



REFERENCES & SYSTEM DESCRIPTIONS OF ZINGA® APPLICATIONS FOR EXTREME CONDITIONS

Zingametall bvba - Rozenstraat 4 - 9810 Eke – Belgium

Tel: +32/9/385.68.81 - Fax: +32/9/385.58.69

E-mail: zingametall@zinga.be - www.zinga.be





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, a roll or painting gloves. 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 45° C or 113° F and down to -15° C or 5° F).
4. ZINGA can be applied on a non-contaminated rusty surface. Once the loose particles have been removed, ZINGA will attach itself perfectly onto the surface.
5. 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.
6. 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 620 °C.
7. ZINGA has a quick drying time. A new layer of ZINGA can be applied after 1 hour. Topcoats can be applied after 4 to 24 hours, depending on layer thickness and atmospheric conditions.
8. 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.
9. 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.



10. 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.
11. 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.
12. 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.
13. 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.
14. 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.
15. 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.
16. 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.
17. 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: epoxy, polyurethane, vinyl and especially developed micaceous iron oxides, the so-called M.I.O.'s. These paints can be applied directly on ZINGA. The lifetime of a duplex system, which is the combination of an active and a passive protection system, is not equal to the sum of the lifetimes of these systems, but it is more than double of this sum.
18. 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.
19. ZINGA is composed of non-toxic elements according to European Standards and can be used in contact with potable water (BS 6920).
20. ZINGA is heat resistant up to 120° C. ZINGA can also intercept occasional and short thermal shocks up to 150° C.



21. ZINGA has fire retardant properties. Moreover, ZINGA is used as primer in the fire resistant system Euroflam: ZINGA, topcoated with the intumescent paint Aquaflam EX and the finishing layer Alkyd RS. This system is the most unique fire protection system in the world. The intumescent paint Aquaflam EX foams up when it is heated. The foam forms an isolation barrier and protects the steel from heat and flames.
22. 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 nv) (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.

NORSOK Certificate (COT nv) (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 (Netherlands)

Determining the galvanic protection

The results showed active behavior of this film (-1114mV using Cu/CuSO₄). 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 at B-Holding (Belgian Railways)

Bend test of ZINGA in layer thickness around 70µm DFT over different diameters

The zingانىsed plates were bended over different diameters (ISO 1519).

ZINGA showed no traces of cracks when the plate was bended over diameter 20mm. If bended over smaller diameters (down to 10mm), cracks were visible, but ZINGA didn't come off which is one of the biggest differences with paints and hot-dip galvanisation.

University of Ghent (Belgium)

Pull-out test on zingانىsed 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 zingانىsed rebars at B-Holding (Belgian Railways)

Adherence of concrete to zingانىsed 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. COW SHED BEAMS - BELARUS	BY-AG-Cow Shed
2. DAIRY FARM VITEBSK - BELARUS	BY-AG-Dairy farm
3. MARTENS DIRK – AGRICULTURAL MACHINERY - BELGIUM	BE-AG-OL-TE-Martens
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. SEOUL AIR CONDITIONING – SOUTH KOREA	KR-AL-PI-Seoul Air Conditioning
4. HIGHWAY DEPARTMENT - THAILAND	TH-AL-Highway Department

AM: Historical and recreational buildings

1. MUSEUM HOTEL IN WENDAKE - QUEBEC	CA-AM-CO-Wendake
2. BIRD'S NEST - CHINA	CN-AM-Bird's Nest
3. GENT - KIOSK – BELGIUM	BE-AM-CO-OL-Gent Kiosk
4. METRO – MINSK – BELARUS	BY-AM-LT-TC-Metro
5. RENOVATION SCHOOL SAINT-JOSEPH – LEVIS QUEBEC	CA-AL-AM-HD-Saint-Joseph
6. PARLIAMENT BUILDING - QUEBEC	CA-AM-Parliament Building Quebec
7. EGLISE SAINTE THERESE – CHURCH – CANADA	CA-AM-Eglise Sainte Thérèse
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.	USNS ZEUS CABLESHIP - USA	CA-AR-MA-HD-SH-USNS Zeus Cablesheet
4.	POLES ARMY TENTS - UNITED KINGDOM	UK-AR-DI-Poles Army Tents
5.	US ARMY - ARMY VEHICLES - UNITED STATES OF AMERICA	US-AR-HD-OL-TE-TR-US Army
6.	MISSISSIPPI DEPARTMENT OF TRANSPORTATION BILOXI BRIDGE – UNITED STATES OF AMERICA	US-AR-BR-TE-MDOT
7.	NEXRAD TOWER – UNITED STATES OF AMERICA	US-AR-PY-Nexrad Tower

AS: Automatic spraying lines

8.	REBAR SPRAYING INSTALLATION TEHRAN HARA - IRAN	IR-AS-RE-AutomSprayLine
----	--	-------------------------

AZ: Aquazinga

1.	FLOREAC – COAL FUNNEL – BELGIUM	BE-AZ-HT-OL-Floreac
2.	CARSID - BELGIUM	BE-AZ-HT-OL-TE-Carsid
3.	J.M. INDUSTRIAL – RACKS, METAL EQUIPMENT AND STRUCTURES IN BRICK MANUFACTURING FACTORIES- BELGIUM	BE-AZ-CE-HU-OL-TE-JM Ind
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.	MOLISSON STREET BRIDGE- AUSTRALIA	AU-BR-Molisson Street Bridge
2.	QUEENSLAND RAILWAY BRIDGES - AUSTRALIA	AU-BR-RW-QR Railway Bridges
3.	REYNELLA BRIDGE - AUSTRALIA	AU-BR-TC-Reynella Bridge
4.	EUROPEAN TECHNICAL ASSOCIATION FOR PROTECTIVE COATINGS - BELGIUM	BE-BR-OL-TE-ETAPC
5.	DE BRANDT – FENDER CONSTRUCTIONS - BELGIUM	BE-BR-IM-OL-De Brandt
6.	MELLE BRIDGE - BELGIUM	BE-BR-OL-TC-Melle Bridge
7.	GENT - KEIZER BRIDGE - BELGIUM	BE-BR-CR-OL-Keizer Bridge
8.	WEGENFONDS BRIDGE - BELGIUM	BE-BR-OL-Wegenfonds
9.	RUMST BRIDGE – BELGIUM	BE-BR-Rumst Bridge
10.	RAILWAY OFFICE - BENIN	BJ-BR-OL-RW-Chemins Fer
11.	DR QUESNELL BRIDGE EDMONTON CANADA	CA-BR-Dr Quesnell Bridge Edmonton
12.	CONFEDERATION BRIDGE - CANADA	CA-BR-OL-Confederatie
13.	BC FERRY TERMINALS - CANADA	CA-BR-MA-OL-TE-BC Ferry
14.	OVERLANDER BRIDGE - CANADA	CA-BR-OL-TE-Overlander
15.	HANGZHOU BAY BRIDGE - CHINA	CN-BR-RE-Hangzhou Bay
16.	BLANICE RIVER BRIDGE – CZECH REPUBLIC	CZ-BR-OL-Blanice
17.	EL SALAAM BRIDGE - EGYPT	EG-BR-MA-PI-TE-Salaam
18.	AUTOMATED PARKING SYSTEMS SILODAM AMSTERDAM – NETHERLANDS	NL-BR-CO-Automated Parking Systems Silodam Amsterdam
19.	KALVOYA BRIDGE - NORWAY	NO-BR-MA-OL-TE-Kalvoya
20.	BRIDGE GIRDERS – POLAND	PL-BR-Girders
21.	FOOTBRIDGES AND PROTECTION BARRIERS BYDGOSZCZ - POLAND	PL-BR-CR-Bydgoszcz
22.	RENOVATION OF THE SIERKIERKOWSKI BRIDGE IN WARSAW, NATIONAL ROAD- POLAND	PL-BR-CR-Sierkierkowski Bridge



23.	ST PAUL – JETTY – REUNION	RE-BR-MA-St. Paul
24.	TEMPVAR BRASOV BRIDGE – ROMANIA	RO-BR-PI-Tempvar Brasov Bridge
25.	NEWARK MARINA BRIDGE - UNITED KINGDOM	UK-BR-OL-Newark Mar.
26.	TAXI BERTH BRIDGE IN CARDIFF BAY - UNITED KINGDOM	UK-BR-Taxi Berth
27.	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
----	------------------------------	-----------

CE: Cement factories and brick manufacturing companies

1.	HOLCIM GRANULATS - CEMENT FACTORY - BELGIUM	BE-CE-OL-TE-Holcim
2.	J.M. INDUSTRIAL – RACKS, METAL EQUIPMENT AND STRUCTURES IN BRICK MANUFACTURING FACTORIES- BELGIUM	BE-AZ-CE-HU-OL-TE-JM Ind.
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.	DULLE GRIET - CANNON – BELGIUM	BE-CI-TC-Dulle Griet
2.	DE GIEY – THE FENCE OF THE CASTLE - BELGIUM	BE-CI-CR-OL-De Giey
3.	KLEIN KASTEELKEN – CAST IRON FENCE - BELGIUM	BE-CI-CR-OL-TC-Klein Kasteelken
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.	ANTWERP - PORT CRANES – BELGIUM	BE-CN-OL-Antwerp Port Cranes
2.	HARBOUR OF GENK – BELGIUM	BE-CN-OL-TE-KHG
3.	MENGE – THE TOWER CRANE OF THE COMPANY MENGE, SPECIALISED IN RENOVATION OF CHIMNEYS - BELGIUM	BE-CN-Menge
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.	DENDERMONDE - BACOB BANK – BELGIUM	BE-CO-OL-Bacob
3.	CNO – A COOLING TOWER - BELGIUM	BE-CO-OL-CNO
4.	BLANKENBERGE - PARAVENT – BELGIUM	BE-CO-CR-MA-OL-Paravent
5.	DUFERCO – A SHELTER – BELGIUM	BE-CO-Duferco
6.	LAFAUT – PRIVATE HOME FAMILY JOY – BELGIUM	BE-CO-Lafaut
7.	SE INDUSTRIES - CONSTRUCTION AND ENGINEERING – BELGIUM	BE-CO-OL-SE Industries
8.	TRACTEBEL – POWER STATION - BELGIUM	BE-CO-EL-OL-TE-Tractebel



9.	METAL CONSTRUCTIONS – VAN HEE - BELGIUM	BE-CO-Van Hee
10.	MAKO BETON - RACKS - BELGIUM	BE-CO-Mako Beton
11.	OPMETAAL - CHASSIS - BELGIUM	BE-CO-Opmetaal
12.	TEATRO MUNICIPAL - BRAZIL	BR-CI-CO-TC-Teatro
13.	ROHR – BUILDING INDUSTRY (SCAFFOLDING, TUBES, ...) - BRAZIL	BR-CO-Rohr
14.	TECHNICAL FAIR - BULGARIA	BG-CO-TE-TechnFair
15.	MUSEUM HOTEL IN WENDAKE - QUEBEC	CA-AM-CO-Wendake
16.	METRO VANCOUVER SKYTRAIN – CANADA	CA-CO-Metro Vancouver Skytrain
17.	DÜSSELDORF - AIRPORT - GERMANY	DE-AP-CO-HD-OL-TE-Düss.Airport
18.	SCHALKE 04 – FOOTBALL STADION - GERMANY	DE-CO-Schalke
19.	ZDF TELEVISION BROADCASTING STATION – CONSTRUCTION -GERMANY	DE-CO-OL-ZDF
20.	JEAN D'HUART - STEEL SUPPLIER AND APPLICATOR - FRANCE	FR-CO-D'Huart
21.	LE MANS CENTRE OF SPORTS AND CULTURE STEEL CONSTRUCTION FRANCE	FR-CO-OL-Le Mans
22.	RENAULT - CAR MANUFACTURING COMPANY - FRANCE	FR-CO-OL-TE-TR-Renault
23.	DUBLIN HOME – IRELAND	IE-CO-DublinHome
24.	MINISTRY OF PUBLIC WORKS – KUWAIT	KW-CO-Ministry of Public Works
25.	VENTILATION PIPES - MOROCCO	MA-CO-Ventilation shaft
26.	AUTOMATED PARKING SYSTEMS SILODAM AMSTERDAM - NETHERLANDS	NL-BR-CO-Automated Parking Systems Silodam Amsterdam
27.	CONTAINERS AND METAL GIRDERS - POLAND	PL-CO-TA-ZREMB
28.	LONDON – CARDINAL PLACE - UNITED KINGDOM	UK-CO-Cardinal Place
29.	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.	BLANKENBERGE - PARAVENT – BELGIUM	BE-CO-CR-MA-OL-Paravent
3.	ANTWERP - CRASH BARRIERS – BELGIUM	BE-CR-OL-Antwerp
4.	INTERCOMMUNALE E3 - METAL CONSTRUCTIONS - BELGIUM	BE-CR-OL-TE-Intercomm.
5.	CALLUWAERTS - FENCE – BELGIUM	BE-CR-Calluwaerts
6.	CHIMAY – SIGN OVER THE HIGHWAY - BELGIUM	BE-CR-Chimay
7.	DE GIEY – THE FENCE OF THE CASSTLE - BELGIUM	BE-CI-CR-OL-De Giey
8.	SLAUGHTERHOUSE CHARLEROI - BELGIUM	BE-CR-FO-HD-LT-OL-TE-Abattoir Charleroi
9.	HERAS – A FENCE – BELGIUM	BE-CR-OL-Heras
10.	GENT - KEIZER BRIDGE - BELGIUM	BE-BR-CR-OL-Keizer Bridge
11.	KLEIN KASTEELKEN – CAST IRON FENCE - BELGIUM	BE-CI-CR-OL-TC-Klein Kasteelken
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 BYDGOSZCZ - POLAND	PL-BR-CR-Bydgoszcz
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-SuvarnabhumiAirport



- | | | |
|----|--|------------------------------------|
| 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. | SLAVETICE TRANSFORMER STATION – CZECH REPUBLIC | CZ-EL-PY-Slavetice |
| 9. | TEMELIN NUCLEAR POWER PLANT - CZECH REPUBLIC | CZ-EL-OL-Temelin |
| 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-Electrica |
| 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. | SLAUGHTERHOUSES - BELGIUM | BE-FO-OL-Goossens |
| 3. | IGLO OLA – METAL STRUCTURES - BELGIUM | BE-FO-Iglo Ola |
| 4. | DOSSCHE – CATTLE FEED TANKS - BELGIUM | BE-FO-TA-Dossche |
| 5. | QUARTES CATTLE FEED COMPANY - BELGIUM | BE-FO-HD-OL-TA-TE-Quartes |
| 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.	GUANGZOU NEW BAIYUN AIRPORT - CHINA	CN-AP-HD-Baiyun
13.	CHONGQING BROADCASTING COMPANY - CHINA	CN-HD-PY-Chong Broad
14.	DÜSSELDORF AIRPORT - GERMANY	DE-AP-CO-HD-OL-TE-Düss. Airport
15.	CATTLE- AND PIGFARM - FINLAND	FI-AG-FO-HD-Cattle and Pigfarm
16.	DIRECTION DEPARTEMENTALE DE L'EQUIPEMENT, VENDEE SEA BUOYS – FRANCE	FR-HD-IM-MA-OL-TE-Sea Buoys
17.	ZINGA ANTICORROSION DISTRIBUTOR - FRANCE	FR-HD-TE-Guerin
18.	OHENE DJAN SPORT STADIUM LIGHT POLES - GHANA	GH-AM-HD-PY-OheneDjanstadium
19.	PLN HIGH TENSION PYLONS – INDONESIA	ID-EL-HD-PY-PLN High Tension Pylons
20.	GRAIN SILOS NADOR CEREALES – MOROCCO	MA-AG-HD-TA-Grain Silos Nador Cereales
21.	TENAGA NASIONAL BERHAD - PYLONS - MALAYSIA	MY-HD-PY-Tenaga Nasional Berhad
22.	PHCN - POWER HOLDING COMPANY OF NIGERIA - NIGERIA	NG-HD-PY-PHCN
23.	NATIONAL GRID CORPORATION PHILIPPINES – PHILIPPINES	PH-EL-HD-PY-National Grid Corporation Philippines
24.	SANTA RITA BALFOUR BEATTY – PHILIPPINES	PH-EL-HD-PY-Santa Rita Balfour Beatty
25.	YUZHNY GREENHOUSE FARM - RUSSIA	RU-AG-HD-Yuzhny
26.	GLOW ENERGY PUBLIC COMPANY MONOPOLES - THAILAND	TH-EL-HD-PY-Glow Energy Public Company Monopoles
27.	LIGHT POLES – DON MUANG TOLL WAY – THAILAND	TH-HD-PY-Don Muang Toll
28.	FORMOSA PLASTICS COMPANY TRANSMISSION TOWERS - TAIWAN	TW-EL-HD-PY-Formosa
29.	POWER COMPANY – POWER PYLONS - TAIWAN	TW-EL-HD-OL-PY-TE-TPC
30.	EDEN GREENHOUSE DOME – UNITED KINGDOM	UK-AG-HD-HT-TP-Eden
31.	CULVERTS – UNITED KINGDOM	UK-HD-HU-IM-UN-Culverts
32.	KIEV ENERGO POWER PLANT - UKRAINE	UA-EL-HD-PY-Kiev Energo
33.	US ARMY -UNITED STATES OF AMERICA	US-AR-HD-OL-TE-TR-US Army
34.	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.	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.	DIRECTION DEPARTEMENTALE DE L'EQUIPEMENT, VENDEE SEA BUOYS – FRANCE	FR-HD-IM-MA-OL-TE-Sea Buoys
4.	BANGOR PIER – IMMERSED PILES - IRELAND	IE-IM-MA-Bangor
5.	KILLYBEGS FISHING PIER - IMMERSED PIER LEGS - IRELAND	IE-IM-MA-TE-Killybegs pier
6.	SLUICE GATES WEST BENGAL – INDIA	IN-IM-Sluice gates West Bengal
7.	TRASH RACKS POWER PLANT – SOUTH KOREA	KR-EL-IM-MA-TC-Trash rack
8.	SEA BUOYS - SENEGAL	SN-IM-MA-Sea Buoy
9.	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-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.	BLANKENBERGE - PARAVENT – BELGIUM	BE-CO-CR-MA-OL-Paravent
2.	BLOMMAERT - SHIP HATCHES - BELGIUM	BE-MA-SH-BlommaertHatches
3.	DECLOEDT – DREDGING COMPANY - BELGIUM	BE-OL-MA-TE-Decloedt
4.	DRILLING PLATFORM - BRAZIL	BR-MA-PE-Polvo
5.	USNS ZEUS CABLESHIP - USA	CA-AR-MA-HD-SH-USNS Zeus Cableship
6.	BC FERRY TERMINALS - CANADA	CA-BR-MA-OL-TE-BC Ferry
7.	PACIFIC GRAIN ELEVATOR - CANADA	CA-CN-MA-Pacific Grain Elevator
8.	CITY OF BURNABY – A SLOPE - CANADA	CA-MA-TE-CityOfBurnaby
9.	NATIONAL GRAND THEATRE BEIJING - CHINA	CN-AM-MA-Theatre Beijing
10.	YUEHAI PASSAGE TRAIN FERRY PIER TERMINAL - CHINA	CN-AZ-MA-RW-YuehaiTrainFerry
11.	EL SALAAM BRIDGE - EGYPT	EG-BR-MA-PI-TE-Salaam
12.	DIRECTION DEPARTEMENTALE DE L'EQUIPEMENT, VENDEE SEA BUOYS – FRANCE	FR-HD-IM-MA-OL-TE-Sea Buoys
13.	TRANSOCEAN SEDCO FOREX – OFFSHORE DRILLING COMPANY INDONESIA	ID-MA-PE-TransSedcoForex
14.	BANGOR PIER – IMMERSED PILES - IRELAND	IE-IM-MA-Bangor
15.	KILLYBEGS FISHING PIER - IMMERSED PIER LEGS - IRELAND	IE-IM-MA-TE-Killybegs pier
16.	TRASH RACKS POWER PLANT – SOUTH KOREA	KR-EL-IM-MA-TC-Trash rack
17.	SHELL TANK - MOROCCO	MA-MA-PE-TA-Shell
18.	NATIONAL ELECTRICITY COMPANY - MOROCCO	MA-MA-PI-ONE
19.	SHELL - PETROCHEMICAL COMPANY - NETHERLANDS	NL-MA-PE-TE-Shell
20.	KALVOYA BRIDGE - NORWAY	NO-BR-MA-OL-TE-Kalvoja
21.	ST. PAUL – JETTY – REUNION	RE-BR-MA-St. Paul
22.	SEA BUOYS - SENEGAL	SN-IM-MA-Sea Buoy
23.	STATIONARY DOCK - SENEGAL	SN-MA-Dry Dock
24.	OFFICE TOGOLAIS DES PHOSPHATES PHOSPHATE MINE OFFSHORE CHARGING CRANES - TOGO	TG-CN-MA-OL-PE-Off. Togolais
25.	YACHT WATER TANKS - UNITED KINGDOM	UK-MA-OL-Adela
26.	OFFSHORE COMPANIES – UNITED KINGDOM	UK-MA-Offshore



27.	SHIPS – UNITED KINGDOM	UK-MA-SH-Ships
28.	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
----	--	-----------------------

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.	CARSID - BELGIUM	BE-AZ-HT-OL-TE-Carsid
6.	FLOREAC – COAL FUNNEL - BELGIUM	BE-AZ-HT-OL-Floreac
7.	EUROPEAN TECHNICAL ASSOCIATION FOR PROTECTIVE COATINGS - BELGIUM	BE-BR-OL-TE-Etapc
8.	DE BRANDT - BELGIUM	BE-BR-IM-OL-DeBrandt
9.	MELLE BRIDGE - BELGIUM	BE-BR-OL-TC-Melle Bridge
10.	WEGENFONDS BRIDGE - BELGIUM	BE-BR-OL-Wegenfonds
11.	HOLCIM GRANULATS - CEMENT FACTORY - BELGIUM	BE-CE-OL-TE-Holcim
12.	J.M. INDUSTRIAL - BELGIUM	BE-AZ-CE-HU-OL- TE-JM-Ind
13.	DE GIEY - BELGIUM	BE-CI-CR-OL-De Giey
14.	KLEIN KASTEELKEN – CAST IRON FENCE - BELGIUM	BE-CI-CR-OL-TC-Klein Kast.
15.	ANTWERP PORT CRANES - BELGIUM	BE-CN-OL-AntwerpPortCranes
16.	HARBOUR OF GENK - BELGIUM	BE-CN-OL-TE-KHG
17.	BACOB BANK DENDERMONDE - BELGIUM	BE-CO-OL-Bacob
18.	CNO - A COOLING TOWER - BELGIUM	BE-CO-OL-CNO
19.	BLANKENBERGE PARAVENT – BELGIUM	BE-CO-CR-MA-OL-Paravent
20.	SE INDUSTRIES - BELGIUM	BE-CO-OL-SE Industries-
21.	SLAUGHTERHOUSE CHARLEROI - BELGIUM	BE-CR-FO-LT-OL-TE-AbattoirCharleroi
22.	HERAS - A FENCE - BELGIUM	BE-CR-OL-Heras
23.	INTERCOMMUNALE E3 - METAL CONSTRUCTIONS - BELGIUM	BE-CR-OL-TE-Intercomm
24.	KEIZER BRIDGE GHENT - BELGIUM	BE-BR-CR-OL-Keizer Bridge
25.	ZEEBRUGGE UNDERGROUND CROSSING - BELGIUM	BE-CR-OL-Zeebrugge
26.	TRACTEBEL – POWER STATION - BELGIUM	BE-CO-EL-OL-TE-Tractebel
27.	SLAUGHTERHOUSES - BELGIUM	BE-FO-OL-Goossens
28.	CATTLE FEED COMPANY - BELGIUM	BE-FO-HD-OL-TA-TE-Quartes
29.	DECLOEDT – DREDGING COMPANY - BELGIUM	BE-MA-OL-TE-Decloedt
30.	TOTAL PETROCHEMICAL FELUY - PIPELINES - BELGIUM	BE-OL-PE-PI-TE-Fina
31.	WOLF OIL CORPORATION - BELGIUM	BE-OL-PE-TA-Wolf oil
32.	ASSOCIATION COMPANY OF PRODUCTION OF ELECTRICITY - S.P.E.- BELGIUM	BE-OL-PI-TE-SPE
33.	KLUIZEN WATER PURIFICATION STATION - BELGIUM	BE-OL-PI-TC-Kluizen
34.	PIT COAL MINE - BELGIUM	BE-OL-PI-UN-Kemp.Steenk
35.	STORA ENSO PAPER MILL - BELGIUM	BE-OL-PP-TE-Stora Enso
36.	PUBLIC FOUNTAIN IN GHENT - BELGIUM	BE-OL-PW-TC-TE-Gent fount.
37.	ELECTRABEL - BELGIUM	BE-OL-PY-Electrabel
38.	DE LIJN – PYLONS - BELGIUM	BE-HD-OL-PY-RW-De Lijn
39.	CITA – RAILWAY WAGON - BELGIUM	BE-OL-RW-TE-CITA
40.	DREDGING COMPANIES DECLOEDT - BELGIUM	BE-OL-SH-TE-Dredging



41.	NARAI – SAILING SHIP - BELGIUM	BE-OL-SH-TE-Narai
42.	DE GRAEVE SHIPYARDS - BELGIUM	BE-OL-SH-TC-TE-De Graeve
43.	MERCATOR – SAILING SHIP - BELGIUM	BE-OL-SH-TC-Mercator
44.	WESTHINDER – LIGHTSHIP - BELGIUM	BE-OL-SH-TC-Westhinder
45.	RAILWAY OFFICE - BENIN	BJ-BR-OL-RW-Chemins Fer
46.	CONFEDERATION BRIDGE - CANADA	CA-BR-OL-Confederation
47.	BC FERRY TERMINALS - CANADA	CA-BR-MA-OL-TE-BC Ferry
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.	KALVOYA BRIDGE - NORWAY	NO-BR-MA-OL-TE-Kalvoja
67.	RYSTRAUM MOTOR SHIP - NORWAY	NO-OL-SH-TE-Rystraum
68.	REDE ELECTICA NACIONAL - PORTUGAL	PT-EL-OL-PY-TE-REN
69.	ENERGOPROJECT – TRANSMISSION TOWERS - QATAR	QA-EL-OL-PY-TE-Energo
70.	ELECTRICA - NATIONAL ELECTRICITY SUPPLIER - ROMANIA	RO-EL-OL-TE-Electrica
71.	SNCFR - ROMANIAN RAILWAYS - ROMANIA	RO-OL-RW-TE-SNCFR
72.	LAND TRANSPORT AUTHORITY GUARD RAIL PANELS - SINGAPORE	SG-CR-OL-Land Transp. Auth.
73.	PHOSPHATE MINE OFFSHORE CHARGING CRANES - TOGO	TG-CN-MA-OL-PE-Off. Togolais
74.	POWER COMPANY – POWER PYLONS - TAIWAN	TW-EL-HD-OL-PY-TE-TPC
75.	DERBY – TURBINE EXHAUST STACKS - UNITED KINGDOM	UK-AZ-HT-OL-TE-Derby
76.	NEWARK MARINA BRIDGE - UNITED KINGDOM	UK-BR-OL-Newark Mar.
77.	YACHT WATER TANKS - UNITED KINGDOM	UK-MA-OL-Adela
78.	LONDON UNDERGROUND - UNITED KINGDOM	UK-OL-RW-TE-UN-London Underground
79.	US ARMY - UNITED STATES OF AMERICA	US-AR-OL-TE-TR-US Army
80.	LAFARGE - SOUTH AFRICA	ZA-CE-OL-Lafarge
81.	DURAPIPE STEEL PRODUCTION - SOUTH AFRICA	ZA-DI-OL-Durapipe steel production

PE: Chemical, Petrochemicals

1.	FLUXYS - BELGIAN LARGEST GAS SUPPLIER - BELGIUM	BE-PE-TE-Fluxys
2.	BASF – CHEMICAL COMPANY - BELGIUM	BE-HU-PE-TA-TE-BASF
3.	FINA CHEMICALS - PIPELINES - BELGIUM	BE-OL-PE-PI-TE-Fina
4.	WOLF OIL CORPORATION - BELGIUM	BE-OL-PE-TA-Wolf oil

5.	VAN BROEKHOVENS - DIESEL STORAGE TANKS – BELGIUM	BE-PE-TA-TE-Van Broekhoven
6.	DRILLING PLATFORM - BRAZIL	BR-MA-PE-Polvo
7.	KOBRIN OIL PUMPING STATION - BELARUS	BY-PE-TA-TC-Kobrin
8.	SHANGHAI DOVECHEM BOMTA TERMINAL - CHINA	CN-PE-TA-Bomta
9.	SHANGHAI PRAXAIR YIDIAN - GAS PROCESSING COMPANY - CHINA	CN-PE-Praxair
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.	KEMPENSE STEENKOOLMIJNEN – PIT COAL MINE - BELGIUM	BE-OL-PI-TE-UN-Kemp.Steenk.
5.	ASSOCIATION COMPANY OF PRODUCTION OF ELECTRICITY S.P.E – BELGIUM	BE-OL-PI-TE-SPE
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.
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.	ENERGEX - PYLONS - AUSTRALIA	AU-PY-Energex
2.	ALCOA LTD - AUSTRALIA	AU-EL-HD-LT-PY-Alcoa



3.	TRANSEND NETWORKS - AUSTRALIA	AU-EL-PY-TE-Transend Networks
4.	TRANSGRID NETWORKS – NEW SOUTH WALES	AU-EL-PY-Transgrid Networks
5.	BAKCELL COMMUNICATION TOWER - AZERBAIJAN	AZ-PY-TE-Bakcell Communication Tower
6.	BELGIAN ARMY - NAVY SHIPS AND ANTENNA - BELGIUM	BE-AR-OL-PY-SH-Belgian Army
7.	ELECTRABEL – ELECTRICITY COMPANY - BELGIUM	BE-OL-PY-Electrabel
8.	MULLEM WIND MILL – BELGIUM	BE-PY-Mullem Mill
9.	DE LIJN – PYLONS – BELGIUM	BE-HD-OL-PY-RW-De Lijn
10.	FURNAS – ELECTRICITY PYLONS - BRAZIL	BR-EL-PY-TE-Furnas
11.	MOBIMETAL – TELECOMMUNICATION PYLONS - CONGO	CD-PY-TE-Mobimetal
12.	CHONGQING BROADCASTING COMPANY - CHINA	CN-HD-PY-Chong Broad
13.	GUANGZHOU TV TOWER - CHINA	CN-PY-Guangzhou TV tower
14.	KRASIKOV TRANSFORMER STATION - CZECH REPUBLIC	CZ-EL-OL-PY-Krasikov
15.	SLAVETICE TRANSFORMER STATION – CZECH REPUBLIC	CZ-EL-PY-Slavitice
16.	KECHABIA - ALGERIA	DZ-PY-Kecahbia
17.	OHENE DJAN SPORT STADIUM LIGHT POLES - GHANA	GH-AM-HD-PY-OheneDjanStadium
18.	PLN HIGH TENSION PYLONS – INDONESIA	ID-EL-HD-PY-PLN High Tension Pylons
19.	LIGHT POLES OF THE ANFA AVENUE - MOROCCO	MA-PY-Anfa
20.	TENAGA NASIONAL BERHAD - PYLONS - MALAYSIA	MY-HD-PY-Tenaga Nasional Berhad
21.	PHCN - POWER HOLDING COMPANY OF NIGERIA - NIGERIA	NG-HD-PY-PHCN
22.	NATIONAL GRID CORPORATION PHILIPPINES – PHILIPPINES	PH-EL-HD-PY-National Grid Corporation Philippines
23.	SANTA RITA BALFOUR BEATTY – PHILIPPINES	PH-EL-HD-PY-Santa Rita Balfour Beatty
24.	REDE ELECTICA NACIONAL POWER STATIONS AND SUPPLY LINES - PORTUGAL	PT-EL-PY-TE-REN
25.	ENERGOPROJECT – TRANSMISSION TOWERS - QATAR	QA-EL-OL-PY-TE-Energo
26.	ARAD POWER STATION - ROMANIA	RO-EL-PY-Arad
27.	MUNTENIA – PYLONS - ROMANIA	RO-PY-TE-Muntenia
28.	PSA LIGHTING MASTS	SG-PY-PSA Lighting Masts
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-TE-Formosa
32.	POWER COMPANY – POWER PYLONS - TAIWAN	TW-EL-HD-OL-PY-TE-TPC
33.	TAIWAN POWER COMPANY - ZEPHYROS WIND MILLS - TAIWAN	TW-PY-ZC-Zephyros
34.	KIEV ENERGO POWER PLANT - UKRAINE	UA-EL-HD-PY-Kiev Energo
35.	KIEV ROAD ADMINISTRATION - UKRAINE	UA-PY-Kiev Road Administration
36.	NEXRAD TOWER – UNITED STATES OF AMERICA	US-AR-PY-Nexrad Tower
37.	LIGHT POLES, TERMINAL CUENCA DEL PLATA, PORT OF MONTEVIDEO, URUGUAY	UY-HD-PY-Katoennatie Light Pole
38.	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.	CHABAHAH PORT – REBARS - IRAN	IR-RE-TE-Chabahar
7.	OMRAN SAHEL INSTITUTE – REBARS - IRAN	IR-RE-TE-OmranSahelInst.
8.	PERLITE CONSTRUCTION - SULFUR EXPORT WHARF - IRAN	IR-RE-TE-PerliteConstr



9.	RAHE SAHEL INSTITUTE – REBARS - IRAN	IR-RE-TE-RaheSahelInst.
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.	YUEHAI PASSAGE TRAIN FERRY PIER TERMINAL - CHINA	CN-AZ-MA-RW-YuehaiTrainFerry
7.	CONTRACTOR – TURBINES - CHINA	CN-RE-RW-CWTW
8.	MAGLEV TRANSRAPIR RAILWAY - CHINA	CN-RW-Maglev
9.	SOCIETE NATIONALE DE CHEMINS DE FER - FRANCE	FR-OL-RW-TE-SNCF
10.	SNCFR - ROMANIAN RAILWAYS - ROMANIA	RO-RW-OL-TE-SNCFR
11.	TELEGONDOLA – ROMANIA	RO-RW-TE-Telegondola
12.	TRAIN CARRIAGE TRANSRAIL - SENEGAL	SN-RW-TA-Train Wagon
13.	LONDON UNDERGROUND – UNITED KINGDOM	UK-OL-RW-TE-UN-London Underground
14.	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.	BONNE INDUSTRIAL - SHIPS - BELGIUM	BE-SH-TC-Bonne Industrial
4.	COBBAERT SHIP - BELGIUM	BE-SH-Cobbaert
5.	DE GRAEVE SHIPYARDS - BELGIUM	BE-OL-SH-TC-TE-De Graeve
6.	DREDGING COMPANIES DECLOEDT, JAN DE NUL & DREDGING INTERNATIONAL - BELGIUM	BE-OL-SH-TE-Dredging
7.	DUPON BOAT - BELGIUM	BE-SH-Dupon
8.	FULTON MARINE - BELGIUM	BE-SH-Fulton
9.	MERCATOR – SAILING SHIP - BELGIUM	BE-OL-SH-TC-Mercator
10.	NARAI – SAILING SHIP - BELGIUM	BE-OL-SH-TE-Narai
11.	WALTZING MATHILDE SHIP - BELGIUM	BE-SH-Waltzing
12.	WESTHINDER – LIGHTSHIP - BELGIUM	BE-OL-SH-TC-Westhinder
13.	SHIP - BELGIUM	BE-SH-TE-West-VI.
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.	DOSSCHE – CATTLE FEED TANKS - BELGIUM	BE-FO-TA-Dossche
2.	QUARTES CATTLE FEED COMPANY - BELGIUM	BE-FO-HD-OL-TA-TE-Quartes
3.	BASF – CHEMICAL COMPANY - BELGIUM	BE-HU-PE-TA-TE-BASF
4.	VAN BROEKHOVENS - DIESEL STORAGE TANKS – BELGIUM	BE-PE-TA-TE-Van Broekhoven
5.	DUMON AGRO - CONTAINER - BELGIUM	BE-TA-Dumon



6.	GENT PUBLIC WORKS – SALT FUNNELS - BELGIUM	BE-TA-Gent Pub.
7.	COCA COLA - BELGIUM	BE-TA-Coca Cola
8.	SILOS DE COCK – BELGIUM	BE-HD-TA-De Cock
9.	SILO'S DUBO DEUREN – ERPE-MERE	BE-HD-TA-Silo's Dubo Deuren
10.	SNACK FOODS VEURNE - BELGIUM	BE-TA-SnackFoods
11.	PAESEN - CONCRETE MILL - BELGIUM	BE-CE-TA-Paesen
12.	WOLF OIL CORPORATION - BELGIUM	BE-OL-PE-TA-Wolf oil
13.	MAKRO – A TANK - BELGIUM	BE-TA-Makro
14.	SILOS VANDENBERGHE - BELGIUM	BE-TA-Vandenberghe
15.	KOBRIN OIL PUMPING STATION - BELARUS	BY-PE-TA-TC-Kobrin
16.	SHANGHAI DOVECHEM BOMTA TERMINAL - CHINA	CN-TA-PE-Bomta
17.	STROM UND HAUFENBAU HAMBURG HARBOUR COMPAGNY - GERMANY	DE-OL-PE-TA-TE-Strom
18.	GRILLO WERKE AG GAS CYLINDERS GERMANY	DE-TA-Grillo Werke AG
19.	WATER STORAGE TANKS ROURKELA – INDIA	IN-TA-Water Storage Tanks
20.	GRAIN SILOS NADOR CEREALES – MOROCCO	MA-AG-HD-TA-Grain Silos Nador Cereales
21.	HYDRO-TANK - MAROC	MA-TA-Hydro-tank
22.	SHELL TANK - MOROCCO	MA-MA-PE-TA-Shell
23.	TANK - MOROCCO	MA-TA-Kettle construct
24.	STORAGE TANKS - NORWAY	NO-TA-Storage tanks
25.	TANKS – NEW PLYMOUTH – NEW ZEALAND	NZ-TA-New Plymouth
26.	CONTAINERS AND METAL GIRDERS - POLAND	PL-CO-TA-ZREMB
27.	TRAIN CARRIAGE TRANSRAIL - SENEGAL	SN-RW-TA-Train Wagon
28.	MAERSK CONTAINERS - TAIWAN	TW-TA-TE-Maersk
29.	OIL STORAGE TANK - EXXON MOBILE - UNITED KINGDOM	UK-PE-TA-Exxon Mobile
30.	BRAITHWAITE TANK – UNITED KINGDOM	UK-PW-TA-Braithwaite tank
31.	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.	DULLE GRIET - CANNON – BELGIUM	BE-CI-TC-Dulle Griet
4.	KLEIN KASTEELKEN – CAST IRON FENCE - BELGIUM	BE-CI-CR-OL-TC-Klein Kast.
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.	BONNE INDUSTRIAL - SHIPS - BELGIUM	BE-SH-TC-Bonne Industrial
9.	DE GRAEVE SHIPYARDS - BELGIUM	BE-OL-SH-TC-TE-De Graeve
10.	MERCATOR – SAILING SHIP - BELGIUM	BE-OL-SH-TC-Mercator
11.	WESTHINDER – LIGHTSHIP - BELGIUM	BE-OL-SH-TC-Westhinder
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.	TRASH RACKS POWER PLANT – SOUTH KOREA	KR-EL-IM-MA-TC-Trash rack
16.	POWER PLANTS - TAIWAN	TW-EL-TC-ZC-Power Plants
17.	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.	QUARTES CATTLE FEED COMPANY - BELGIUM	BE-FO-HD-OL-TA-TE-Quartes
4.	DREDGING COMPANIES DECLOEDT – BELGIUM	BE-OL-SH-TE-Dredging
5.	DE GRAEVE SHIPYARDS – BELGIUM	BE-OL-SH-TC-TE-De Graeve
6.	INTERCOMMUNALE E3 – METAL CONSTRUCTIONS - BELGIUM	BE-CR-OL-TE-Intercomm
7.	EUROPEAN TECHNICAL ASSOCIATION FOR PROTECTIVE COATINGS – BELGIUM	BE-BR-OL-TE-Etapc
8.	PIT COAL MINE – BELGIUM	BE-OL-PI-TE-UN-Kemp.Steenk
9.	SLAUGHTERHOUSE CHARLEROI – BELGIUM	BE-CR-FO-HD-LT-OL-TE-AbattoirCharleroi
10.	ASSOCIATION COMPANY OF PRODUCTION OF ELECTRICITY – S.P.E. – BELGIUM	BE-OL-PI-TE-SPE
11.	TOTAL PETROCHEMICAL FELUY – PIPELINES – BELGIUM	BE-OL-PE-PI-TE-Fina
12.	NARAI – SAILING SHIP – BELGIUM	BE-OL-SH-TE-Narai
13.	NATO – NATO PUMP STATIONS – BELGIUM	BE-AR-OL-PI-TE-NATO
14.	HOLCIM GRANULATS - CEMENT FACTORY – BELGIUM	BE-CE-OL-TE-Holcim
15.	DECLOEDT – DREDGING COMPANY – BELGIUM	BE-OL-MA-TE-Decloedt
16.	HARBOUR OF GENK – BELGIUM	BE-CN-OL-TE-KHG
17.	STORA ENSO PAPER MILL – BELGIUM	BE-OL-PP-TE-Stora Enso
18.	CITY – RAILWAY WAGON – BELGIUM	BE-OL-RW-TE-CITA
19.	J.M. INDUSTRIAL – BELGIUM	BE-AZ-CE-HU-OL-TE-JM-Ind
20.	CARSID – BELGIUM	BE-AZ-HT-OL-TE-Carsid
21.	MARTENS DIRK – AGRICULTURAL MACHINERY	BE-AG-OL-TE-Martens
22.	PUBLIC FOUNTAIN IN GHENT – BELGIUM	BE-OL-PW-TC-TE-Gent fount.
23.	TRACTEBEL – POWER STATION – BELGIUM	BE-CO-EL-OL-TE-Tractebel
24.	VERDEGEM CATTLE FEED COMPANY – BELGIUM	BE-FO-TE-Verdegem
25.	FLUXYS (BELGIAN LARGEST GAS SUPPLIER) – BELGIUM	BE-PE-TE-Fluxys
26.	BASF – CHEMICAL COMPANY – BELGIUM	BE-PE-HU-TA-TE-BASF
27.	VAN BROEKHOVENS – DIESEL STORAGE TANKS – BELGIUM	BE-PE-TA-TE-VanBroekh
28.	SPX COOLING TECHNOLOGIES – BONNETS OF SRC BUNDLES – BELGIUM	BE-LT-TE-SPX Cooling Technologies
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-OmranSahellnst
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-RaheSahellnst.
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-Energ
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.	US ARMY - UNITED STATES OF AMERICA	US-AR-HD-OL-TE-TR-US Army
78.	MISSISSIPPI DEPARTMENT OF TRANSPORTATION BILOXI BRIDGE – UNITED STATES OF AMERICA	US-AR-BR-TE-MDOT

TP: Tropical environments

1.	TROPICAL ISLAND DOME - GERMANY	DE-TP-Trop Islands
2.	GREENHOUSE - FINLAND	FI-HU-TP-Greenhouse
3.	KENSINGTON PALACE SUNKEN GARDENS – UNITED KINGDOM	UK-AG-AM-CI-TP-Kensington Palace Sunken Gardens
4.	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.	RENAULT - CAR MANUFACTURING COMPANY - FRANCE	FR-CO-OL-TE-TR-Renault
5.	CARTS TO CONVEY STONES - MOROCCO	MA-TR-Transit trailer
6.	CHASSIS – UNITED KINGDOM	UK-TR-Chassis
7.	US ARMY – UNITED STATES OF AMERICA	US-AR-HD-OL-TE-TR-US Army

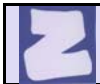
UN: Underground

www.zinga.be

1.	CULVERTS - AUSTRALIA	<i>AU-HD-HU-IM-UN-Culverts</i>
2.	KEMPENSE STEENKOOLMIJNEN – PIT COAL MINE - BELGIUM	<i>BE –OL-PI-TE-UN-Kemp.Steenk.</i>
3.	GASCO COMPANY UNDERGROUND PIPELINES - EGYPT	<i>EG-PI-UN-Gasco</i>
4.	LONDON UNDERGROUND – UNITED KINGDOM	<i>UK-OL-RW-TE-UN-London Underground</i>
5.	CULVERTS - UNITED KINGDOM	<i>UK-HD-HU-IM-UN-Culverts</i>
6.	EXXARO KUMBA GROOTGELUK COALMINE – SOUTH AFRICA	<i>ZA-CO-TE-UN-Kumba Mine</i>

WE: Welding**ZC: Zingaceram**

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



FLOREAC – COAL FUNNEL – BELGIUM

The inside and outside surface of the coal funnel of the heating installation of the company Floreac was treated with Aquazinga in 1990. Floreac is a flower wholesale company situated in Lochristi, Belgium.

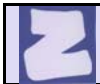
Systeem:

Aquazinga 2 x 60 µm

The pictures were taken during a maintenance evaluation 10 years later, in September 2000.

The condition of the coal funnel was still 100% perfect.



**CARSID (FORMER COCKERILL) – BELGIUM**

Since 1994 the large steel foundry Carsid (formerly known as Cockerill Sambre) has been using Aquazinga as anti-corrosion protection for heated moulding arches (400°C).

BSVBUREAU ET DEPOT
RUE DE MAGNEE 117
4610 BEYNE-HEUSAYTél. : 04/355.32.12
Fax : 04/355.32.15ZINGAMETALL SPRL
A l'attention de Monsieur Patrick Willemot**FAX****DESTINATAIRE : 09/385.58.69**

Liège, le 23 mars 2000

N/Réf. : JD/CM FX00048

Cher Patrick,


Suite à notre entretien téléphonique de ce jour concernant l'application de l'AQUAZINGA au niveau industriel, dans le cadre de la sidérurgie de COCKERILL SAMBRE, je te remets une note explicative :

L'Aquazinga est effectivement utilisé depuis 1994 à la coulée continue de Marchienne au Pont dans le but de protéger les éléments métalliques de ce que l'on appelle l'ARC DE COULEE CONTINUE. Elément métallique de volume et de poids très important soumis à des conditions de température élevée (plus de 400° C) et d'humidité quasi permanente (arrosage à l'eau, pH légèrement acide). Ces éléments métalliques ont été initialement sablé SA 2.5 et recouvert de trois couches d'aquazinga. Après un séjour opérationnel de dix-sept mois, l'arc de coulée continue est retiré de la chaîne, resablé et repeint. La rotation en production est assurée par trois de ces arcs. Depuis 1994, la dégradation des éléments constituant la pièce maîtresse ainsi que le châssis, est fortement diminuée. A notre avis, une augmentation des couches d'aquazinga permettrait une utilisation plus longue de l'arc de coulée. Toutefois, certains éléments devant être obligatoirement remplacés pour raison technique, on limite l'épaisseur du recouvrement de 80 à 100 microns.

Je te prie d'agréer, Cher Patrick, nos sincères salutations.

System:

Aquazinga 3 x 30 µm


J. DOZIN/
AdministrateurB.S.V. DOZIN Jacques
Rue Pirefontaine 23
4140 DOLEMBREUX**Translation:**

Date: 23/03/00 - From: BSV Dozin Jacques - To: Zingametall

Referring to our phone conversation of today, concerning the application of AQUAZINGA on industrial level in the steel foundry COCKERILL SAMBRE, I am giving you hereafter some more details:

AQUAZINGA has been used since 1994 in the department of continuous moulding in Marchienne au Pont, in order to protect the steel parts of the so-called "arch of continuous moulding".

This metallic part which has a big volume and a very heavy weight is heated to very high temperatures (up to 400°C) and is almost continuously under humid circumstances (water spray, slightly acid pH).

Those metal elements were sandblasted to SA 2.5 and coated with 3 layers of AQUAZINGA. After a working period of 17 months, the arch of continuous moulding is being withdrawn from the chain, sand-blasted again and repainted. The continuation of the production is guaranteed by 3 of these arches. Since 1994, the degradation of the elements that compose the main part and the chassis, has been strongly reduced.

In our opinion, an augmentation of the AQUAZINGA layers could increase the lifetime of those moulding arches. However, some pieces must be replaced for technical reasons and this is why we keep the thickness layer of the coating between 80 and 100 microns.

The complete satisfaction of Aquazinga led to another application in 2004. In a foundry with a continuous smelting process, some constructional arches had to be repaired and partly replaced. Inside these arches the hot iron is shaped into blocks. In December 2004 Aquazinga was applied on the whole piece, except for the screws, the rollers and the hydraulic hoses. The application was done at room temperature. During the smelting process, the Aquazinga is being exposed to water spray and to temperatures up to 450°C.



In these arches, the iron is shaped into blocks.



System:

AQUAZINGA 1 x 60 µm

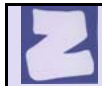




SLAUGHTERHOUSE CHARLEROI - BELGIUM

Pictures taken before application of ZINGA in 1987.





Free translation of letter dated 21.12.2006
Société de l'Abattoir de Charleroi
Charleroi, 21 December 2006

Dear Sirs,

We confirm that in 1987 we applied ZINGA in 2 layers on steel structures at the inside of our slaughter house and also in the cooling chambers.

As a high humidity degree is available in those areas, the hot dipped galvanised steel was rusting. So we needed to prevent the hot-dipped galvanised steel from further rusting.

Only after more than 20 years a little touch-up was required (see pictures).

Those pictures show that ZINGA has been very efficient even in aggressive and humid area.



It is obvious that ZINGA compared to hot-dipping has a better resistance.

This is why we do not hesitate to express our satisfaction towards ZINGA.


We even recommend this Zinganisation system for several other equipment.

Yours faithfully,

Louis P.
President

	SOCIETE DE L'ABATTOIR DE CHARLEROI S.A.	
--	--	---

TVA : 428.307.458
RC Charleroi : 148.275
SGB : 260-0241128-55



ZINGAMETALL Bvba
Rozenstraat 4
9810 EKE

Charleroi, le 21 décembre 2006

Messieurs,

Nous vous confirmons qu'en 1987 nous avons appliqué le ZINGA en 2 couches sur des structures métalliques à l'intérieur de l'abattoir ainsi que dans les frigos.

Vu la haute teneur d'humidité dans ces locaux, l'acier galvanisé qui se corrodait devait être protégé contre l'extension de la rouille.

Ce n'est qu'après plus de 20 ans qu'il y a lieu de faire quelques petites retouches (voir photos).


Ces photos démontrent que le ZINGA a été très efficace même en milieu agressif et humide.

Il est clair que le ZINGA, comparé à la galvanisation à chaud, a mieux résisté.

C'est la raison pour laquelle nous n'hésitons pas à exprimer notre satisfaction du ZINGA de même que nous conseillons le système ZINGA pour divers autres équipements.

Veuillez agréer, Messieurs, l'expression de nos sentiments distingués.

Pour l'Abattoir de Charleroi


LOUIS P.
Directeur

Place de l'Abattoir, 1 - B-6000 CHARLEROI • Tél. : (071) 41 05 62 / 28 67 00 • Fax : (071) 42 35 18



BASF – CHEMICAL COMPANY - BELGIUM

Reference letter from the chemical company BASF, Antwerp, dated 10/12/03, confirming that ZINGA is an efficient alternative for hot-dip.

BASF Antwerpen N.V.

BASF

Van Look Ann
Goossens Marc

STC E935
STC E935

2003-12-10 / MW
SEQ/M - D530
Winkelmans Mark
☎ 44 08
📠 41 01

rapport nr.: 03-c-03/1

ZINGA als alternatief voor thermisch verzinken

“ZINGA offers a potential alternative for hot-dip galvanisation.”

1 Situering

Thermisch verzinken wordt bij BASF Antwerpen N.V. vaak toegepast om koolstofstaal te beschermen tegen corrosie. De ervaring leert dat de aangebrachte zink slechts een bescherming van de onderliggende structuur biedt voor een periode van 15 tot 20 jaren. Nadien dringt zich een renovatie van staalstructuren op waarbij de verschillende onderdelen opnieuw thermisch verzinkt dienen te worden om het oorspronkelijke beschermingsniveau te bereiken. Hiervoor moeten staalstructuren geheel of gedeeltelijk gedemonteerd worden wat tot aanzienlijke kosten kan leiden.

ZINGA biedt een mogelijk alternatief voor thermisch verzinken. ZINGA is een monocomponent zinkcoatingsysteem dat kan aangebracht worden door te verspuiten, door te verven met borstel of rol, of door onder te dompelen.

ZINGA kan aangebracht worden op zowel nieuwe structuren, bestaande thermische verzinking als op oude ZINGA-lagen.

ZINGA biedt net als een thermische verzinking een actieve bescherming door de kathodische/zelfopofferende werking van de aangebrachte laag. Tevens biedt ZINGA dezelfde voordelen als een verfsysteem. Met behulp van zinkoxyden en bindmiddel wordt een barrière gevormd voor de lucht en zodoende wordt de onderliggende staalstructuur tegen corrosie beschermd.

2 Uitgevoerd onderzoek

Om de doeltreffendheid van de ZINGA-coatings te evalueren werden koolstofstalen probes voorzien van ZINGA-coatingssystemen gedurende 4 maanden aan agressieve omstandigheden in de waterzuiveringsinstallatie bij BASF Antwerpen N.V. blootgesteld.

This statement is based on an internal investigation by BASF : during 4 months, zinganised steel probes have been exposed to aggressive atmosphere of a waste water tank in the water purification installation of BASF.

BASF Antwerpen N.V.

BASF

De probes werden ingebouwd in de bezinkingsbekkens van de waterzuiveringsinstallatie. De probes werden gedeeltelijk ondergedompeld in de restwater-stroom en bevonden zich gedeeltelijk in de agressieve atmosfeer boven het restwater (figuur 1).



Figuur 1 Ingebouwde probes bezinkingsbekkens waterzuiveringsinstallatie

De visuele beoordeling van de probes na de inbouwfase toonde aan dat geen enkele aantasting van de coatings plaats gevonden heeft en dit zowel in de waterstroom, aan het grensvlak water/atmosfeer als in de atmosfeer. Aan het grensvlak water/atmosfeer vertoonden de probes wel een roestbruine verkleuring (figuur 2). Deze verkleuring is zeer oppervlakkig en kan door een lichte wrijfbeweging verwijderd worden.




Figuur 2 Uitzicht probe na 4 maanden blootstelling aan een agressieve omgeving.

3 Besluit

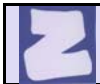
Op basis van de uitgevoerde corrosietesten kan ZINGA als een volwaardig alternatief beschouwd worden voor het thermische verzinken van koolstofstalen structuren.

Voor eventuele bijkomende testen in andere omgevingen zijn nog probes beschikbaar.

met vriendelijke groeten,


Mark Winkelmans
Technische Inspectie

“Based on the performed corrosion tests, ZINGA can be considered as an equivalent alternative for hot-dip galvanisation of steel structures.”



SPX COOLING TECHNOLOGIES BONNETS OF SRC BUNDLES – BELGIUM

Testimonial letter for ZINGA dated 21/04/2006.

They use ZINGA for corrosion protection of the bonnets of their secondary SRC bundles.



Cooling Technologies

Balcke | Hamon Dry Cooling | Marley

SPX Cooling Technologies Belgium SA/NV
Rue Neerveld 107
1200 Brussels
Belgium
Phone : +32 (0)2 761 61 11
Fax : +32 (0)2 761 61 86
VAT : BE 862 198 455
www.spxcooling.com

Mr. Guy Willemot
ZINGAMETALL bvba
Industriepark
Rozenstraat 4
9810 Eke
BELGIUM

Subject: Testimonial Letter for ZINGA

Brussels, 21 April 2006.

Dear Mr. Willemot,

We, SPX Cooling Technologies, confirm herewith that we are currently applying in a regular basis the ZINGA for corrosion protection of the bonnets of our secondary SRC bundles.

The corrosion protection with ZINGA on the above mentioned parts has recently become our new Standard for Worldwide jobs considering its ease of application on well prepared carbon steel surfaces, its weldability and its ability of touch-up by reloading.

Kind regards,

Marc Cornelis

Technical Director
SPX Cooling Technologies Belgium

Paul Riley

VP Manufacturing (Global ACC)
SPX Cooling Technologies



PULP AND PAPER INDUSTRY CANADA



Since 1988, ZINGA was applied in the most corrosive and abrasive areas with excellent results at the following pulp mills:

- Port Mellon Pulp & Paper at Port Mellon, BC
 - Alpac mills in Alberta
 - Castlegar pulp mill
 - MacMillan Bloedel/Pope & Talbot at the Harmac plant in Nanaimo, BC
 - Various other MacMillan Bloedel mills on Vancouver Island, BC
 - Fletcher Challenge/Norske Canada at Elk falls, BC
 - Weyerhaeuser mills at Prince Albert SK, and Dryden, Ontario
 - Various pulp & paper projects in Washington and Oregon States, USA
- ZINGA was chosen by the consulting engineers from AMEC.

In 2004, **17 years** after the application of ZINGA, Mr. Bruce Hunter (Evergreen Consulting) says the ZINGA is still providing excellent protection without the need for complementary touch-ups.

System:

Surface preparation:

Sandblasting to SA 2,5 and Rz 50-70µm

System:

ZINGA 2 x 60 µm DFT

EVERGREEN CONSULTING

1483 Doe Place
Campbell River BC V9W 6E5
Tel (250) 923-7793 – Toll-free 866-923-7793 – Fax (250) 923-7233
brucebeegee@aol.com

6 February 2004

Attention: To whom it may concern

My first use of ZINGA was in February 1987 on Tower 10 (retention tower) at ELK Falls Pulp & Paper mill in Campbell River BC (a very aggressive environment).

The tower was sandblasted to SSPC-SPC 6 standards and then sprayed with two coats of ZINGA to a finish of 4 mils DFT.

As of 4 January 2004, the tower coating is in excellent condition with the exception of some rust streaks emanating from unpainted flange bolts installed at some point after the original ZINGA coating. These streaks do not affect the ZINGA and only serve to spoil the aesthetics of the tank.

Since that time I oversaw the Zinagnization of the Recovery & Kraft Mill Bridge 200 ft. up in the air. The Granite Bay Road Bridge for the BC Ministry of Highways (1996), the Overlander Bridge addition (1997) for the City of Kamloops BC, the Victoria Quay Bridge (1997) in Port Alberni, BC and many smaller jobs such as Port Mann Bridge repairs in 2000

To date, every one of these jobs completed with ZINGA is still in pristine condition.

I feel that ZINGA outperforms many times over conventional zinc coatings and is easily comparable if not better than hot-dip galvanizing.

Bruce Hunter
EVERGREEN CONSULTING

P.S.:

The cost saving over the years is enormous considering conventional coating lasts at best 7-8 years and require complete surface preparation (i.e. sandblasting) before re-coating whereas ZINGA when it eventually requires re-coating needs only high-pressure water cleaning to prepare it.



GREENHOUSE - FINLAND



System:

ZINGA 2 x 50 µm



Watering pipeworks and underground heating pipelines are sandblasted to Sa 2.5 and coated with Zinga 2 x 50 µm.

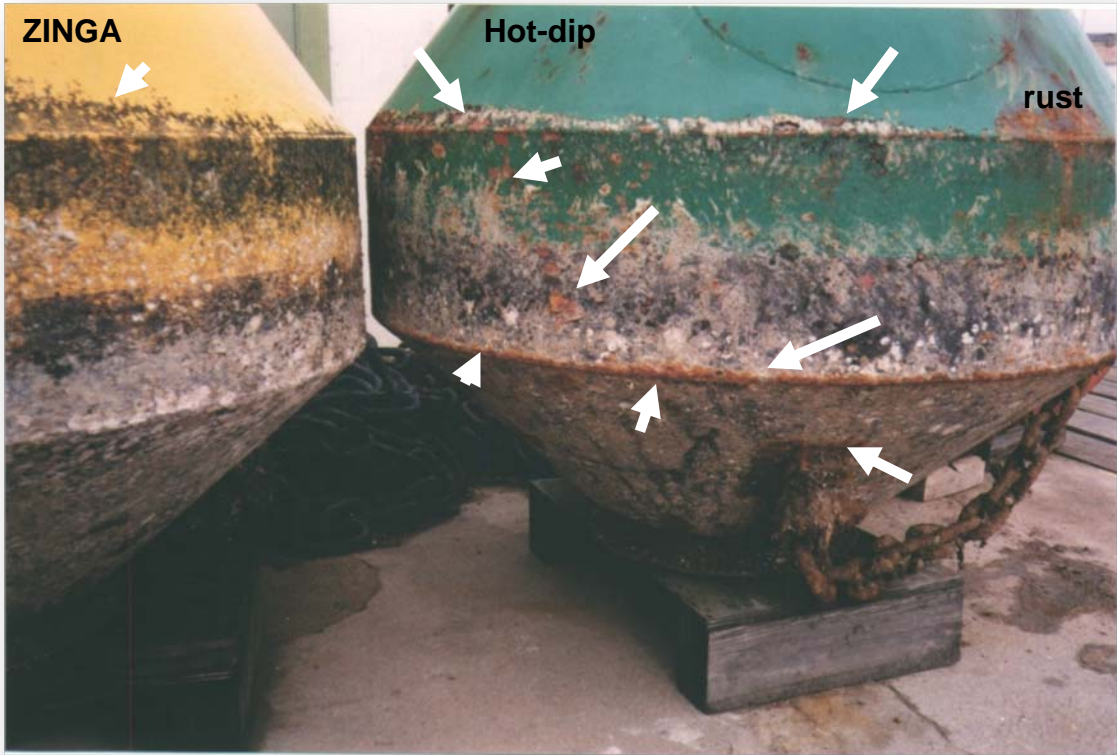
Zinga has been used both in maintenance and new pipelines for nearly 15 years.





DIRECTION DEPARTEMENTALE DE L'EQUIPEMENT, VENDEE
SEA BUOYS – FRANCE

These two sea buoys have been floating in the Atlantic Ocean for 4 years. The yellow buoy, a mild steel buoy treated with Zinga, was compared to the green buoy that was galvanised by the traditional hot-dip process. The two buoys had received the same type of topcoats with the same layer thickness, with a supplementary adhesion coating for the hot-dipped buoy.



Conclusion of this test : the buoy treated with Zinga showed no trace of rust, but the hot-dip galvanised buoy was severely corroded in several places.

System :

Yellow buoy:
Duplex system ZINGA

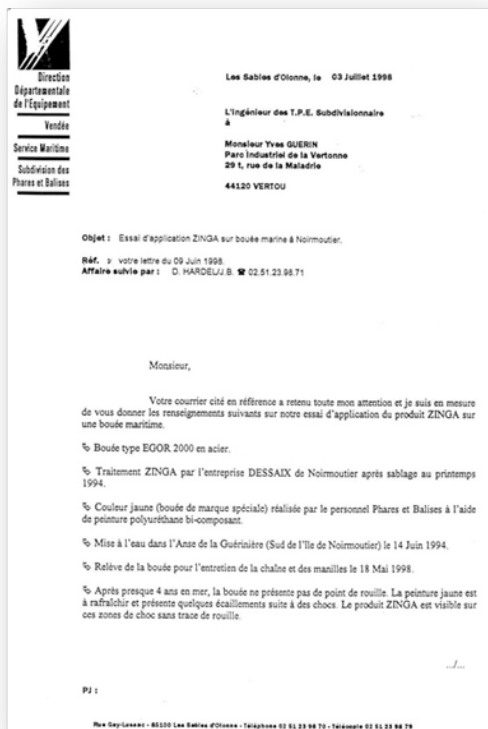
Above the water line:
ZINGA 1 x 80 µm
2c Pu Plastilaque 2 layers

Below the water line:
ZINGA 1 x 80 µm
Epoxy Plastitar 1 layer

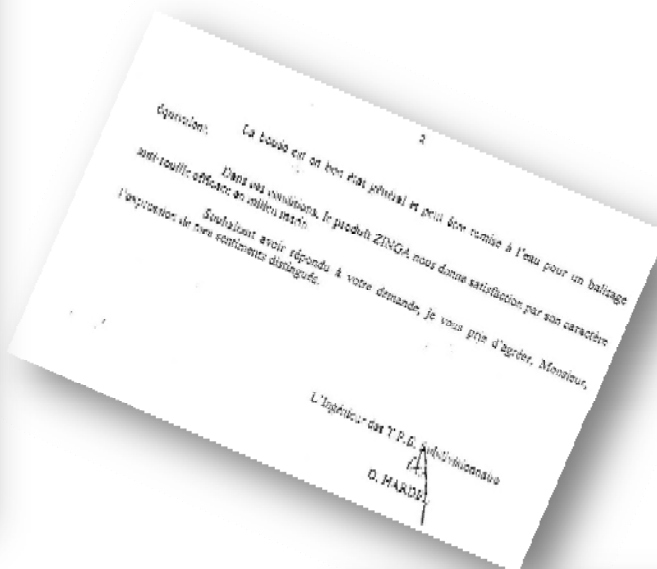
Green buoy:
Duplex system hot-dip galvanisation

Above the water line:
Hot-dip 80 µm
Galvalu pickling
2c Pu Plastilaque 2 layers

Below the water line:
Hot-dip 80 µm
Galvalu pickling
Epoxy Plastitar 1 layer



This is the testimonial from the Department Management of Equipment of Vendée, confirming the excellent behaviour of Zinga in comparison to hot-dip galvanisation.



Translation

Direction Départementale de l'Équipement

From : Department Management of Equipment, Vendée,
Maritime Service, Subdivision of Beacons and Buoys

Subject : Test application Zinga on marine buoy in Noirmoutier.

Dear Sir,

I have devoted all my attention to your above mentioned letter and I am able to provide you with following information concerning our test application with Zinga on a marine buoy.

- Type of buoy EGOR 2000 made of steel.
- Treatment with Zinga by the company DESSAIX in Noirmoutier after sandblasting in the spring of 1994.
- Yellow colour (special mark buoy) effected by the personnel of "Beacons and Buoys" by means of a two component polyurethane paint.
- Launched into Guérinière bay (south of the Isle of Noirmoutier) on 14th June 1994.
- Removal of the buoy for maintenance of the chain and shackles on 18th May 1998.
- After a period of nearly 4 years in the sea, the buoy doesn't show a single rust spot. The yellow paint needs a little refreshing and shows some blisters due to shocks. The Zinga product is visible on these spots, without any trace of rust. The buoy is in good general shape and can be launched into the water again for an equivalent period of time. In these conditions the ZINGA product gives us satisfaction because of its efficient anti rust character in a marine environment.



BANGOR PIER – IMMERSSED PILES - IRELAND



ZINGA was applied on immersed piles at Bangor harbour. The piles were first UHP water-blasted and then grit-blasted to give the correct surface profile. Then approx. 200 µm of ZINGA was applied in 4 coats by brush. The work was executed by the contracting company SAR Marine and General in November 2000.

System :

ZINGA 4 x 50 µm

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.



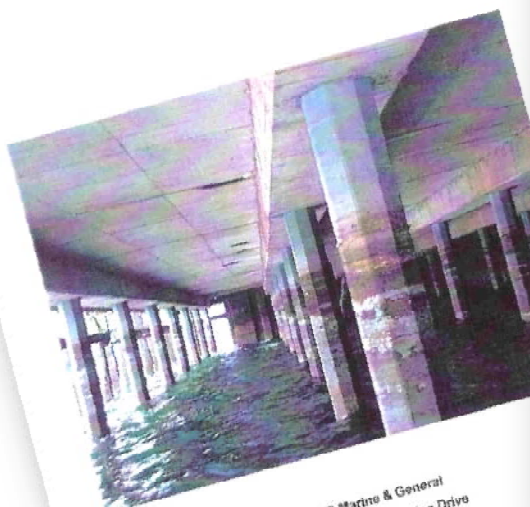
The piles were prepared by UHP water-jetting and blasting to SA 2.5 with Rz 40 to 60 μm . The application happened under severe surveillance of SGS Axa-Med, because it was a very difficult and delicate application as they had to take into account the tidal movement of the water and the constant contact 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.

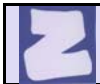
When the DFT readings taken during the inspection of the Zinga coating, see appendix A, are compared to those taken at completion of the works no significant change can be seen.



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

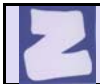
Our reference:
1127-N-1519-2003

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

Department of the Marine and Natural Resources
Roinn na Mara agus Acmhainní Náidhreacha

LIESPIN LANE
DUBLIN 2
TELEPHONE 9260
INSPECTOR & ENGINEER GJ PARRELL M.E.M. Eng.Sc. P.M.D. C.Eng. F.I.E.E.

LÁNA CHILL MOCHARGAN
BAILE ATHA CLIAITH 2
FAX 90606790

**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 Eiliméad na hEorpae

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.





SULTAM – CHIMNEY - ISRAEL

An old chimney in the factory Sultam Ltd in Yokneam, Israel, was repaired and treated with Aquazinga in 1997, after internal combustion. It was originally electrolytically galvanised.

System:

Aquazinga 2 x 60 µm





PORT ELISABETH ELECTRICITY DEPARTMENT FUEL TANKS AND EXHAUST – SOUTH AFRICA

In July 1999 several metal structures of the Electricity Department of the Port Elisabeth Municipality were zinganised. Zinga was applied on jet fuel tanks and on inlet stacks. Aquazinga was applied on the exhaust stacks for the hot fumes of a large turbine generator installation.

These pictures show the 2 inlet stacks with filter systems, painted blue, and 2 exhaust stacks, protected with Aquazinga.

System:

Inlet stacks :

ZINGA 1 x 60 µm

Blue topcoat

Exhaust stacks :

Aquazinga 2 x 40 µm



These pictures show 5 jet fuel tanks that are treated with Zinga.

System :

ZINGA 2 x 60 µm





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 gr/Lt (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	<ul style="list-style-type: none">- 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	<ul style="list-style-type: none">- 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 Lt/m ² - for 120 µm DFT : 0,55 Kg/m ² or 0,21 Lt/m ²
Theoretical coverage	- for 60 µm DFT : 3,62 m ² /Kg or 9,67 m ² /Lt - for 120 µm DFT : 1,81 m ² /Kg or 4,83 m ² /Lt
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	<ul style="list-style-type: none">- 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	<ul style="list-style-type: none">- 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.
-----------------------------	--

- **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.
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 spraying with spray gun with gravity cup**

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	1,7 to 2,5 mm

- **Application by spraying with 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	1,7 to 2,5 mm



- **Application by airless spraying**

Dilution	0 to 5% (volume on volume)
Pressure at the nozzle	± 150 bar
Nozzle opening	± 0,03 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 (± 0,05 Kg/dm ³)
Solid content	- 35% (± 2%) by weight - 25% (± 2%) by volume
Type of thinner	Zingasolv (does not contain xylene or MEK)
Flash point	≥ 40°C to < 60°C

- **Dry film**

Colour	aluminium
--------	-----------

- **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 spraying with spray gun with gravity or suction cup**

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 spraying with 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*

* 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.



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/L (± 0,05 Kg/L) 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.
---------	--



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
----------	-------------------------

- **Application by spraying with air**

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.
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**.

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.



AQUAZINGA

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

Aquazinga is a 2 pack 100% water-based anti-corrosion system based on inorganic zinc silicates. Due to its high zinc content in the dry film (92%) it provides cathodic protection to ferrous metals. It can be used as a stand alone system as an alternative to hot-dip galvanisation or metallisation. Aquazinga has an excellent resistance to abrasion and is designed to withstand corrosive environments and severe conditions, including high temperatures (up to 600°C).

Physical data and technical information

• Wet product

Components	- water-based inorganic zinc silicate - zinc powder
Density	3,36 Kg/dm ³ (± 0,05 Kg/dm ³)
Solid content	- 83% by weight (± 1%) - 63% by volume (± 1%) according to ASTM D2697
Type of thinner	If necessary: water
Flash point	not applicable : water-based
Pot life	4 hours at 20°C, depending on ventilation and temperature
VOC	0 gr/L

• Dry film

Colour and gloss	matt grey
Zinc content	minimum 92% (± 2%) by weight, with a purity of 99,995%
Special characteristics	- atmospheric temperature resistance - minimum : -90°C - maximum : 550°C with peaks up to 600°C - pH resistance in immersion (at least 12 days after polymerisation) - lower limit : 5,5 pH - upper limit : 9,5 pH - excellent resistance to abrasion - excellent resistance to certain chemicals

• Packing

5 Kg	3,8 Kg base and 1,2 Kg binder
25 Kg	19 Kg base and 6 Kg binder

• Conservation

Storage	- minimum : 5°C - store in a cool and dry place
Shelf life	12 months



Application data

• System recommendations

Unique system	<ul style="list-style-type: none">- Aquazinga is used as a stand-alone system, applied in 1 layer between 50 and 80 µm.- When applied in a DFT* higher than 120 µm the coating can start to crack. Excessive thickness should be avoided as it will reduce the effectiveness of the system.
Duplex system	<ul style="list-style-type: none">- In a duplex system, Aquazinga should also be applied in one layer of 50 to 80 µm.- The surface of the Aquazinga should be free from zinc salts and other contaminations prior to application of a topcoat.- Aquazinga can be topcoated with a wide range of compatible sealers and topcoats. (To avoid pinholes when topcoated, use the mist coat/full coat technique).
Stripe-coat	It is recommended to apply a stripe-coat of Aquazinga by brush on all sharp edges, nuts and bolts and weld areas after the spray application.

• Coverage and consumption

Theoretical consumption	for 60 µm DFT : 0,31 Kg/m ²
Theoretical coverage	for 60 µm DFT : 3,25 m ² /Kg
Practical coverage	depends upon the roughness profile of the substrate and on the application method

• Environmental conditions during application

Ambient temperature	<ul style="list-style-type: none">- minimum 5° C- maximum 30° C- Do not apply Aquazinga in bright and hot sunshine.
Relative humidity	<ul style="list-style-type: none">- maximum 70 %- minimum 40 %
Surface temperature	<ul style="list-style-type: none">- minimum 3° C above the dew point- no visual presence of water- minimum 5° C- maximum 30°C

• Drying process and overcoating

Drying process	The drying process is influenced by the total WFT, the ambient air (humidity and temperature) and the steel surface temperatures.
Drying time	<ul style="list-style-type: none">- for 80 µm DFT at 20° C in a well-ventilated environment :<ul style="list-style-type: none">- touch-dry : after 30 min.- dry to handle : after 1,5 hours- fully cured : after 48 hours <p>Please contact the Zingametall representative for resistance to chemicals and/or water.</p> <p>Forced air circulation is negative and substrate temperature shouldn't be above 30°C.</p>

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



Overcoating (with another paint)	Minimum: after 5 hours Maximum: after 24 hours Please contact the Zingametall representative for overcoating with a water based paint.
-------------------------------------	--

Instructions for use

• Surface preparation

Cleanliness	<ul style="list-style-type: none">- Before the application of Aquazinga the metal substrate should first be degreased, preferably by steam-cleaning at 140 bar at 90°C. After that it should be grit-blasted to cleanliness degree SA 2,5 to SA 3 according to the standard ISO 8501-1 or to the cleanliness degree described in the standards SSPC-SP10 to SP5 and NACE nr 2 to nr 1. 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).- 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.
Roughness	Aquazinga should be applied on a metal substrate that has roughness degree Rz 40 to 70 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.
Maximum time to application	Apply the Aquazinga as soon as possible on the prepared metal substrate (max. 4 hours waiting time). If contamination occurs before coating, the surface must be cleaned again as described above.

• Special instructions

Mixing	<ul style="list-style-type: none">- Stir the binder in its original can and pour the zinc powder progressively into the binder while mixing until a homogeneous mixture is obtained.- It is necessary to filter the Aquazinga after mixing through a 150 µm (100 mesh) sieve.
Stirring	Aquazinga must be thoroughly mechanically stirred to achieve a homogeneous liquid before application. The liquid must be stirred continuously.
Rinsing of tools and equipment	Immediately after using the spraying equipment, it must be rinsed with fresh water. Brushes and rollers should also be rinsed with water. Do not wait longer than 10 minutes before rinsing the spraying equipment if you have stopped spraying Aquazinga.
Recommended application method	Aquazinga should be applied using conventional low-pressure air spray equipment (airgun or air pressure pot). Brushes should be used for small touch-ups and stripe-coats.



Special demands for spraying equipment	<ul style="list-style-type: none">- For the spraying of Aquazinga, it is better to remove all filters from the pistol to avoid blockage.- The spray gun must be equipped with reinforced needle springs.- Use short tubes.- The needle and the spray tip must be made out of Tungsten carbide metal.
--	---

- **Application by roller or brush**

Viscosity	Aquazinga is ready for use. Never dilute.
Type of roller or brush	<ul style="list-style-type: none">- short hair roller (mohair)- industrial round brush

- **Application by conventional low pressure air spraying**

Viscosity	Aquazinga is ready for use. Never dilute.
Pressure at gravity cup	2 to 4 bar
Pot pressure	0,8 to 1,5 bar
Nozzle opening	1,8 to 2,0 mm

- **Application as shopprimer**

Dilution	Dilute binder (part B) with 10 to 20% (in weight) pure water Mix thoroughly
Application	Only by conventional low pressure air spraying (never airless)

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