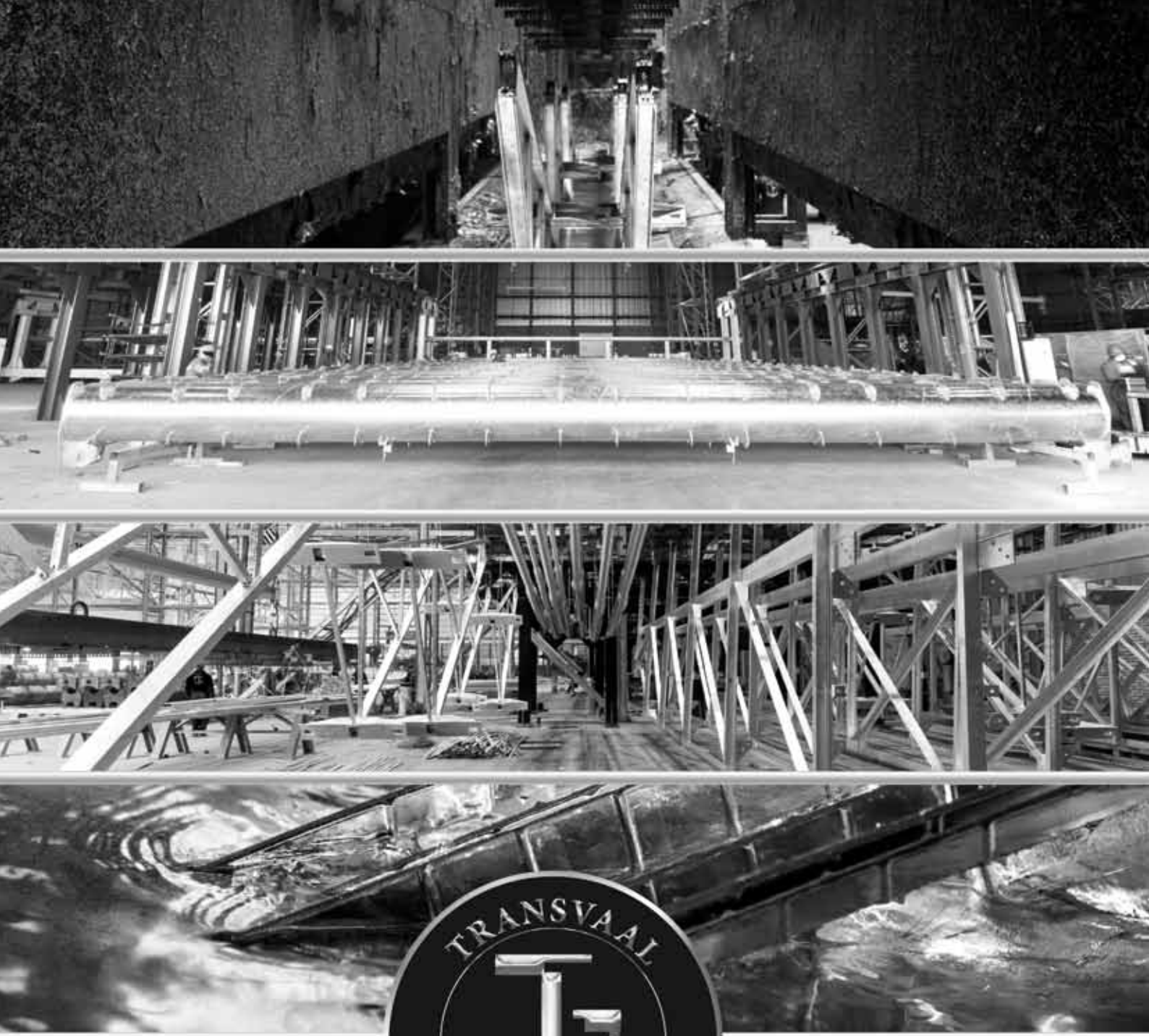
Volume 17 Issue 1
February / March 2020

HOT DIP GALVANIZING TODAY 74

The Official Publication of the Hot Dip Galvanizers Association Southern Africa

CORROSION CONTROL OF STEEL



TRANSVAAL GALVANISERS

QUALITY SPECIALISTS IN DIP & DRAGLINE GALVANISING

Transvaal Galvanisers is the largest capacity galvaniser in Africa, operating 4 hot dip galvanising lines on a single premises.

Our biggest zinc kettle allows for the galvanising of 14 tonnes of material in a single dip.

As galvanising experts we pride ourselves on offering you the highest quality finished products, customer service and advice.

011 - 814 - 1113/4 | www.transgalv.co.za | transgalv@transgalv.co.za

5

8

12

Contents

THE ASSOCIATION IS AN INFORMATION CENTRE ESTABLISHED FOR THE BENEFIT OF SPECIFIERS, CONSULTANTS, END USERS AND ITS MEMBERS.

ISSN 1023/781X

PUBLISHED BY:
Hot Dip Galvanizers Association Southern Africa
Bedfordview Office Park, Building 1, Ground Floor, 3 Riley Road, Germiston
P.O. Box 2212 Edenvale 1610 Tel: 011 456 7960 Email: hdgasa@icon.co.za Website: www.hdgasa.org.za

Executive Director: Robin Clarke Cell: 082 902 5119 Email: robin@hdgasa.org.za

Publication Liaison: Anthony Botha Cell: 082 326 6080 Email: anthony@hdgasa.org.za

Design and Layout: Sandra Addinall Tel: 011 868 3408 Email: cbtdesign@adcot.co.za

Reproduction and Printing: Camera Press Tel: 011 334 3815 Fax: 011 334 3912 Email: cpress@iafrica.com

EXECUTIVE DIRECTOR'S Comment

The following extract was taken from a letter written by the Association to a multi-national EPC company and reflects our view related to the delivery of service and quality to customers of hot dip galvanizing. The letter, which was written as a conclusion to a technical intervention, stated in part:

"It may be of interest that the Association has had cause over the past seven months to perform three assessments on the quality of hot dip galvanized products imported into Africa. All three projects were of a significant infrastructural nature. In two of these instances delays pending completion of sample collection, couriering to Johannesburg, lab work and reporting had occurred. The cost thereof the evaluation were negligible in relation to the costs associated with project delays and the stress associated with potential rejections or rework.

The reason that this is brought to your attention is that the HDGASA always recommends that, at project initiation phase, strict compliance is defined and subsequently adhered to of the first part of the guidelines of Paragraph 5 of the ISO 1461:2009 standard. This paragraph gives definition to Acceptance inspection and sampling

Here it is stated:

"acceptance inspection can be undertaken by, or on behalf of, the purchaser and shall be undertaken before the product leaves the hot dip galvanizers custody, unless otherwise specified at the time of ordering.

We believe it to be imperative that a trained and competent inspector is able to assess the coating at the galvanizer and prior to release, then report, (preferably in compliance with ISO 10474 parameters) on a pass, rework or fail basis relative to the ISO 1461:2009 standard or any other current standard related to the galvanizing process as specified in the contract.

To this end the HDGASA has invested significantly in training material related to corrosion control, the mechanisms by which hot dip galvanizing provides corrosion control and most importantly the evaluation of the coatings relative to acceptance criteria against these international standards. Over a period of 15 years the Association has trained, examined and accredited candidates that have passed the course. These inspectors are able to assess coatings and report in a manner which will provide a level of assurance to project owners of compliance to standards, or otherwise. Some inspectors operate independently and others were trained to provide the galvanizers with inhouse competence in assessment and certification.

It is further of relevance that some of the galvanizers in South Africa ascribe to a SABS mark scheme . In such instances product is identified via a unique identifying paint mark prior to release to the customer. This mark reflects that the product has been inspected and warranted to comply with the SANS121:2011-ISO 1461:2009 standard.

For these reasons I would encourage engagement with the South African supplier base for hot dip galvanized products. Capacity as well as credible product assurance mechanisms is available and the support of our Association is conveniently at hand."

The Hot Dip Galvanizers Association will continue to encourage all stakeholders throughout Africa to support the hot dip galvanizing sectors when sourcing such corrosion control technology.

9 LINCOLN RD, BENONI SOUTH, 1502 | PO BOX 15040, FARRARMERE, 1518
TEL: 011 421 1495 | FAX: 011 421 4737
TEL: 011 420 0912/14

SMT GALVANIZERS

SMT Galvanizers are specialists in the hot dip galvanizing of all types of fasteners including the treating of embrittlement on site. We do offer a wide variety of services to our clients by creating a comprehensive supply chain for all their galvanizing needs. Our expert services are procured by hand railing, flooring, construction, fabrication, civil and general engineering industries for open dipping.

All work is done according to SABS-ISO 1461SANS 121 Specifications. SMT Group is SABS and SATAS accredited and BEE compliant.

SMT Group offers the following services:

- **Hot dip galvanizing** - spinning and dipping;
- **De-embritteling** on site;
- **High tech engineering workshop** - cnc milling, turning and dynamic balancing;
- **Design and building** of machines to customer requirements;
- **Supply** of electrical spares at the best prices.

SABS SATAS SEESA

SMT GALVANIZERS
SPINNING & DIPPING

SMT Galvanizers (Spinning & Dipping) | **alex@smtgroup.co.za**
SMT Steel (Engineering) | **bernadette@smtgroup.co.za**

EDITORIAL COMMENT
in this issue

Thomas Edison the renowned inventor and scientist reported stated that" Opportunity is mostly missed by people because it is dressed in overalls and looks like work!" Waiting for opportunity to arrive is futile, opportunity exists wherever we are willing to go and put in the effort to reap it.

- Mozambique's gas field – A new door to opportunity
- Opportunity to more efficient and effective control of process using acid inhibitors.
- An opportune one stop duplex supplies shop from sweep-blasting to paint application.
- Education and training – courses and opportunities to host workshops or similar training.
- Chantéll Aucamp – An opportunity to meet our Office Manager of the HDGASA.
- Membership and the opportunities for reaping benefits by being part of the Association.

While times change opportunities will always be on the way in and the current 4th industrial revolution is no different. Focussing on the need of the customer and the latest economic imperative is the first step in reaping rewards – however it cannot be done for you, it is a DIY process.

So Do It Yourself – you deserve success.

THE ASSOCIATION WELCOMES
new Office Manager

Chantéll Aucamp is the HDGASA Office Manager based in Bedfordview, Germiston. She joined at the beginning of January 2020 and has already excelled at achieving her Level II Inspectors accreditation.

When asked what her next step was in her time with the HDGASA she replied "I'm looking forward building new relationships with each and every member and customer of the Hot Dip Galvanizing Association."

For all HDGASA courses, Galvpatch, Pro Metal Markers and HDGASA literature Chantéll can be contacted at the office on +27 11 456 7960 or by email at hdgasa@icon.co.za

Welcome aboard Chantéll – from all staff and members of the HDGASA.

OPPORTUNITIES PRESENTED BY the discovery of large LNG gas fields

THE SCALE OF THE GAS RESOURCES DISCOVERED OFFSHORE IN MOZAMBIQUE ARE YET TO BE FULLY UNDERSTOOD. TO GIVE PERSPECTIVE TO THE DISCOVERY THE 150 TRILLION CUBIC FEET OF GAS PLACES MOZAMBIQUE INTO A POSITION OF 4th LARGEST LIQUID NATURAL GAS PRODUCER AFTER RUSSIA, USA, QATAR AND AUSTRALIA.

Projects valued at over 50 billion USD are under consideration and it is estimated that at least half that has been fully committed to date.

A floating natural gas facility at a value of USD 5 billion is under construction in Asia after Eni of Italy triggered commencement of the project in 2017. This vessel will be deployed off the coast of Mozambique and gas pumped from the vessel to the onshore liquification plants.

These onshore plants, North of the Ravuma basin, as well as the infrastructure projects in support of these facilities will be mega projects. It is estimated that by 2024 Mozambique may have four operational LNG trains. It is possible that by 2029 an additional five LNG trains may be commissioned.

These international investments have positive spin-offs also for the sparsely populated regions within the Cabo

Delgardo province. It is estimated that infrastructural developments will need to triggered for support of approximately quarter of a million people estimated to inhabit "Gas City".

It is envisaged that an entirely new infrastructure will arise from manufacturing, agriculture, fishing, retail and associated support systems.

What opportunities exist for South African companies to participate?

An approximate USD 5.5 billion has been earmarked for Mozambiquan local content, of which USD 1.5 billion from South Africa may be considered part of this local content program.

Encouragingly the Department of Trade, Industry and Competitions has indicated its intention to assist with the mobilisation of South African companies to supply approximately R8 million worth of goods and services during the project phase, partly underwritten by the Export Credit Insurance Corporation.

Outside of the project requirements it needs to be borne in mind that the Mozambiquan economy, current GDP approximately USD 14 billion, may grow its GDP by over USD 20 billion – growth that will open new market opportunities for South African manufactured goods.

The Hot Dip Galvanizers Association has been invited over several years by the ISF to numerous seminars, presentations and think tanks related to the LNG projects. For a number of years the inertia in project actualisation created a certain level of scepticism within South African manufacturing and construction circles. This time has past and there is no doubt that opportunities exist on our doorstep. Furthermore under favourable political conditions the projects may deliver a regional integration not previously experienced

As momentum has grown further interactions between the Association and with other parties have developed. Examples are with The Manufacturing Circle and a seminar hosted by Turner

and Townsend related to mobilising South Africa for these opportunities were attended.

The key points covered in this workshop are:

- the possibility of Memorandums of Understanding between South Africa and Mozambique governments on economic cooperation.
- Preparing South African companies for participation – compliance on start up, localisation challenges and risk/reward management.
- Stakeholder management.

At the Turner and Townsend presentation, the DTI unpacked the potential areas of economic cooperation on infrastructure projects. These included rail projects such as rehabilitation of the Ressano Garcia and Beira-Machipanda railway lines. Port infrastructure projects may include a fertilizer port at Beira. Energy infrastructure projects related to hydropower dams and transmission lines are envisaged, as are extensive road infrastructure development.

As the presently challenged South African economy continues to show little to zero growth it is hoped that adroit South African companies, especially the construction, manufacturing and services sectors will engage proactively with strategic partners to leverage the opportunities these projects and the growth of our neighbour may deliver.

Acknowledgements: Engineering News; ISF and Turner and Townsend.

4 SIMPLE STEPS TO ACHIEVING a flawless duplex coating

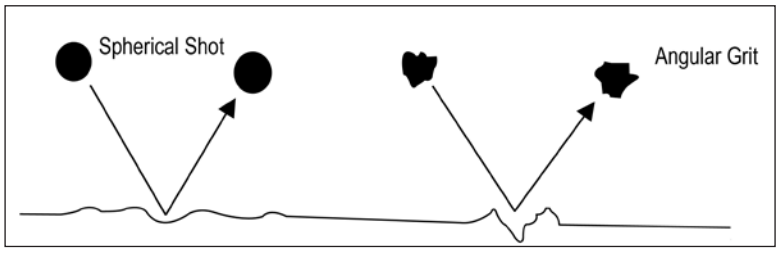
THE TERM 'DUPLEX COATING' QUITE LITERALLY MEANS TWO COATINGS, AND IS A SPECIALISED COATING PROCEDURE THAT PROVIDES ADDITIONAL CORROSION PROTECTION IN A HIGHLY CORROSIVE ENVIRONMENT.

A duplex coating system uses a combination of two corrosion protection systems – typically paint or powder coating over galvanized steel (hot dip, electro or zinc spray metallizing). The resultant corrosion protection is superior to either protection system used independently. The coating thickness of hot dip galvanizing usually ranges between 50 – 200 microns, depending on the parent steel thickness and chemical composition. The top coating ranges between 90 – 300 microns depending on application specifications.

Surface preparation

After the galvanizing process is completed it is time to prepare this layer for its top coating. An abrasive blast pot is used for this application. With standard abrasive blasting the goal is to remove mill scale, rust and coatings. However, in this particular application we do not want to remove the galvanised layer, but rather give it a profile or anchor pattern onto which the top coating can adhere. It is recommended that this blasted profile be between 20 – 45 microns.

1 Different types of blasting media create different types of profies.



1

In order to adjust the blast pot to blast 'lightly' we need to make a few adjustments and slightly alter our blasting technique. Firstly, the grit valve should be changed to a micro metering valve and secondly a suitable regulator to control pressure should be fitted. Set the air regulator to a pressure of 1.5 – 2 bar. Do not exceed 2 bar! Your stand-off distance (nozzle to surface) should be 2 meters. Your dwell time must be absolutely minimal (think of very light and fast sweep blasting).

The type of abrasives used for this application also play a huge role. It is highly recommended that a very fine abrasive is used. The particle size should range from 150 – 250 microns. This should create an average surface profile on the galvanized layer that is between 20 – 45 microns. It is crucial to set the micro metering valve to a very light flow of abrasives as a heavy/rich mixture will cause too much abrasion and remove the galvanising. AGT20 has a particle size of 150 microns and is ideal for this application. Keep in mind how easily galvanising can be removed.

Surface profile measurement

Why do we measure the surface profile of the galvanised layer? The peak-to-valley height of a resultant surface profile is an important factor in the performance of applied protective coatings. Low profile may reduce the coating bond strength (adhesion). If the profile is too high the peaks may receive insufficient coverage

and possibly removal of the hot dip galvanizing. The costly repercussion of purchasing more paint may be required if the profile is too high. In order to ensure that the top coating adheres properly to the galvanizing, meets contract specification and to not waste costly products, surface profile should be measured. The Standard PosiTector SPG (surface profile gauge) easily ready and displays surface profile. Where the surface of the galvanising is too concave or convex, textex tape can be used (PosiTector Replica Tape Reader).

Coating application

When it comes to applying an organic protective top coating there is a variety of equipment that can be used, such as conventional spray equipment and airless spray equipment. The best way to decide which equipment to use will be to see what is recommended in the product's data sheet. Paint data sheets almost always include the specifications of which equipment is too be used. Instead of just assuming that your current equipment will be the best, always first check your data sheet or inquire with your paint supplier.

Measure the coating thickness

Once the top coating has adequately dried, it is now time to measure the coating thickness. Duplex coatings require records of the thickness of both the galvanised layer and the top layer of paint. The PosiTector FNDS probe measures the individual thicknesses of

IN ORDER TO ENSURE THAT THE TOP COATING ADHERES PROPERLY TO THE GALVANIZING, MEETS CONTRACT SPECIFICATION AND TO NOT WASTE COSTLY PRODUCTS, SURFACE PROFILE SHOULD BE MEASURED.

Award Winning Probe Interchangeability!

Made in USA

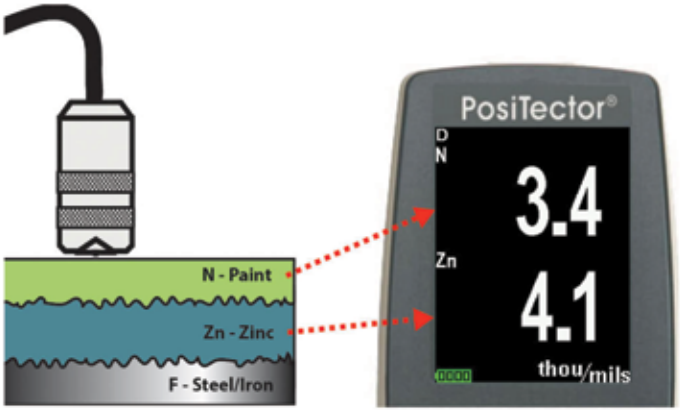
DeFelsko®
Inspection Instruments

PosiTector RTR
Digital micrometer for measuring surface profile with replica/testex tape

PosiTector 6000
Measures coating thickness on ferrous and/or non-ferrous metals

PosiTector DPM
Meaures climatic conditions including surface temperature

PosiTector SPG
Measures peak to valley surface profile heights on steel and concrete



PosiTector 6000 FNDS
Measures the individual thicknesses of both the paint and the zinc layers in a duplex coating system with a single reading

For more info contact:
Storm Machinery (Pty) Ltd
www.stormmachinery.co.za
sales@stormmachinery.co.za

strictly superior
Storm machinery

IN DUPLEX MODE, THE POSITECTOR 6000 FNDS UTILISES BOTH MAGNETIC (FERROUS) AND EDDY-CURRENT (NON-FERROUS) PRINCIPLES SIMULTANEOUSLY TO CALCULATE AND DISPLAY THE INDIVIDUAL PAINT AND ZINC LAYER THICKNESSES.

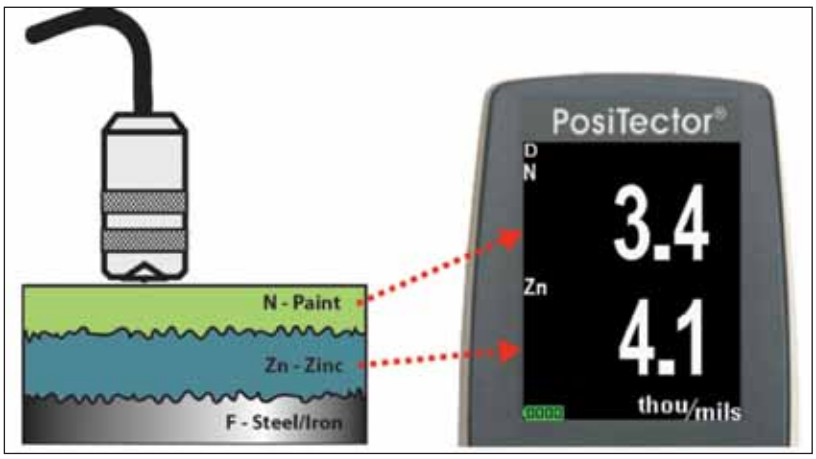
2

3

both the paint and the galvanized layer with a single reading.

In Duplex mode, the PosiTector 6000 FNDS utilises both magnetic (ferrous) and eddy-current (non-ferrous) principles simultaneously to calculate and display the individual paint and zinc layer thicknesses. The magnetic principle is used to measure the combined paint/zinc layer over the ferrous substrate, and the eddy principle is used to measure the paint thickness over the non-ferrous zinc coating. The zinc is calculated by subtracting the paint thickness from the combined paint/zinc thickness measurement.

Most duplex coatings specify that you measure the thickness of the galvanizing before blasting, then measure the thickness of the combined coatings once dried.



4

2 Digital Surface Profile Gauge.

3 Replica Tape Reader (Testex Tape) Gauge.

4 New PosiTector 6000 FNDS Duplex Probe.

"Knowledge is the only instrument of production that is not subject to diminishing returns" John Maurice Clark

COURSES OFFERED

Level I: Introduction to Hot Dip Galvanizing

The HDGASA one day INTRODUCTION TO HOT DIP GALVANIZING course is designed to provide an initial understanding of the concepts relating to hot dip galvanized coatings applied for corrosion control of steel components. The course comprises six modules. In order for the course to be viable we require six or more candidates to attend. Arrangements can also be made for this course to be held at a venue of your choosing for more than six candidates. In addition to the course, a special visit to a hot dip galvanizing plant may be arranged on a separate date, should six or more candidates be interested and able to attend.

Level II: Certified Galvanizing Inspectors

The HDGASA advanced Level II course provides the necessary skills to assess the quality and conformance of Hot Dip Galvanized coatings and Duplex Systems to the applicable specification. Delegates are introduced to other metallic type coating specifications and their application for corrosion control design.

The course provides an in-depth interpretation of the specifications and accepted best practice procedures for determining coating thickness, visual inspection of surface finishes as well as the evaluation of these coatings for corrosion control of steel components. The course includes a visit to a hot dip galvanizing plant where delegates will have an opportunity to assess finished product against the relevant quality standards on a real time first hand basis.

Three Continuous Professional Development (CPD) points are awarded to delegates attending the entire course. Bookings are limited to a maximum of 10 people, with applications treated on a first-come-first-serve basis. In order for the course to be viable we require 6 or more candidates to attend. Arrangements can also be made for the course to be held at a venue of your choice for more than 6 candidates.

ENROL IN A COURSE TODAY!
CALL 011 456 7960
EMAIL: hdgasa@icon.co.za

INCLUDES ELECTRONIC 'HDGASA INSPECTOR TOOLKIT'

HOT DIP GALVANIZERS ASSOCIATION SOUTHERN AFRICA

THE USE OF INHIBITORS
in hydrochloric acid pickling

What is steel pickling?

After hot-rolling, the oxygen in the atmosphere chemically reacts with the hot, surface iron on the steel and forms a compound normally referred to as SCALE.

Chemically speaking, this scale can be made up of one, or any, or all of these separate compounds:

Ferrous Oxide – scale (black, scaly)

Ferric Oxide – rust (brown, powdery)

Ferrous-Ferric Oxide – magnetite (blue black, magnetic).

This scale, no matter what proportion of the three above compounds it contains, is generally a very hard, brittle coating, from between paper thin to 1mm thick, adhering to the surface of the steel.

This scale needs to be removed from the steel before hot dip galvanising to ensure that the zinc adheres to the steel and that no excessive dross is created. The scale is removed through chemical cleaning using hydrochloric acid, also called pickling.

Chemical reactions in pickling

When steel is immersed in hydrochloric acid in a pickle tank, two reactions take place.

1) Scale is dissolved:

   $FeO + 2HCl = FeCl_2 + H_2O$

   scale + acid = ferrous chloride + water

   If there is rust or magnetite on the steel, these will produce ferric chloride ($FeCl_3$), thus:

1

2

1 Polished steel panel after immersion in hydrochloric acid with no inhibitor showing excessive etching of surface.

2 Polished steel panel after immersion in hydrochloric acid with inhibitor showing no etching of surface

$Fe_2O_3 + 6HCl = 2FeCl_3 + 3H_2O$

$Fe_3O_4 + 8HCl = FeCl_2 + 2FeCl_3 + 4H_2O$

2) Base metal is dissolved:

$Fe + 2HCl = FeCl_2 + H_2$ (gas)

steel + acid = ferrous chloride + hydrogen

We want the first reaction (1) to take place, because this is what removes the scale. We don't want the second reaction to take place because it consumes acid and etches the steel.

This is why inhibitors should be used.

Use of inhibitors to economize pickling

The action of the inhibitors has been found to be selective. Inhibitors retard the dissolution of metallic iron but the rate of dissolution of the scale or other compounds present like carbonates remains unchanged. The action of inhibitors affects only the reaction that takes place between the acid and the metal

The pickling process can be economized to a considerable extent by using suitable inhibitors in the acid bath. The benefits that can be derived by the use of proper inhibitors are:

- Reduction in acid consumption,
- Reduction in metal loss,
- Increase in productivity,
- Creating a pollution free congenial working environment,
- Decrease of pollution load in discharge water,
- Decreasing the coating weight,
- Decreasing the rejection of galvanized material due to hydrogen embrittlement.

Hydrogen embrittlement is a major problem during the pickling of mild steel. The addition of a suitable inhibitor to the hydrochloric acid eliminates or reduces embrittlement. This embrittlement occurs

INHIBITORS RETARD THE DISSOLUTION OF METALLIC IRON BUT THE RATE OF DISSOLUTION OF THE SCALE OR OTHER COMPOUNDS PRESENT LIKE CARBONATES REMAINS UNCHANGED.

when atomic hydrogen produced by the introduction of the acids, diffuses into the lattices of the metal and strains it. This results in brittleness at the molecular level, with no advanced indications such as visible pitting.

When metal dissolves in acid during pickling, a definite volume of hydrogen is produced. Atomic hydrogen, absorbed or dissolved in steel, affects its flexibility and ductility.

The bubbles of molecular hydrogen that form at the metal surface from conjugation of atomic hydrogen are extremely light. Blisters on sheet or plate during pickling and galvanizing are caused by the same phenomenon. Hydrogen bubbles rise rapidly through a poorly inhibited bath. As they reach the surface of the liquid, they break violently and produce fumes that can affect the health of workers and rapidly corrode metalwork and masonry in the pickling room. Inhibitors minimize acid fumes by reducing the hydrogen that causes them.

Acid inhibitors are organic based chemical compounds having active adsorption centres at elements such as, S, N, 0 and at delocalized electrons.

They are normally high molecular weight organic compounds, completely soluble in acid solutions. Different types of inhibitors are employed for different acids. For hydrochloric acid solutions, e.g. amino compounds are quite effective.

Pickling inhibitors must fulfil several requirements in order to be effective under severe conditions. The protective effects of these compounds must be maintained in the aggressive pickling environment and their efficiency has to be high in the presence of large amounts of iron salts, which are known to stimulate the pickling attack onto the metallic surface.

The properties required can be summarized as follows:

- effective inhibition of metal dissolution,
- no over-pickling in the presence of higher iron salt contents,
- no delay of the pickling process,
- effective at low concentrations,
- effective at higher temperatures,
- thermally and chemically stable,
- effective inhibition of hydrogen up-take by the metal,
- good surfactant characteristics,
- good foaming characteristics

To fulfil all these requirements for the prevention of metal dissolution, mostly mixtures of inhibitors must be used. Substances such as wetting agents, detergents and foaming components are added to these mixtures as the properties of inhibitors in this respect are generally poor. Wetting agents normally facilitate

the scale to flake off as the penetration of the acid in cracks or fissures is enhanced. They also help the acids to drain off the surface and to rinse them from the pickled components.

The foaming agents form a foam layer which eliminates much of the fumes released by the solution and it therefore avoids health hazards for the workers. These additives must be stable within a wide range of temperatures and salt and acid concentrations.

Effect of accumulation of iron in the bath

With the increase of iron content of the bath, the pickling efficiency, (i.e. the pickling rate), decreases. This is owing to the blocking effects of iron salts in fissures of the mill scales and thus reducing the transport of the acid beneath the scale and hence the negligible reaction with the base metal surface.

Increased iron in the bath leads to increased iron in the subsequent rinses and flux tank. Increased iron in the rinses will result in the need for increased effluent treatment and costs. Iron in the flux can lead to galvanising defects such as black spots, as well as increased ash and dross.

All of this means increased costs of the galvanising process.

Acid life extenders

It has been found that the addition of specialised chealating agents to pickling acid solutions, bind to the iron and other metallic impurities which can then be removed from the solution using a simple filtration system.

These specialised chealating agents drop metals, organics and impurities out of solution that build up in the metal treatment process. This frees up the remaining available acid in solution and thereby extending the acid life and decreasing the quantity of new acid necessary to maintain the desired ratio of acid to water.

Summary and conclusion

The addition of inhibitors into hydrochloric acid pickling baths can have a significantly beneficial effect on the running and quality of a galvanising plant, particularly if a combination of corrosion and fume inhibitors are used.

These benefits include:

- Reduced acid consumption
- Reduction or elimination of fumes
- Reduced defects from iron contamination
- Reduced hydrogen embrittlement

Duncan Thompson, Krome Metal Chemicals.

AVAILABLE FROM THE ASSOCIATION

METAL-PRO GALV-FRIENDLY MARKERS

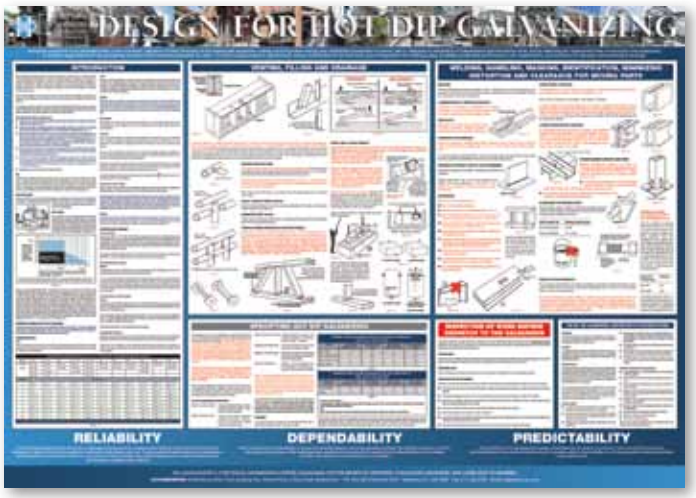
Designed for use in the hot dip galvanizing process, this **marking pen** stays on during fabrication but is removed completely in the galvanizing process.

PRO FEATURES

- Permanent marks during fabrication
- Ergonomic non-slip rubber PRO GRIP®
- Marks on wet and oily surfaces
- Durable clip cap
- Fast drying
- Weather resistant marks
- Crisp lines or bold lines
- Suitable for all metal surfaces

DESIGN FOR HOT DIP GALVANIZING WALL CHART

The **wallchart** is an invaluable reference chart for fabricators and specifiers. Key information is readily available to allow for best engineering practice for galvanizing.



TECHNICAL GUIDES

The HDGASA **Steel Protection Guide** and **Facts about Hot Dip Galvanizing** are available in high-gloss printed material for reference and guidance.

HOT DIP GALVANIZERS ASSOCIATION SOUTHERN AFRICA

CALL NOW FOR PRICES

CONTACT CHANTÉLL AUCAMP +27 11 456 7960 OR EMAIL hdgasa@icon.co.za

PLEASE CHECK THAT THIS IS THE LATEST UPDATED LIST

HOT DIP GALVANIZING MEMBERS

GALVANIZER	LOCATION	TEL. NO	SPIN	NO. OF LINES	BATH SIZES (L x W x D) (m)
GAUTENG					
ArcelorMittal South Africa	Vanderbijlpark	016 889 9111		3	Sheet galvanizer
Armco Galvanizers	Isando	011 974 8511		1	13.2 x 1.5 x 2.2
Armco Galvanizers - Randfontein	Randfontein	011 693 5825		1	6.5 x 1.3 x 2.0
Galferro Galvanisers In-line and general	Springs	011 817 3667		4	13.5 x 1.65 x 2.5 6.8 x 0.9 x 1.4 6.5 x 0.9 x 1.5 6.45 x 0.755 x 0.9
Lianru Galvanisers cc	Nigel	011 814 8658		2	7.2 x 1.3 x 1.6 4.5 x 1.3 x 1.6
Pro-Tech Galvanizers (Pty) Ltd	Nigel	011 814 4292	•	2	3.2 x 1.1 x 1.5 3.0 x 1.1 x 1.2
Silverton Engineering	Silverton	012 843 8000		1	7.0 x 1.7 x 2.0
SMT Galvanizers	Benoni South	011 421 1495	•	2	2.6 x 1.0 x 1.5 2.0 x 1.0 x 1.5
Transvaal Galvanisers In-line and general	Nigel	011 814 1113		4	15.5 x 2.0 x 3.2 – 1 of 12.5 x 1.2 x 1.8 – 1 of 8.0 x 1.2 x 1.5 – 2 of
WESTERN CAPE					
Advanced Galvanising (Pty) Ltd	Bellville	021 951 6242		1	14.0 x 1.4 x 3.0
South Cape Galvanizing (Pty) Ltd	George Industria	044 884 0882		2	3.7 x 0.94 x 2.3
EASTERN CAPE					
Galvanising Techniques cc	Port Elizabeth	041 486 1432		1	12.0 x 1.3 x 2.3
Morhot (Pty) Ltd	East London	043 763 1143		1	7.0 x 2.5 x 1.5
KWAZULU/NATAL					
A&A Galvanisers	Pietermaritzburg	033 387 5783	•	1	3.8 x 0.9 x 1.8
Bay Galvanisers	Richards Bay	035 751 1942		1	5.0 x 1.2 x 2.5
Durban Galvanizing (Pty) Ltd	Briardene	031 563 7032		1	9.5 x 1.3 x 3.0
Phoenix Galvanizing (Pty) Ltd	Phoenix	031 500 1607	•	2	14.0 x 1.4 x 2.5 3.0 x 1.2 x 1.2
Pinetown Galvanizing	Pinetown	031 700 5599		1	9.0 x 1.2 x 3.0
INTERNATIONAL					
MAURITIUS					
Galvanising Co Ltd	Port Louis	+230 234 5118		1	7.0 x 0.75 x 1.68
ZIMBABWE					
Essar Tubes	Graniteside	+263772833477		1	10.0 x 1.1 x 1.0

- Sheet, wire, pipe and other in-line galvanizing members dedicate their plants to the galvanizing of their own products. The bath sizes are inside dimensions and not maximum component size. Kindly take note of the expansion of the component when dipped into molten zinc or discuss with relevant galvanizer.

HOT DIP GALVANIZING... THE **BEST PROTECTION!**

CONSISTENTLY DELIVERING SUPERIOR QUALITY GALVANIZED PRODUCTS TO ALL OUR CUSTOMERS

Armco Galvanizers Isando has been operating since 1989. Geared up to accommodate heavy structural steel up and till 13m in length. Isando has an average output of plus minus 2000 tons per month.

Armco Galvanizers Randfontein is our second facility based in the Randfontein area. Randfontein has an average output of plus minus 800 tons per month and is geared up to handle light to medium structural steel up and till 6m in length.

Armco Superlite is listed in accordance with the BSI ISO 9001:2015 quality scheme which ensures the quality of all products and services produced by **Armco Superlite**. Specific customer quality plans are drawn up where required for any of our operations.

Armco holds the SATAS mark for Hot Dipped Galvanized steel and all products galvanized at our premises are according to the SANS 121 / ISO 1461 specification. Galvanizing certificates are supplied on request.

Isando | **Tel.** +27 11 974 8511

Randfontein | **Tel.** +27 11 693 5825

Web. www.armco.co.za

ARMCO SUPERLITE

OBO Bettermann Group