inspection report:

Brief conclusion.

The piles didn't show any significant progress in corrosion since the last inspection in 2006 (after 6 years in service). Only on the piles at the Blackrock Pier we saw slight corrosion on the upper 0.5 to 1 m. The touch-up done before and during the last inspection in 2006 shows some blistering. This is probably caused by remaining salts underneath. The overall thickness has not significantly changed.



An extract of the report:

The coating is at present in quite good condition; if well maintained, the system can remain in service for another 10 years.





MUMBAI DOMESTIC AIRPORT - INDIA

The domestic terminals in Mumbai with the same name as its international wing are located in Santa Cruz, East. There are two domestic terminals - Terminal 1A (with an area of 28960 sqm), and Terminal 1B (with an area of 45000 sqm).

Tereminal 1B was constructed by Unity Infrastructures where the Structural Consultants were M/S Mahimtura & Co.



In 2006 all steel structures including the huge curved spans of the new airport of Mumbai Domestic Airport are coated with ZINGA and finished with a white PU. 5 years after application the structures still look as if they were treated yesterday.

**System:**ZINGA 1 x 60 μm

Topcoat PU white

TRANSFORMERS – SOUTH KOREA

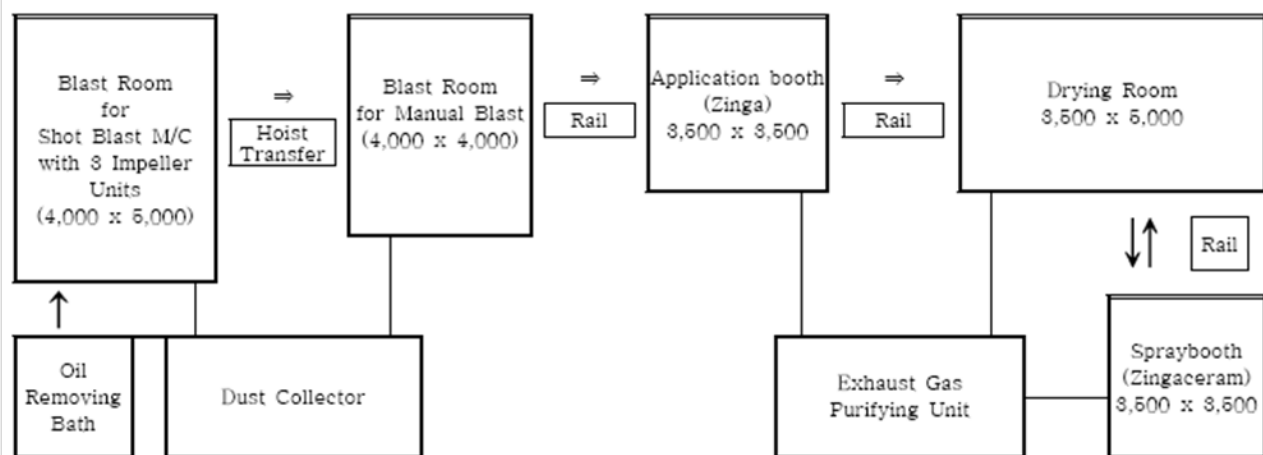
After rigorous comparative testing in 2007, KEPCO transformers decided to use a Zingametal system to protect thousands of transformers against corrosion.

These transformers will be placed next to the sea shore and thus will be exposed to aggressive conditions.



In order to work as efficient as possible, an automatic blasting-spraying and drying line was assembled.

* Shop Layout for Zinga Application on Transformers



System:

Surface treatment: sandblasting
 System: Inside: 100 µm DFT Zingaceram S
 Outside: 60 µm DFT ZINGA
 100 µm DFT Zingaceram M



SHELL TANK - MOROCCO

Since 2006, 4 huge storage tanks for hydrocarbon products that are property of Shell have been repaired using a system based on ZINGA.

The biggest of these storage tanks measured 16 meters in height and 20 meters in diameter and has been repaired in November 2007.

This storage tank (together with another one that was treated in August 2006) is located in Mohammedia.

In October 2009 a storage tank was Zinganised in Agadir and in March 2010 a storage tank was treated in Tan-Tan.

This repeated use of the system based on ZINGA proves the quality delivered (even in marine environments).

**System:****Surface preparation:**

Blasting to SA 2,5 and Rz 50-70µm

System:

ZINGA	1 x 60 µm DFT
Alufer N	1 x 80 µm DFT
Local Polyurethane	1 x 40µm DFT

TELEGONDOLA DOPPELMAYR/LEITNER - ROMANIA

Since 2003, **Doppelmayr Co.** Garaventa decided to protect their cableways against corrosion with ZINGA.

In 2007, **Leitner Co.** decided to use ZINGA as well for the protection of their structures.

- A **first** application was done in 2003/2004 at 'Mamaia' for Doppelmayr.
The inside was treated with 80 μm DFT ZINGA.
The outside was treated with 1 x 60 μm DFT ZINGA, finished with a polyurethane topcoat.
10 poles were treated and 1.835 Kg of ZINGA was used.



Mamaia:
ZINGA 1 x 60 μm DFT
PU Topcoat



- The **second** application, in 2007, was done at 'Azuga' for Leitner.
The inside was treated with 90 μm DFT ZINGA.
The outside was treated with 1 x 90 μm DFT ZINGA and finished with 1 x 40 μm DFT *Alu ZM*.
12 poles were treated and 750 Kg ZINGA and 120L *Alu ZM* were used.

Azuga:
ZINGA 2 x 40 μm DFT
Alu ZM 1 x 40 μm DFT



- The **third** application, in 2007, was done at 'Sinaia' for Doppelmayr.
The inside was treated with 90 μm DFT ZINGA.
The outside was treated with 1 x 120 μm DFT ZINGA and finished with 1x50 μm DFT *Alu ZM*.
8 poles were treated and 700Kg ZINGA and 130L *Alu ZM* were used.

TELEGONDOLA DOPPELMAYR/LEITNER - ROMANIA

- The **fourth** application was done in 2007 at 'Piatra Neamt' (close to the Black Sea) for Doppelmayr.

The inside was treated with 80 µm DFT ZINGA.

The outside was treated with 2 x 80 µm DFT ZINGA.

10 + 8 poles were treated and 1260 Kg of ZINGA was used.

Piatra Neamt:
ZINGA 2 x 80 µm DFT



- The **fifth** application was done in 2009 at 'Borsa' for Doppelmayr.

The inside was treated with 80 µm DFT ZINGA.

The outside was treated with 2 x 80 µm DFT ZINGA, finished with 1 x 50 µm DFT *Alu ZM*.
17 poles were treated and 1.550Kg ZINGA and 150L *Alu ZM* were used.

Surface preparation (inside and outside):
Full blasting to SA 2,5 and Rz 50-70 µm
Application:
Airless

YUZHNY GREENHOUSE FARM - RUSSIA

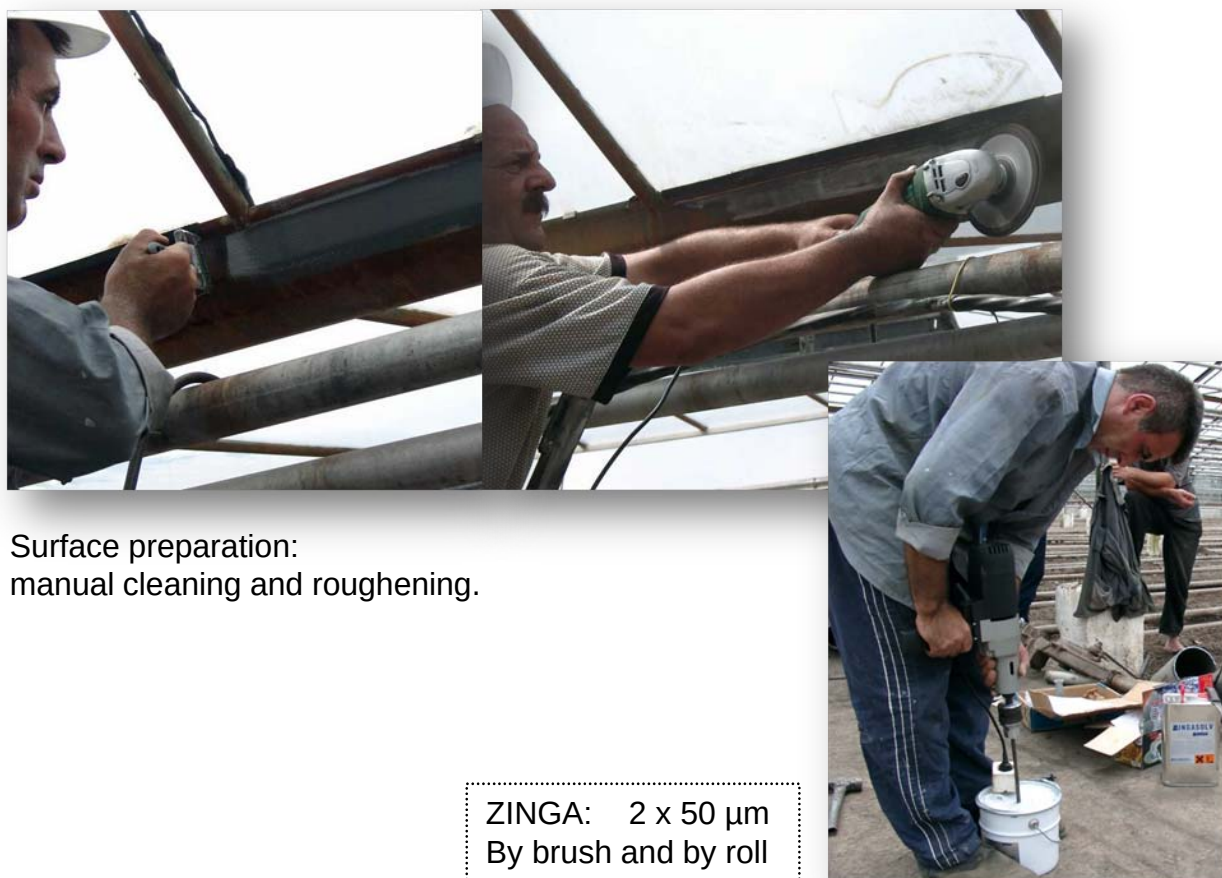
Yuzhny Greenhouse Farm is the largest European greenhouse farm of its kind. It is situated in Cherkessk Stavropol region, Russia.

The total area of the glass covered houses is over 144 hectares.



Conditions of exploitation inside the greenhouse:

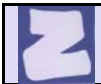
- temperature: 20 to 30°C - humidity: 80%



Surface preparation:
manual cleaning and roughening.

ZINGA: 2 x 50 µm
By brush and by roll

The metal structures used as support were originally hot-dipped. Late in July 2003, the previously hot-dipped coating of the metal structures was repaired or restored by means of ZINGA. At the first stage 5 tons of ZINGA were already supplied. The applications continued until August/September 2003.



PSA LIGHTING MASTS - SINGAPORE

PSA (Port of Singapore Authority), is the 4th largest port in the world and the second busiest after Rotterdam. ZINGA was selected to be coated on 30 lighting masts.

Each lighting mast measures 45 meters in height within minimum DFT of 120 microns.

At this moment 90% of the light masts in this harbor are protected with Zinga. The first light masts were treated in 2002.

Being at the container area, most of the lighting masts (previously protected by hot-dip) were installed near to the sea coast and were found to be quite rusty.

Surface preparation:

Wire brush: → to remove loose rust

Wash down: → to remove contaminants.

Application:

ZINGA: → 2 coats by roller and brush

DFT: → minimum of 120 microns
as specified in contract to qualify for warranty

Date: → Commenced in March 2008
completed in June 2008 (average of 3 days per 45 m mast)

Place: → Within the premises of the port (Keppel Terminal)



System:

Old hot-dip

ZINGA 2 x 60 µm



OFFICE TOGOLAIS DES PHOSPHATES PHOSPHATE MINE OFFSHORE CHARGING CRANES - TOGO

The phosphate mine Office Togolais des Phosphates has placed 2 offshore charging cranes at 1.6 km in the sea. These cranes are linked to the stock department by means of a conveyor. These cranes are very mobile and weigh 325 tonnes each. The Office Togolais des Phosphates produces $\pm 2.400.000$ tonnes of phosphates per year. An average of 5 ships per month is charged.





In 1994 the cranes were repaired by the French company Africaine de Montage. A permanent service and maintenance was obligatory during the repair of the cranes. After grit-blasting, the structures needed to be repaired by welding.

These two cranes and their passing link (the conveyer) were heavily corroded and it was decided that they had to be protected by an anti-corrosion system providing cathodic protection : **ZINGA WAS CHOSEN !!**



The application was done in 1995-96 under the supervision of the controlling organism **Socotec**.

Surface preparation:
GRIT-BLASTING

System:

ZINGA 2 x 60 µm





In 2006 an **inspection** was done because an overall maintenance program was planned to extend the lifetime of the structure.



Evaluation inspection 2006 after 12 years !

- at first sight: bad condition
- at close look: phosphate dust & other deposits!
- adhesion test: excellent
- overall good condition of Zinga
- some local formation of blisters

**Phosphate
dust**

Zinga in
perfect
condition

Only some local minor repairs had to be done to remove blisters (due to solvent retention) and rust spots (due to mechanical abrasion and local bad surface preparation).

- a very nice reference of Zinga used as unique system
- in an extremely aggressive offshore environment
- easy to evaluate and monitor the condition and the layer thickness of Zinga
- it is possible to set up an ongoing maintenance program for these cranes and the conveyer
- important: lifetime can be extended of these structures for a very long time
- customer: high satisfaction



SUARNABHUMI AIRPORT - THAILAND

The new airport Suvarnabhumi is located on a bog, 3,100ha site in the Samut Prakarn province of Thailand at Nong Ngu Hao (translated as Cobra Swamp), 30 km east of Bangkok. Construction of Suvarnabhumi Airport began in January 2002 and was finished in September 2006.



The constructions below (9.200 pieces) at the Suvarnabhumi Airport were all treated, with ZINGA, some of them by means of dipping.
The main contractor was Italian – Thai Company Limited.

**System:**

ZINGA

1 x 50 μ m



CHERNOBYL NUCLEAR POWER STATION UKRAINE

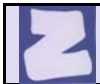
ZINGA is the one material that can meet the high and strict requirements of the Chernobyl Nuclear Power Station for anti-corrosion protection. In 2002 ZINGA was used for the repair of welds and transportation and assembly damages of various metal structures. Starting from October 2003, more anti-corrosion protection works are planned, namely on the platforms and grid walks of the nuclear waste tanks. The general contractor for the works is the French corporation Vinci.



System:

ZINGA 2 x 50 µm





ZUYEVSKAYA THERMAL POWER PLANT - UKRAINE

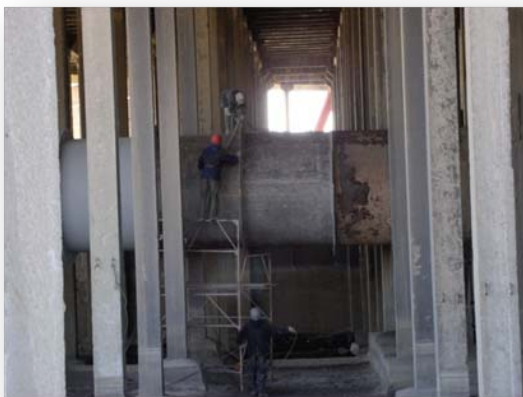
The Zuyevskaya Thermal Power Plant, near the city of Donetsk, is one of the biggest of this type in Ukraine. It generates 5430 million kW-hours of electricity per year. In September 2003 one of its water-cooling towers was being overhauled, including the all-around anti-corrosion protection and the hydrophobic sealing. In total 3500 m² had to be coated with ZINGA.

**System:**

ZINGA 2 x 50 µm

These pictures were taken on 04/10/03 during an inspection by the supplier of ZINGA, the company KVVVT, Vector Technologies.





The surface preparation was done by sand-blasting followed by blowing. The Zinga coating was applied with brushes and rollers, with welding seams painted twice. ZINGA was applied in two coats.



The surface of all metal structures was very rough and deeply corroded. The resulting surface finish after sand-blasting was very rough and uneven, all dappled with cavities, grooves, indents and pits. But all those indentations and cavities were cleaned up, blasted and coated with ZINGA.

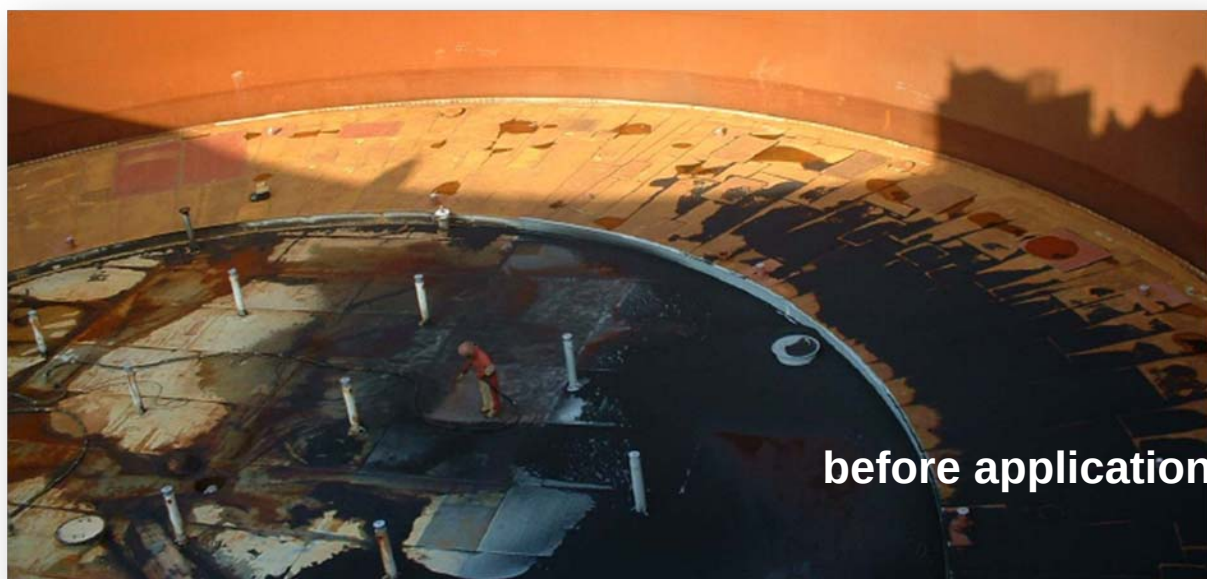


The minimum coat thickness was 80 µm and the maximum thickness was 130 µm. The adhesion was perfect.

OIL STORAGE TANK - EXXON MOBIL - UNITED KINGDOM

This floating crude-oil storage tank is located in an area called Fawley, one of Esso's biggest refineries in the United Kingdom, which is actually south of Southampton on the south coast of England. On the pictures you can see the roof of an floating crude-oil storage tank project of Exxon Mobil, the photos show the true scale of the project.

The application of ZINGA was done in August of 2007, the oil storage tank has been blasted with a profile average of 75 μm . The application team really loved working with ZINGA after using epoxies for years, as they did not have the worries about dragging blast-hoses across semi-cured coatings or applying an epoxy in the morning and letting it cure for a few hours and then continuing to blast (with grit flying everywhere) and with the first-stage epoxy ending up as an unplanned non-skid surface!



The contracting team could already walk on the ZINGA after only one hour, dragging their hoses etc and blasting adjacent to where the first-stage zinc layer stops with no adverse effects whatsoever.



System:

ZINGA 120-140 μm





MISSISSIPPI DEPARTMENT OF TRANSPORTATION BILOXI BRIDGE – UNITED STATES OF AMERICA

In **November 2002** the steel parts of the Back Bay Bascule Bridge over the Mississippi in Biloxi, were coated with ZINGA.

For the refurbishment of the Bascul Bay Bridge in Biloxi, the Mississippi Department of Transportation (MDOT) has chosen for ZINGA, taking into account the corrosion control research of the US Army.



Biloxi, Back Bay Bascule Bridge
(MDOT US 1-110)



Corrosion Prevention & Control Update

A Bulletin Dedicated to the
Establishment and Operation of an Aggressive Corrosion Prevention Control Program

In 1995, Battelle Corporation scientists updated a joint Battelle - National Institute of Standards 1978 report entitled "Economic Effects of Metallic Corrosion in the United States". In that update, it was estimated that corrosion of metal costs the United States economy almost \$300 billion per year. It was also suggested that one-third of these costs could be reduced by broader application of corrosion resistant materials and the application of best corrosion-related technical practices. The bottom line conclusion based on the current contract efforts and a decade of corrosion specific research and testing, is that the United States Army can save over 30% of its current corrosion related annual costs. This can be accomplished through continued aggressive implementation of recently adopted Army Material Commands (AMC) corrosion prevention control practices and application of commercially available corrosion protection technologies.

Extracted from the Fielded Fleet Corrosion Control Program Report, 1997

The purpose of the Corrosion Prevention & Control Update is to make important product information available to you about the approved

commercial sources referred to in the referenced study. The data provides information about commercial vendors, which are approved and available for providing information and products. The vendor information, here in, is provided in alphabetical order, with no preference given or inferred. Each company participated in the Fielded Fleet Corrosion Control Program and was chosen as an approved vendor for corrosion products and applications.

Commercial Vendor List

- **Carwell Products Inc.**
275 cooper Avenue, Suite 105
Tonawanda, NY 14150
(716) 877-2363 or 1-800-856-6798
Fax: (716) 877-2364
POC: Barry O'Halloran/ Bill Balcom
Bill@carwell.com
- **Sulzer Metco**
1101 Prospect Avenue
Westbury, NY 11590-0201
(516) 338-2303
Fax: (516) 338-2134
POC: Peter Foy/Patty Cook
- **Tafa - Midwest Thermal Spray**
2013 Marie Street
Westland, MI 48185
(313) 729-2990
Fax: (313) 729-2992
POC: Thomas Gross/Michael Poe

...List Continued

Zingametal
Industriepark VENECO
Zeehavenstraat, Belgium
385.68.81
Tel: 09 385.58.69
Fax: Piet Van Riet

Products/Applications
Zingametal Products, Inc.
Inhibitor Spray (NSN 3892-1413) - This product is approved for the inside of and wheel wells of trucks. The use of this product does not affect the infrared reflectance. Product performance was improved 30% in corrosion resistance. Additionally, the use of corroded hinges and other parts was restored to original condition with the use of this product.

approved for use on the exterior of vehicles.

Zingametal
Zinc Rich Coating - The performance of this zinc rich coating also proved to be well above the 30% improvement in corrosion protection. This product has been approved for use on the exterior of vehicles.

Points of Contact

United States

Mr. Donald Tappett
Materials Modification Inc
2929 Eskridge Road
Eskridge Centre, Merrifield
Laboratory/Suite P1
Fairfax VA 22031
(703) 560-1370 Ext. 12
Fax: (703) 560-1372

IMMC

Ms. Mary Grzenkiewicz or Mr. Gene Teufel
USATACOM
ATTN: AMSTA-IM-HHH
Warren, MI 48397-5000
(810) 374-8496/8900
DSN 786-8496/8900
Fax: (810) 574-7510

Spray System, Arc
- The performance of
proved to be well
improvement in
a corrosion resistant
product has been

The "Corrosion Prevention and Control Update", issued in 1997, describes the US Army research to reduce the costs spent on anti-corrosion protection, with 30%. Included is a list of approved vendors, amongst which Zingametal. This approval is based on the tests that are performed by the US Army Tank Automotive Command (TACOM) in Hawaii in 1995. ZINGA has been selected from a large range of anti-corrosion protection products, together with only a few other products (no direct competitors).



NEWS RELEASE SOUTH MISSISSIPPI CONGRESSMAN **Gene Taylor** 5th Congressional District

Press Contact: Amy P. Gregory • 601-864-7670 • FAX: 601-864-3099
2424 14th Street, Gulfport, MS 39501

For Immediate Release

Thursday, Dec. 23, 1999

Taylor announces \$500,000 award for I-110 bridge

U.S. Rep. Gene Taylor announced today that the U.S. Department of Transportation (DOT) has approved \$500,000 for a recoating project for the I-110 bridge at d'Iberville. The Mississippi Department of Transportation (MDOT) had requested federal funds for the testing and evaluation of a system for recoating steel bridges.

Taylor said, "This could be an important step in reducing the costs and maintenance associated with repainting bridges with a steel superstructure. The d'Iberville bridge on I-110 is a 500 foot bascule bridge. The steel is currently protected with a coating, but repainting is necessary."

MDOT wants to reduce costs by using a system of surface preparation and recoating developed by Total Rust and Corrosion, Inc. The TBI system includes a zinc rich coating called "Zinga." The system was originally developed for use in the naval and maritime industry.

Taylor said the project will result in bridges with significantly lower rehabilitation costs and will add to the expected life of bridges. He added, "It is important that this recoating process will also have less impact on our environment."

The DOT agency approving the project is the Federal Highway Administration.

In the press release dated **23/12/99**, congressman Gene Taylor announced the **recoating of the bridge with ZINGA**. This bascule bridge is the first of all bridges over the Mississippi that will be coated with ZINGA: the start of an enormous project in the USA!



Before application



The application has successfully been done in **November 2002** in presence of Zingametall and the controlling organism SGS Axa-Med.

System:

ZINGA 2 x 75 µm
(or 2 x 3 mills)





Below you can read the CAB report that was carried out on **15th November 2007**.

**COATING ADVIESBUREAU BVBA****Coating Consulting Office**

'T HOGE 11, B - 8200 BRUGGE (BELGIUM)

ASSESSMENT REPORT

SUBJECT : Back Bay Bridge - Assessment
SITE : Back Bay Bridge Biloxi,
Louisiana, USA

INSPECTION DATE : 5/11/2007**1. SPECIFICATIONS****1.1. Object description**

Back Bay Bridge – Northern approach (section 4) of the I-110 bridge in Biloxi, MS.
Estimated surface coated: 25.000 ft² (2.322,98m²)

1.2. System specifications**Surface preparation :**

Shop :

Yard : SSPC – Roughness : Rz 2 to 3 mil

DFT limits :

80/20 rule : Min. 80 % of the values must be higher than the minimum DFT
Measurements lower than the absolute minimum DFT are not accepted.
Absolute minimum DFT = 0,8 x minimum DFT.



3. CONCLUSION

The coating works executed on the Biloxi bridge in 2002 remain in a very good condition.

So far no beginning of corrosion was stated.

No accumulation of zinc salts was seen and the surfaces were equally dull grey.

Pigeons are living on the bridge parts but no destructive influence was stated due to this aggression.

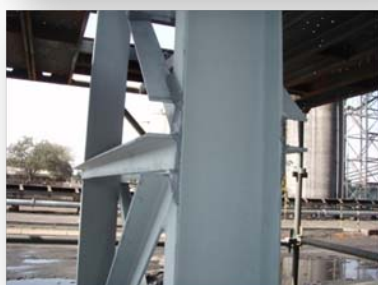
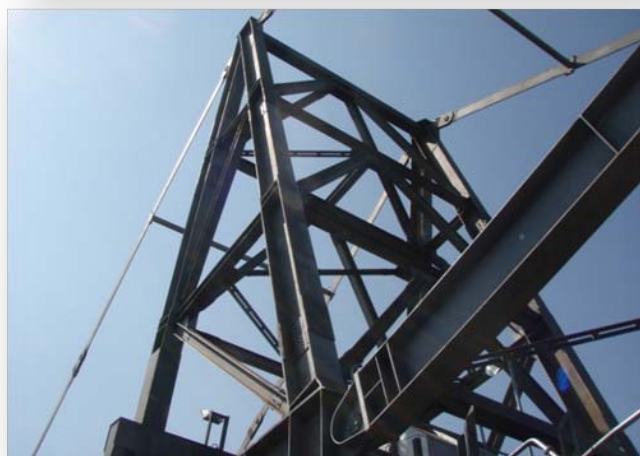
Below you can see pictures taken during the inspection on the **15th November 2007**.





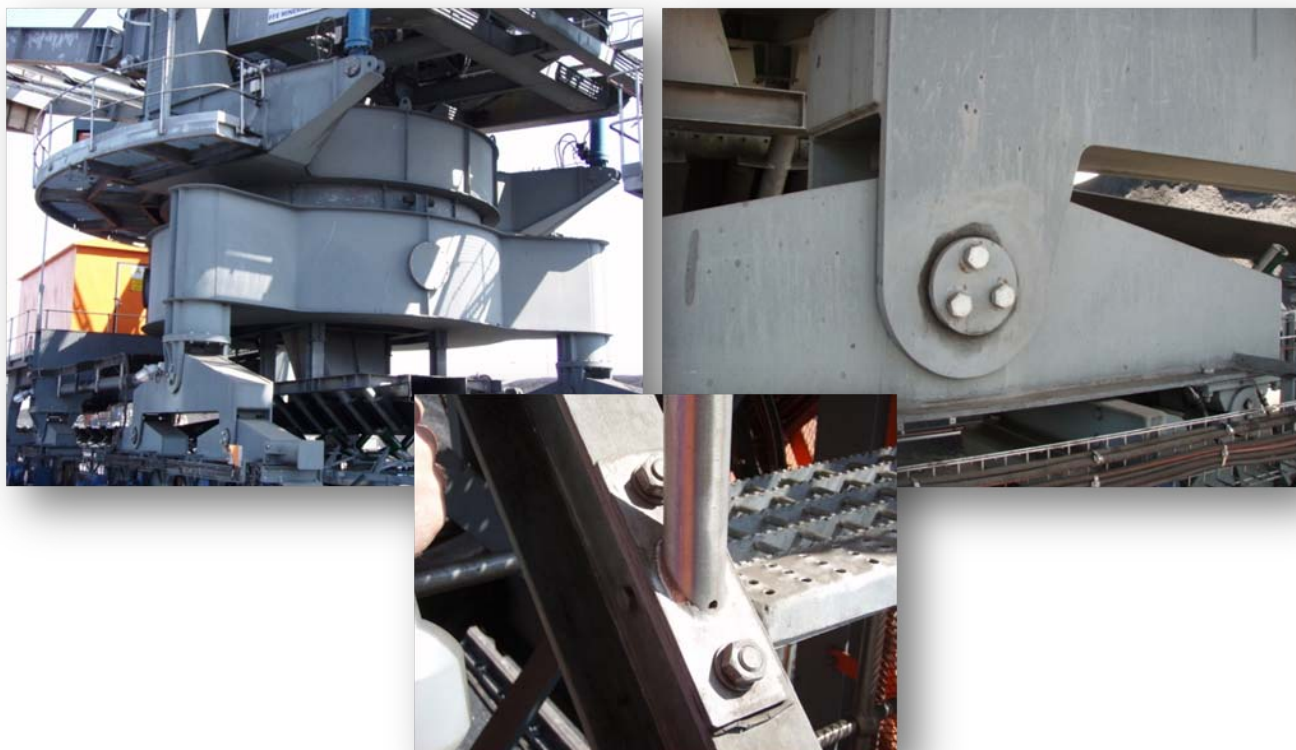
EXXARO KUMBA GROOTGELUK COALMINE – SOUTH AFRICA

In 2005 the Kumba Resources (now called Exxaro) started with the application of ZINGA on their infrastructure (6500 m² in total). Originally they applied only one thin layer of ZINGA (because they had used too much solvent) which was not enough. After application of a new ZINGA layer in March 2006, the customer was very satisfied. There were inspections in October 2006 and again in February 2007.



System:

ZINGA 120 µm



This is the conclusion of the inspection rapport dated 02/02/07, demonstrating the excellent behaviour of ZINGA.

CONCLUSION:

- 1 As per the photographic report I conclude that Zinga has achieved galvanic protection and that no deterioration of the coating was witnessed.
- 2 Structural steel installed in Plant above screens exposed to continuous moisture and water has shown no reduction on dry film thicknesses.
- 3 Column bases done with Zinga metall exposed to water, coal fines and occasional impact has shown no reduction in dry film thicknesses.
- 4 No cracking of the sealing compound from the steel column to cement base was witnessed.
- 5 Zinga must be applied in accordance with MPCS 04 and it's the responsibility of the applicator to ensure that required DFT'S are obtained.

As the representative of Zinga Metall both O'Grady's and Zinga Metall Belgium believe that it is essential that a strict Quality Control plan is introduced to eliminate application faults.

Yours Faithfully

C.P.MEYER
 NACE LEVEL 1 COATING INSPECTOR
 CIP No. 12518



ZINGA

ZM-RE-PRO-04-A (01/08/06)

The film galvanising system Zinga is a one pack coating that contains 96% zinc in the dry film and provides cathodic protection to ferrous metals. It can be used as a unique system as an alternative to hot-dip galvanisation or metallisation, as primer in a duplex system or as a recharging system for hot-dip galvanisation or metallisation. It can be applied by brushing, rolling or spraying on a clean and rough substrate in a wide range of atmospheric circumstances. Zinga is also available as an aerosol and is sold as Zingaspray.

Physical data and technical information

• Wet product

Components	- zinc powder - aromatic hydrocarbons - binder
Density	2,67 Kg/dm ³ (± 0,06 Kg/dm ³)
Solid content	- 80% by weight (± 2%) - 58% by volume (± 2%) according to ASTM D2697
Type of thinner	Zingasolv
Flash point	≥ 40°C to < 60°C
VOC	474 g/L (EPA method 24) (= 178g/Kg)

• Dry film

Colour	matt metallic grey (colour darkens after contact with humidity)
Zinc content	96% (±1%) by weight, with a purity of 99,995% Zinga gives full cathodic protection and conforms to the standard ISO 3549 in regard to its zinc purity of 99,995 % and to the standard ASTM A780 in regard of its use as repair coating for hot-dip galvanisation.
Special characteristics	- atmospheric temperature resistance - minimum : -40°C - maximum : 120°C with peaks up to 150°C - pH resistance in immersion: from 5,5 pH to 9,5 pH - pH resistance in atmospheric circumstances: from 5,5 pH to 12,5 pH - excellent UV resistance
Non-toxicity	A dry layer of Zinga is not toxic and can be used in contact with potable water, according to the standard BS 6920.



- **Packing**

500 ml	aerosol
1/4 Kg	available as sample (on request)
1 Kg	available, packed in undividable boxes of 12 x 1 Kg
2 Kg	available, packed in undividable boxes of 6 x 2 Kg
5 Kg	available
10 Kg	available
25 Kg	available

- **Conservation**

Storage	store in a cool and dry place
Shelf life	unlimited In case of long time storage it is recommended to shake the unopened tin in an automatic shaker at least once every 3 years.

Application data

- **System recommendations**

Unique system	- Zinga is used as a stand-alone system, applied in 2 or 3 layers to obtain a total maximum DFT* of 120 to 180 µm. - This system is strongly recommended because of the easy maintenance. In time the layer will become thinner as the Zinga sacrifices itself due to the cathodic protection. A new layer of Zinga can be directly applied once the surface has been properly cleaned and it will re-liquidise and recharge the previous Zinga layer. The DFT of Zinga that should be applied depends upon the remaining Zinga layer. - The system Zinga 2 x 60 µm DFT conforms to the standards: NORSOK M-501 syst. 7 ISO 12944-6: 2 x 60µm DFT ZINGA: C4-High, C5M-Medium and C5I-Medium 2 x 90µm DFT ZINGA: C5M-High and C5I-High
Duplex system	- In a duplex system, Zinga should be applied in one single application, preferably by spraying, to obtain a maximum DFT of 60 to 80 µm. - The surface of the Zinga should be free of zinc salts and other contaminations prior to application of a topcoat. - Zinga can be topcoated with a wide range of compatible sealers and topcoats. To avoid pinholes when topcoated, use the mist coat & full coat technique (meaning a standard diluted coat of 25 to 30µm DFT followed by a full coat of the same product).
Stripe-coat	It is recommended to apply a stripe-coat of Zinga by brush on all sharp edges, nuts and bolts and weld areas before the application of the first full layer of Zinga.
Recharging system	Zinga can be applied on top of a hot-dip galvanising layer, a metallisation layer or an old Zinga layer in order to renew or enhance the cathodic protection. The DFT of Zinga that should be applied depends upon the existing galvanising layer.

*DFT & WFT : dry film thickness and wet film thickness ; to be measured **above the peaks** of the roughness profile



- **Coverage and consumption**

Theoretical consumption	- for 60 µm DFT : 0,28 Kg/m ² or 0,10 L/m ² - for 120 µm DFT : 0,55 Kg/m ² or 0,21 L/m ²
Theoretical coverage	- for 60 µm DFT : 3,62 m ² /Kg or 9,67 m ² /L - for 120 µm DFT : 1,81 m ² /Kg or 4,83 m ² /L
Practical coverage	depends upon the roughness profile of the substrate and the application method

- **Environmental conditions during application**

Ambient temperature	- minimum -15°C - maximum 40°C
Relative humidity	- maximum 95%
Surface temperature	- minimum 3°C above the dew point - no visual presence of water or ice - maximum 60°C
Product temperature	During application the temperature of the Zinga liquid must remain between 15 and 25°C. A lower or higher temperature of the product will influence the smoothness of the film when drying.

- **Drying process and overcoating**

Drying process	Zinga dries by evaporation of the solvent. The drying process is influenced by the total WFT, the number of coats applied, the ambient air and surface temperatures and the air circulation.
Drying time	for 40 µm DFT at 20°C in a well-ventilated environment: - touch-dry: after 10 min. - dry to handle: after 1 hour - fully cured: after 48 hours - ready for immersion: after 2 hours
Overcoating	- with a new layer of Zinga : - brush : 2 hours after touch dry - spray gun : 1 hour after touch dry - with a compatible paint : after 6 to 24 hours depending on the drying conditions
Reliquidisation	Each new layer of Zinga reliquidises the former Zinga layer so that both layers form one homogeneous layer.



Instructions for use

- Surface preparation

Cleanliness	- The most common method to obtain a clean (and at the same time rough) surface for the application of Zinga is: The metal substrate should first be degreased, preferably by steam-cleaning at 140 bar at 80°C. After that it should be grit-blasted or slurry-blasted to cleanliness degree SA 2,5 according to the standard ISO 8501-1 or to the cleanliness degree described in the standards SSPC-SP10 and NACE nr 2. This means that the surface must be free from rust, grease, oil, paint, salt, dirt, mill scale and other contaminants. Once the grit-blasting is completed the surface should be de-dusted with non contaminated compressed air according to the standard ISO 8502-3 (class 2) or in case of slurry-blasting the surface should be dried with non-contaminated compressed air. - Another method to obtain a clean surface is UHP water-jetting to cleanliness degree WJ2 according to the standards NACE nr 5 and SSPC-SP12 level SC1. But keep in mind that this method does not create surface roughness. - This high degree of cleanliness is not needed when Zinga is applied on a hot-dip galvanisation or a metallisation layer, or when it is applied on top of an existing Zinga layer. Please consult with the Zingametall representative. - For substrates that will not be immersed Zinga can be applied on mild flash rust (FWJ-2) occurring in the allowed time limit. For applications that will be immersed Zinga can only be applied on an SA 2,5 prepared surface with contaminants to NACE No5/SSPC SP-12 level SC1 unless otherwise agreed with the Zingametall representative. - On small areas or on non-critical applications Zinga can be applied on a surface that is manually prepared to degree St 3 according to ISO 8501-1. Please consult with the Zingametall representative.
Roughness	- Zinga should be applied on a metal substrate that has roughness degree Rz 50 to 70 µm (for total DFT < 280 µm) or Rz 60 to 80 µm (for total DFT > 280 µm) according to the standard ISO 8503-2. This can be obtained by grit-blasting (with sharp particles) but not by shot-blasting (with spherical particles). Make sure that the surface is degreased before the grit-blasting. - This high degree of roughness is not needed when Zinga is applied on a hot-dip galvanisation or a metallisation layer, or when it is applied on top of an existing Zinga layer. Please consult with the Zingametall representative. - On small areas or on non-critical applications Zinga can be applied on a surface that is manually prepared e.g. with a needle gun or a grinding disk, in order to obtain an adequate roughness for Zinga. Please consult with the Zingametall representative.



Maximum time to application	Apply the Zinga as soon as possible on the prepared surface. - in dry circumstances : depending on the location - in case of water-cleaning or if the relative humidity is close to 80%: max. 4 hours waiting time If contamination occurs before coating, the surface must be cleaned again as described above. Flash rust can be removed by means of a wire brush.
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- **Special instructions**

Stirring	- Zinga must be thoroughly stirred to achieve a homogeneous liquid before application. After a maximum of 20 min. re-mixing is necessary. - During the spraying application, the product must be stirred continuously.
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Dilution	Zinga can be diluted with 0 to 5% (volume on volume) of Zingasolv when using airless spray equipment and 0 to 25% for air supported applications. The Zingasolv must be added whilst stirring.
Rinsing of tools and equipment	Before and after using the spraying equipment, it must be rinsed with Zingasolv. Brushes and rollers should also be cleaned with Zingasolv. Never use White Spirit.
Special demands for spraying equipment	- Pour the Zinga through a filter of 100 mesh (150 µm) into the drum. - For the spraying of Zinga, it is better to remove all filters from the pistol and from the drum to avoid blockage. - The spray gun must be equipped with reinforced needle springs.

- **Application by brush and roller**

Viscosity	Zinga is ready for use when applied by brush or roller. Do not dilute.
First layer	The first layer must never be applied by roller, only by brush, in order to fill the cavities of the roughness profile and to wet the surface.
Type of brush and roller	- short hair roller (mohair) - industrial round brush

- **Application by conventional spray-gun**

Dilution	0 to 25% (volume on volume)
Spray viscosity	25 to 35 sec. Ford cup nr. 4 at 20°C
Pressure at the nozzle	2 to 4 bar
Nozzle opening	2,2 to 2,5 mm
Remark	Make sure ZINGA is stirred frequently so the zinc in ZINGA cannot settle to the bottom.

- **Application by conventional spray-gun with pressure pot**

Dilution	0 to 25% (volume on volume)
Spray viscosity	25 to 35 sec. Ford cup nr. 4 at 20°C
Pressure at the nozzle	3 to 4 bar
Pot pressure	0,8 to 1,5 bar
Nozzle opening	1,8 to 2,2 mm



- **Application by airless spraying**

Dilution	0 to 5% (volume on volume)
Pressure at the nozzle	± 150 bar
Nozzle opening	± 0,023 inch

- **Other application methods**

Please consult with the Zingametall representative.

For more specific and detailed recommendations concerning the application of Zinga, please contact the Zingametall representative. For detailed information about the health and safety hazards and precautions for use, please refer to the Zinga **safety data sheet**.

Waiver*

* The information on this sheet is merely indicative and is given to the best of our knowledge based on practical experience and testing. The conditions or methods of handling, storage, use or disposal of the product cannot be controlled by us and are therefore outside our responsibility. For these and other reasons we retain no liability in case of loss, damage or costs that are caused by or that are linked in any way to the handling, storage, use or disposal of the product. Any claim concerning deficiencies must be made within 3 months upon reception of the goods quoting the relevant batch number. We retain the right to change the formula if properties of the raw material are changed. This data sheet replaces all former specimens.



ALU ZM

ZM-RE-PRO-04-A (01/08/06)

Alu ZM is a quick drying one pack coating based on aluminium flakes. It can be applied either without primer on an old, non-corroded hot-dip galvanisation or metallisation layer or as topcoat on top of Zinga. It can be applied by brushing or spraying in a wide range of atmospheric circumstances. Alu ZM is mainly applied for esthetical reasons as it gives a nice aluminium aspect and has a good chemical resistance which allows it to be used in industrial environments.

Physical data and technical information

- **Wet product**

Components	- aluminium powder - aromatic hydrocarbons - binder
Density	1,01 Kg/dm ³ ($\pm$ 0,05 Kg/dm ³)
Solid content	- 35% ($\pm$ 2%) by weight - 25% ($\pm$ 2%) by volume
Type of thinner	Zingasolv (does not contain xylene or MEK)
Flash point	$\geq 40^{\circ}\text{C}$ to $< 60^{\circ}\text{C}$

- **Dry film**

Colour	aluminium
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- **Packing**

1 L	available, packed in undividable boxes of 6 x 1 L
2,5 L	available
15 L	available

- **Conservation**

Storage	store in a cool and dry place
Shelf life	unlimited In case of long time storage it is recommended to shake the unopened tin from time to time.



Application data

• System recommendations

As topcoat on Zinga	Alu ZM can be applied in 1 layer of 40 to 60 µm DFT as topcoat (by airspray or airless) on top of the anti-corrosion system Zinga on a metal substrate. Even though we always recommend maximum 60 µm DFT for Zinga in a duplex system, in combination with Alu ZM, the maximum layer thickness of Zinga is 120µm DFT in 1 layer applied by airless.
Stripe-coat	We recommend applying a stripe-coat of Alu ZM by brush on all sharp edges, nuts and bolts and welding areas before the application of the first full layer of Alu ZM.

• Coverage and consumption

Theoretical consumption	- for 40 µm DFT : 0,16 L/m ² - for 80 µm DFT : 0,32 L/m ²
Theoretical coverage	- for 40 µm DFT : 6,19 m ² /L - for 80 µm DFT : 3,09 m ² /L
Practical coverage	depends upon the application method

• Environmental conditions during application

Ambient temperature	- minimum -15°C - maximum 40°C
Relative humidity	- maximum 95%
Surface temperature	- minimum 3°C above the dew point - no visual presence of water or ice - maximum 60°C

• Drying process and overcoating

Drying process	Alu ZM dries by evaporation of the solvent. The drying process is influenced by the total WFT, the number of coats applied, the ambient air and surface temperatures and the air circulation.
Drying time	for 40 µm DFT at 20°C in a well-ventilated environment with at least 60% relative humidity : - touch-dry : after 25 min. - dry to handle : after 1,5 hour - fully cured : after 24 hours
Overcoating	- with a new layer of Alu ZM : 1 hour after touch dry - Any intermediate coat contamination that could disturb the adherence of the next coat should be removed by appropriate cleaning.
Reliquidisation	Each new layer of Alu ZM reliquidises the former Alu ZM layer so that both layers form one homogeneous layer.



Instructions for use

• Surface preparation

Cleanliness	- When Alu ZM is applied on top of Zinga, the surface should be free of zinc salts and other contaminations. That means that the Alu ZM must be applied within 24 hours after the application of the Zinga. In case the application of the Alu ZM can only be done after 24 hours, the Zinga surface should first be washed preferably by steam-cleaning at 140 bar at 80°C.
Roughness	When Alu ZM is applied on top of a new hot-dip galvanisation layer, the surface should be roughened by blasting with wet inert product, by using Scotch Brite or a nylon brush.
Maximum time to application	Apply the Alu ZM as soon as possible on the prepared surface. - in dry circumstances : max. 24 hours waiting time - if the relative humidity is close to 80% : max. 4 hours waiting time If contamination occurs before coating, the surface must be cleaned again as described above.

• Special instructions

Stirring	- Alu ZM must be thoroughly stirred to achieve a homogeneous liquid before application. After a maximum of 20 min. re-mixing is necessary. - During the spraying application, the product must be stirred continuously.
Dilution	Alu ZM can only be diluted with Zingasolv.
Rinsing of tools and equipment	Before and after using the spraying equipment, it must be rinsed with Zingasolv. Brushes should also be cleaned with Zingasolv. Never use White Spirit.

• Application by brush

Viscosity	Alu ZM is ready for use when applied by brush. Do not dilute.
Type of brush	- industrial round brush

• Application by roller

Viscosity	Alu ZM is ready for use when applied by roller. Do not dilute.
Type of brush	Industrial short haired roller (not foam based)



- **Application by conventional spray-gun**

Viscosity	10 to 20% Zingasolv (volume on volume)
Pressure at the nozzle	2 to 4 bar
Nozzle opening	1,4 to 1,8 mm

- **Application by conventional spray-gun with pressure pot**

Viscosity	10 to 20% Zingasolv (volume on volume)
Pressure at the nozzle	2 to 4 bar
Pot pressure	0,8 to 1,5 bar
Nozzle opening	1,4 to 1,8 mm

- **Application by airless spraying**

Dilution	0 to 5% (volume on volume)
Pressure at the nozzle	100 to 200 bar
Nozzle opening	0,017 to 0,021 inch

For more specific and detailed recommendations concerning the application of Alu ZM, please contact the Zingametall representative. For detailed information about the health and safety hazards and precautions for use, please refer to the Alu ZM **safety data sheet**.

Waiver*

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ALUFER N

ZM-RE-PRO-04-A (01/08/06)

Alufer N is a moisture curing one pack polyurethane. Micaceous iron oxides create the special lamellar structure which create a very tight paint film

→ excellent water and corrosion resistance.

Alufer N can be applied as an intermediate and/or topcoat on Zinga.

Alufer N can be used for immersion in water, sea water and several chemicals.

Physical data and technical information

- **Wet product**

Components	- micaceous iron oxides - aluminium silicates - magnesium silicates
Binder	moisture curing aromatic polyisocyanate prepolymers.
Density	1,52 Kg/dm ³ (± 0,05 Kg/dm ³) at 20°C
Solid content	- 79% by weight (± 2%) - 66% by volume (± 2%)
Viscosity	105 KU (± 5 KU) at 20°C
VOC	300 g/L (= 198 g/Kg)

- **Dry film**

Colour	Grey
Gloss	Mat

- **Packing**

1 L	available (per box of 6 L)
4 L	available
20 L	available

- **Conservation**

Storage	2 years in the original, unopened package stored in a dry environment at temperatures between -20°C and +40°C.
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Application data

- **Surface preparation**

When the waiting time between the successive coats is abnormally prolonged or in extremely polluted areas, the primed surface can become contaminated. All contamination that hampers the adhesion of the paint should be removed by appropriate means.

Surfaces contaminated with oil and grease should be washed down with solvent, alkaline solutions or emulsifier.

Salt deposits or other water-soluble contaminations should be removed with water and brush, water under high pressure or steam. Possible white zinc rust on zinc dust primers should be removed with water and rigid nylon brush.

- **Coverage and consumption**

Theoretical coverage	- for 80 µm DFT: 7,5 m ² /L - for 100 µm DFT: 6,0 m ² /L - for 150 µm DFT: 4,0 m ² /L
Practical coverage	depends upon the roughness profile of the substrate and the application method

- **Environmental conditions during application**

Ambient temperature	- minimum 0°C - maximum 35°C
Relative humidity	- minimum 30% - maximum 98%
Surface temperature	- minimum 3°C above the dew point

- **Drying process and overcoating**

Drying time	for 80 µm DFT at relative humidity of 75%: - 10°C: dustdry: 2,5 hours tackfree: 4 hours dry: 6 hours - 20°C: dustdry: 1 hours tackfree: 2,5 hours dry: 4 hours - 30°C: dustdry: 40 minutes tackfree: 1,5 hours dry: 3 hours
Overcoating	for 80 µm DFT at relative humidity of 75%: 10°C: minimum: 24 hours maximum: 3 months 20°C: minimum: 6 hours maximum: 1 month 30°C: minimum: 4 hours maximum: 1 week Remark: At longer intervals a good cleaning is necessary to avoid intermediate coat contamination which could disturb the adherence of the next coat.



Instructions for use

- **Application by brush and roller**

Dilution	5 to 10% with Zingasolv
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- **Application by conventional spray-gun**

Dilution	10 to 20% with Thinner 41
Pressure at the nozzle	3 to 5 bar
Nozzle opening	1,2 to 1,5 mm

- **Application by airless spraying**

Dilution	5 to 15% with Thinner 41
Pressure at the nozzle	100 to 300 bar
Nozzle opening	0,017 to 0,024 inch

- **Remarks**

Stripe coat	It is always recommended to treat corners, sharp edges, bolts and nuts before applying a uniform coat.
Dry layer thickness	Recommended: 60 to 100 µm Maximum: 120 to 160 µm
Cleaning	With Zingasolv

For more specific and detailed recommendations concerning the application of Alufer N, please contact the Zingametall representative. For detailed information about the health and safety hazards and precautions for use, please refer to the Alufer N **safety data sheet**.

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