

Investing in the future

Bernard Hauffman, Elcometer Belgium, reports on Elcometer's participation in a Industrial Coatings Training program.

The FOREM in Belgium is a public service for employment and professional training. FOREM aim to help people acquire new qualifications and find employment. It also helps companies recruit and train their staff.

Among their many training centres, FOREM has developed a new Pigments division in association with French IFI Peintures. The new building in Charleroi, Belgium provides a training centre specifically for industrial coatings. Due to the success of the Pigment division, a mobile Pigment unit has also been developed and is currently based in Liege, Belgium for the next few months. The mobile unit will move from city to city providing industrial coatings training across Southern Belgium.



FOREM Pigment Division, Charleroi

The training covers all the steps of the coating process from surface preparation, spray and powder coating to coating inspection. Needing to purchase inspection equipment to enable training on viscosity, roughness, dewpoint, wet film thickness, coating thickness and adhesion in order to familiarise trainees with quality control procedures, FOREM approached Elcometer.

Elcometer Belgium supplied many instruments to FOREM for both Pigment training centres. These included the Elcometer 319 Dewpoint Meter, Elcometer 456 Coating Thickness Gauge, Elcometer 1542 Cross Cut Adhesion Testers, Wet Film Gauges, Elcometer 125 Surface Roughness Gauges and the Elcometer 128 Pictorial Surface Standards.



Elcometer 456



Elcometer 125

The instruments are vital to the training programme, giving trainees the advantage of becoming familiar with the practical use of the instruments. For example, using the Elcometer roughness gauges helps to control and improve their sandblasting skills, while using and

Elcometer 456 coating thickness gauges enables them to measure the paint thickness they have applied.

The 12 week training course gives students first hand experience in using some of the Elcometer products that they will come across everyday in their future roles in the Industrial Coating industry.

Elcometer would like to wish every success to FOREM Pigments and their present and future trainees.

Why is Elcometer orange?

Mr I.C Sellars, Managing Director Elcometer Instruments Ltd, answers a question that he has been asked many times.

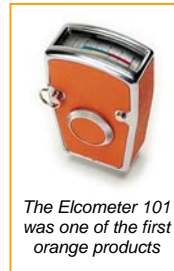
Mr I.C. Sellars has been interviewed on many occasions throughout his career and a question that is often raised is why is Elcometer orange?



Fishing for lobsters led to Elcometer becoming orange

In the 1950's, Mr Sellars and his father used to fish for lobsters. The lobster pots had floats attached, so they could be located and collected. As it was quite often difficult to spot the cork floats, Mr Sellars' father decided to paint the corks orange. This made them highly visible both above and beneath the water. The only disadvantage was that others could easily spot the orange floats too and quite often there were no lobsters in the pots when there should have been!

The first products Elcometer produced were black, which then changed to green for the early Elcometer 101 and Elcometer 111. While in the manufacturing facility one day, Mr Sellars heard the comment that once the gauges had been put down, they could never be easily found again. Thinking back to the lobster pots, Mr Sellars realised that if all the gauges were orange they would be highly visible and be easy to locate.



The Elcometer 101 was one of the first orange products

From the mid 1960's, Elcometer products have been manufactured in the distinctive orange colour, which has been gradually introduced over the years, and that has become synonymous with the Elcometer brand, representing quality and reliability across the world.

product of the month

NEW Elcometer 142 Dust Tape Test Kit

The new Elcometer 142 Dust Tape Test Kit is the first purpose test kit to meet ISO 8502-3, the assessment of dust on steel surfaces prepared for painting.



Supplied in a compact, portable kit box, the Elcometer 142 contains the test tape compliant to standard ISO 8502-3, clear, acrylic dust assessment plate, comparator display board, illuminated microscope and test record sheets, making cleanliness judgements and assessment of dust particle size easy and accurate.

For further information on the Elcometer 142 or any of our other surface cleanliness products, please visit our website www.elcometer.com or contact BAMR at sales@bamr.co.za.

Highway lighting column inspection

A recent e-mail to Elcometer's Technical Department, described the problem of obtaining accurate results when measuring coating thickness on steel lighting columns.

Steel lighting columns are protected against corrosion with a coating of zinc and paint. The problem faced was that when testing in the field, the inspectors needed to establish both the zinc thickness and the paint thickness.

The protection at the base of the column is especially prone to failure due to condensation inside the column, road salt and dogs. The thickness of the steel wall may reduce due to corrosion and become too weak to support the lighting column, posing a threat to public safety. Occasional checks to measure the remaining thickness of steel are necessary at points just above and just below ground level.

CHECKING THE PAINT & ZINC

For general inspection of the total coating, use of the Elcometer 456 in F (ferrous) mode is recommended. The reading will show the paint thickness plus the zinc thickness. Switching the gauge over to N (non-ferrous) mode allows the gauge to read the paint thickness only.



To calculate the zinc thickness, the two values are simply subtracted from one another. The calibration of the Elcometer 456 can be

checked by reading the bare steel with the F mode and the galvanised steel with the N mode.

An alternative method to check coating thickness is to use an Elcometer 121 Paint Inspection Gauge (P.I.G). This is a destructive method and involves a cut being made in the coating. Using the integrated microscope, this quick, easy test allows the different layers of paint to be viewed and measured, including the zinc layer which will appear as a blue layer over the brown steel.

CHECKING THE STEEL

Thickness at the base of the column is the most important, so some excavation is necessary. To check the steel thickness, the Elcometer 205 Ultrasonic Gauge is recommended.

The surface must be scraped clean of all loose material at a number of test points. Some couplant must be applied to the prepared points and the probe from the Elcometer 205 Ultrasonic gauge must be pressed firmly against the steel. The gauge will show the steel thickness as any corrosion products on the inside of the column will not be registered by the gauge. A reduction in steel thickness can be identified before there are any visible signs externally. This can indicate a potential weakness in the column and repair measures can be carried out before the problem becomes serious.



Certified viscosity cups

Viscosity cups are easy to use instruments to measure the consistency of paints, varnishes, inks and similar products.

Viscosity cups typically measure kinematic viscosity, which is where the force of gravity produces flow through a short tube at the bottom of the cup (right) at a controlled temperature. The time it takes before the flow breaks is a measure of the kinematic viscosity, generally expressed in seconds (s) flow time. These can then be converted into centistokes (cSt).



Elcometer now offer viscosity cups complete with calibration certificates. Calibration certificates offer traceability and assurance that the viscosity cups have been individually tested and comply to standards.

The wide range of viscosity cups are suitable for use in both the laboratory and on the production line. The Elcometer flow cups with calibration certificates such as the BS, DIN, FORD and ISO cups are all mainly used in the laboratory environment. The cups are supplied separately or with an adjustable stand, which includes a precision level and an overflow glass draw plate.



Flow cup with stand



Zahn dip cup

The Elcometer dip cups with calibration certificates such as the FRIKMAR, ZAHN and Shell cups are more widely utilised during manufacturing processes due to their ease of use and portability.

A list of available viscosity cups to order with calibration certificates are shown below:

Model Number	Description
Elcometer 2210	Zahn Viscosity Cups Numbers: 1, 2, 3, 4, 5
Elcometer 2310	Shell Viscosity Cups Numbers: 1, 2, 3, 4, 5, 6
Elcometer 2530	DIN Viscosity Cups Numbers: 2, 4, 6, 8
Elcometer 2351	FORD ASTM Viscosity Cups Numbers: 1, 2, 3, 4, 5
Elcometer 2353	ISO Viscosity Cups Numbers: 3, 4, 5, 6, 8
Elcometer 2354	BS Viscosity Cups Numbers: 2, 3, 4, 5, 6
Elcometer 2434	DIN FRIKMAR Viscosity Cups Numbers: 2, 4, 6, 8
Elcometer 2437	ISO FRIKMAR Viscosity Cups Numbers: 3, 4, 5, 6, 8

For ordering information, visit www.elcometer.com, e-mail sales@elcometer.com or contact BAMR at sales@bamr.co.za.

The importance of regular concrete structure inspection

In early October 2006, five people were killed when a section of concrete bridge carrying traffic over Highway 19 in Montreal, Canada collapsed.



Initial investigations into the failure of the 36 year old bridge, suggest that salt corrosion of the steel reinforcement (rebars) in the bridge deck may have caused the accident. It was also reported that poor positioning of the rebars contributed towards the tragedy. The Canadian Society for Civil Engineering have warned that further incidents could happen if an investment of CAN\$ 125 billion does not occur.

The Society's past president, Saeed Mirza, has been quoted as saying "if we do not properly maintain infrastructure, this will happen again. Surveys [of these structures] are 10 to 15 years old and the deficit between the money available for maintenance and the money needed is about CAN\$ 125 billion."

Similar structures in Canada were closed following the collapse. All, except one, have now been re-opened. The remaining bridge was found to be identical in terms of age and construction to the bridge over Highway 19, and is currently under inspection.

This is the second bridge in the area to suffer collapse, the first was in 2000 and collapsed during construction, killing one man.

There are many products on the market today that make concrete inspection straightforward and accurate. A gauge such as the Elcometer 331 Concrete Covermeter with Half-Cell is ideal to monitor and record the potential of rebar corrosion within concrete structures as well as the concrete cover. Rebars are also susceptible to movement while concrete is poured. The Elcometer 331 is able to accurately measure depth, position and orientation of rebars, making the gauge invaluable while construction is in progress as well as checking for possible faults in existing structures.



Salt content of the concrete can also be tested using products such as the Elcometer 134CSN kit to test chlorides, sulphates and nitrates. During construction, it is also important to test the salt content of the water being used to mix the concrete and salt content of the aggregate, as a higher than average salt content will also lead to premature corrosion of the steel rebars and lead to potential premature failure.

Such products will become a much more common sight as many concrete structures across the world are now approaching an age where failure due to the corrosion of the supporting rebars, begins to take effect.

The Elcometer range of concrete testing equipment, has been specifically designed to carry out inspection testing as an aid to specify required maintenance and to monitor the construction process.

Obsolete standard revived

Good ideas don't go away, but if they do, they are more than likely to return. This is true in a particular case where a standard test was made obsolete but was then revived because it was needed.

The French Norme NF A 91-124 for testing the adhesion of hot dip galvanising has the cross-hatch test alongside a percussion method (using a spring-loaded chisel). This will produce a grid of scratches that are 3mm (0.12") apart within a 15x15mm (0.59x0.59") square.

The tool is defined as cutting at 90 degrees to the test surface with a 75 degree angle. This can be achieved using the Elcometer 1537 ISO Scratching Tool, the same tool described in a similar test for sprayed zinc coatings,



Elcometer 1537 ISO Scratching Tool

EN 2063. It is interesting that this tool is also used for scratching painted test panels before subjecting them to salt-spray testing (ISO 2063).

The standard BS EN 22063:1994 *Metallic and other inorganic coatings – thermal spraying – Zinc, Aluminium and their Alloys* uses similar procedures to the new standard NF A 91-124 *Metallic coatings – Galvanisation by Immersion in Molten Zinc (hot-dip galvanising) – adhesion test methods*.

This just shows that good ideas are often recycled as in this case, the hard part is noticing them.

Elcometer's Technical Support Department offer Sample Testing

For certain applications, it is not always possible to establish the best instrument for the job or whether the product can be tested at all.

In such circumstances, the best way to solve this problem is to test the actual product with real instrumentation. It is not widely known that the Elcometer Technical Department offer a service of 'sample testing' on site at Elcometer's Head Office in Manchester, UK.

The aim is to establish which instrument is the most suitable for the task and whether it can satisfy the requirement of the customer.

The service is available for small quantities of product that can be safely shipped, but please consult Customer Service before shipping your samples.

The technical department have many years experience in testing and knowledge of applications and most of the instrumentation is readily available in Manchester.

We hope that by offering this service it will help to increase confidence and improve sales over a period of time.

For more information, e-mail techsales@elcometer.com or contact BAMR at sales@bamr.co.za.

Film applicators

The thickness of a film of paint or similar coating is one of the variables that must be kept constant when testing the physical properties. A number of devices provide a means of spreading a sample of the liquid evenly on the test substrate. We look at some of the different types here.

DIFFERENT TYPES

The same problem solved by different people resulted in a number of devices for spreading the wet film. Some have particular advantages or specific uses and personal choice comes into the selection process, too.

SPIRAL BAR

A cylindrical bar wound with stainless steel wire can be used to spread one or more liquids onto a flexible or soft material. The diameter of the wire determines the gap between adjacent wires and the substrate through which the liquid is forced. Only so much can get through in the time it takes to move the bar from one end of the chart to the other, controlling the film thickness.

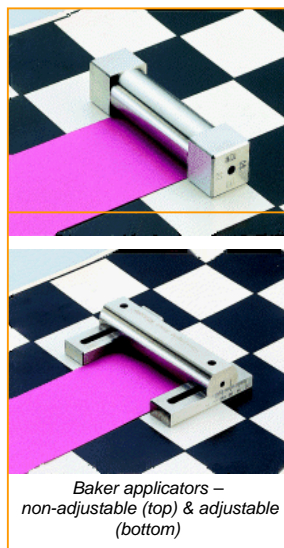
The movement of the bar (Elcometer 4360 and 4361) is provided by hand or by a machine. The test chart or material being coated is placed on a soft plastic mat. There is a little bending under the downward pressure applied to the bar, ensuring the contact is constant. The bar is not allowed to rotate, it must be held firmly during the stroke.



Spiral Bar Coater

Spiral bar applicators are often used by hand to produce a single thickness of film from 4 to 500 microns. A selection of them is often purchased.

BAKER



Baker applicators – non-adjustable (top) & adjustable (bottom)

In its simplest form, the Baker applicator comprises a cylinder between two cubes. The centre of the cylinder is offset leaving four gaps, depending on which side the device is resting on.

The adjustable version has the cubes replaced by two wedges marked with a scale. The position of the cylinder along their slope determines the size of the gap, which can also be set as a wedge, thinner on one side.

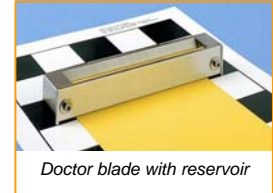
The Baker applicator (Elcometer 3520, 3525, 3530) is used on a firm flat surface, moved either by hand or by machine.

BIRD

A longitudinal corner of a cuboid provides the gap in a Bird applicator. The two-wedge system of the Baker provides a variable gap. When the same fluid is spread with both applicators, the results will sometimes be different because of the dynamics of flow around the gap.

DOCTOR

This class of applicators uses a blade raised up to 1mm from the surface. Screws can hold the blade in different positions after a metal shim is used to set the gap. Used for thicker wet films, there is one with and without a reservoir (Elcometer 3600 and 3700).



Doctor blade with reservoir

A version with 2 or 3 reservoirs (Elcometer 3800 and Elcometer 3805) is used for comparing samples on the same substrate (Elcometer 4695/18 etc). It is moved by hand or by machine.

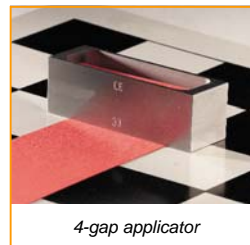
CUBE

A small version of the Doctor applicator producing a 12mm wide film up to 1mm thick is made with a single reservoir or as a set of 5 (Elcometer 3505). They are used for applying films to glass panels to test their drying time.

GAP

Four fixed gaps up to 250 microns and a reservoir form a simple film applicator (Elcometer 3560) for flat rigid substrates.

A version with two reservoirs (Elcometer 3508) is used for comparative tests on the Washability and Abrasion tester (Elcometer 1720).



4-gap applicator

CASTING KNIFE

To apply thick layers up to 6mm, the Casting Knife (Elcometer 3580) is used. The gap is set accurately with the fixed micrometers and the big sides contain the large

volume of sample to be spread. The Casting Knife is usually moved by hand on a firm flat substrate.

FLUID DYNAMICS

It is important to note that the thickness of the film is rarely the same as the gap of the applicator. The way liquids behave under pressure in the reservoir and under low pressure just outside of the gap, their surface tension and other factors mean that the film is usually thinner than the gap. However, it will be consistent for a particular liquid applied in the same way. Mechanical applicator machines (Elcometer 4340) ensure that the speed of application is more steady and controlled than it could be by hand.

In the next issue of elconews e-zine the product focus group will be on the subject of Abrasion and Wear Testing