

Getting a handle on coating control.

Joe Walker – Elcometer USA, reports on a solution to door handle quality problems.

When a manufacturer of high-end decorative door handles was unable to conform to industry quality standards, they had to find where the process was going wrong.

A leading manufacturer of speciality chemicals was supplying a clear coating powder to a door handle manufacturer. In this industry, as outdoor exposure to the elements is a major source of corrosion, one of the industry standards states that door handles must remain rust free after being subjected to 100 hours in a salt fog cabinet. The door handle manufacturer was in danger of losing a lucrative contract with a major US retailer because their products were rusting in critical areas after completion of the test.

As clear powder coat was the last step in the process, the customer assumed that the powder was substandard. The powder manufacturer knew the powder itself was not to blame because their strict quality control measures ensure their products conformed to standards.



It was suspected that either the door handle manufacturer was not applying sufficient powder coating or the Mexican company supplying the brass plating, was not controlling the brass thickness. A combination of both these factors was also possible.

As each door handle comprised a steel substrate with brass plating, which was then covered with clear powder, there seemed no easy or accurate way to determine the thickness of the different coatings. The powder company, after contacting other companies that could not help, approached Elcometer for a solution.

The Elcometer 355 Top is capable of determining thickness of coatings on a variety of both ferrous and non-ferrous metal substrates. Its batch feature with individual calibration was especially beneficial in this case, storing up to 200 separate batches each with its own calibration. The Elcometer 355 Top was set to measure the thickness of each coating with the F1 (ferrous) or N1 (non-ferrous) probes. It was simple to move from batch to batch, copying the calibration depending on the sample, without setting up the unit each time. Also, as each batch identification number being up to 7 digits, it was easy to match it to the relevant products.

Able to store up to 10,000 readings and supplied with statistical analysis software, the Elcometer 355T can output to a printer or PC so a statistical analysis report can be generated.

By using the Elcometer 355 Top, the door handle manufacturers were now able to check incoming brass thickness and outgoing cured powder thickness at their facility. This has reduced the wastage and costs, which in turn increased profitability, ensuring they were able to continue supplying high quality products.

Car auctions are no longer a gamble.

Larry Beasley – Pre-owned Sales Director at Sonic Automotive, reviews the Elcometer 311 Milgauge™ in the USA.

Finding one's market edge is essential to gaining the upper hand in a highly competitive environment, including the used car arena.

Today, the Elcometer 311 Milgauge™, or Refinishing Gauge, has become a familiar site at automotive auctions across the world.



Remarketing professionals appreciate the simple design and accuracy of this gauge.

With the ability to quickly and precisely determine paint thickness, they are able to assign a cash value to the vehicle with confidence. Pricing the vehicle in line with its true condition allows them to stay competitive in this fast-paced market place.

Each Elcometer 311 is supplied with a calibration check piece, to ensure accuracy. This is why automotive dealers choose it time and time again.

Larry Beasley, Director of Sub-Prime Sales and Director of Certified Pre-Owned Vehicle Sales at Sonic Automotive, is thrilled with the performance of the Elcometer 311 and states: "At the end of the day, it doesn't matter if it's a Mercedes, Toyota or Chevrolet. It's about the right tool to make the right valuation decision every time. Standing in the lane or working a deal at the desk, our managers wouldn't be without one. Elcometer is the industry standard!"

product of the month

The Elcometer 319 Dewpoint Meter

The design of the Elcometer 319 Dewpoint Meter incorporates all the needs required for climatic condition monitoring in one portable gauge.



The unique feature of the Elcometer 319 is the stability of its humidity sensor. Typically in the past, relative humidity (%RH) sensors had to be calibrated regularly to ensure accuracy. The Elcometer 319 uses one of the most stable and accurate %RH sensors in the world. Manufactured in Switzerland, it will still be accurate after 3 to 5 years of intensive use.

The %RH sensors are actually more accurate and stable than the saturated salt solution that users still sometimes use to calibrate them. By self-calibrating, the result is a gauge less accurate than it was before the calibration.

With calibration no longer a factor, you can carry out inspections knowing that the readings you store are correct every time. Independent calibration laboratories agree, making the Elcometer 319 probably the most precise and affordable portable Dewpoint Meter available today. Visit www.elcometer.com for more information or contact your local Elcometer distributor.

Ship ahoy!

With the super-yacht business booming, shipbuilders are constantly looking for ways to improve their efficiency and their processes. There are relentless pressures to decrease labour time on each project. With the time taken to manufacture the steelwork reduced to a 1/5th of that a few decades ago, now time has to be saved elsewhere.

The coating of a ship hull is a lengthy process and each phase must be carried out correctly to achieve the corrosion resistance required for the harsh maritime environment. There are strict specifications for the thickness of each of the coatings and it is essential they are applied in the correct climatic conditions, too; otherwise the coatings will fail quickly due to poor adhesion or insufficient thickness.

Instruments are available from Elcometer to check all of these processes, and are widely used throughout the shipbuilding industry.

During the application of a coating, the presence of water in the air or on the surface results in a poor quality finish. To determine how much moisture is present, it is necessary to measure air temperature and relative humidity. The calculated dewpoint must be lower than the measured surface temperature. All this can be done with a single gauge; the Elcometer 319 Dewpoint Meter simplifies this major task.



With this information, the contractor can determine the optimum time to apply the coatings and eliminates the possibility of a failure due to application in unfavourable climatic conditions.

The second process is establishing that the coatings applied are of the required thickness. With an Elcometer 112 or 115 Wet Film Comb and an Elcometer 456 Coating Thickness Gauge, the whole process of applying coatings can be monitored. The inspector checks each layer during the process, taking multiple readings to make certain the coatings meet the specification.

The final process is to ensure the coatings are free from pinholes, caused by air entrapment, which is then released from the surface, or by particulates (dust, sand etc). These flaws in the finished coatings can cause premature corrosion, especially in holds. The consequent cost of repair and subsequent time in dry dock is considerable, but preventable. The Elcometer 236 DC Holiday Detector, with its convenient carry case and both audio and visual alarms, essential for a noisy environment of a shipyard, makes the detection of flaws simple and accurate.

All this testing before, during and after the coating process is vital. Although initially it may seem to be more time consuming, and the aim of ship and yacht builders as we know is to reduce time, it does enable them to get the job right, first time. This saves both time and cost by not having to fix problems that appear later on in the construction process.

On the road

Lines of traffic paint on the roads are something we all take for granted. After all, traffic paints have been used for over 90 years. The cost of replacing them however has gone up and the ability to shut busy roads has gone down, so paints have been continuously improved to extend their serviceability.

With developments in paint chemistry and changing industry and environmental standards, highways agencies must thoroughly test the properties of all proposed traffic paints to ensure compliance. As with all laboratory testing, it is important that tests are comparable and repeatable in order to achieve an informed final decision.

The basis of many of the tests is to apply the sample of traffic paint to an appropriate surface in a standard way before analysis. Such a uniform application can be achieved with the Elcometer 4170 Traffic Paint Film Applicator.



This applicator is specifically designed to spread paints containing glass beads (ballottini) onto a rigid base plate made of cement, glass, metal, plastic etc. The applied films are clean and flawless and their thickness can be from 0.3 to 1mm (12 to 40 mils), depending on the tests specifications. The Elcometer 4170 provides the ideal way of producing uniform test samples time after time.

Can you stack it?

From cans of beer to boxes of biscuits, manufacturers of coil-coated metals all need to know that their metal sheets can withstand stacking after printing or colouring.

Typically, coiled metal is cut into flat sheets then coated. Later, it is shaped into the finished product. In between, these flat sheets need to be stored and in some cases shipped. The manufacturer needs to know that when they reach the next stage of the process, they can be separated from each other, especially those at the bottom of the stack.



The problem is as the warm sheets come off the printing line and are stacked onto pallets. If the printing is soft or not fully cured, the sheets can stick together and even transfer print on to adjacent sheets. This can cause a jam in the next part of the process or produce scrap containers.

The solution is to pre-test print designs with the Elcometer 8400 Heated Press. It comprises two horizontal parallel heating plates mounted on a frame. The upper plate is mobile and applies a pressing force up to 30,000 Newtons (6,744 pounds force) against a small stack of the samples. The heating is electronically regulated up to 250°C (482°F), simulating production situations. Adjusting the coating process accordingly will save costly mistakes on the production line later.

Not looking for rebar?

Much emphasis is placed on being able to locate depth and direction of rebars but many contractors simply want to find an area of concrete where there are no rebars. They want to safely drill holes for brackets and pipes without ruining their drill bit or causing serious structural damage.

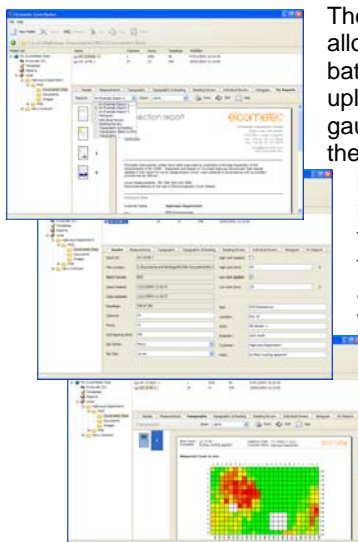


The rugged, waterproof and feature packed Elcometer 331 Covermeter can accurately measure the size and depth of reinforcement bars. It can also be used as a simple metal detector to locate areas without any reinforcement.

Surveys with CoverMaster®

Software designed to make using your covermeter even easier is supplied free with each Elcometer 331 Model S and T. Elcometer's CoverMaster® is a powerful software package that enables you to

- Set up batches and pre-program the Elcometer P331 Model S or Model T covermeters from your PC;
- Display survey readings clearly on the computer screen and then archive them;
- Print a report, export the file as a PDF and e-mail it to your client.
- Store all information about the survey in one folder;
- Generate high quality reports with the report design tool; layout the data, information, logos, survey report, site photographs etc. to suit you.



The CoverMaster® software allows you to download batch information to and upload readings from the gauge. Pre-programming the gauge with batch header and data format is very simple. A batch template is created on the PC and when gauge and PC are connected, you simply 'drag and drop' it into the covermeter icon. The process for uploading information is simply the reverse and saves the information in any folder in the PC.

This easy to use yet powerful software allows you to not only generate accurate, clear, professional and precise survey reports, but also to reliably save site information in the user-friendly storage management system.

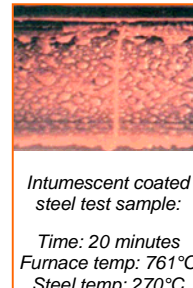
contributions, comments or questions?

e-mail us: editor@elcometer.com

Standard protection from fire

The fire protection provided by intumescent paints can mean the difference between life and death. Determining resistance to fire of structural elements is stated in ISO 834. The formulation of intumescent coatings tries to provide protection exceeding this with thinner films that remain decorative. But each manufacturer does this differently.

When exposed to fire, intumescent coatings expand to form a tough foam barrier that slows the transfer of heat. Steel structures stand up longer, giving more time to extinguish the fire. Deprived of fuel, the fire does not burn the building elements and so less smoke is produced.



Intumescent coated steel test sample:
Time: 20 minutes
Furnace temp: 761°C
Steel temp: 270°C

For an intumescent paint to be effective, it must have a certain dry film thickness. How much, depends on the element being protected and the paint characteristics. Manufacturers specify how much of their product is needed. However, the same volume from different sources can result in a different dry thickness.

Dry film thickness on metal is easy to check non-destructively, according to ISO 2810 or 19840, but not so easy on say a wooden substrate. A destructive test with a paint inspection gauge (P.I.G) according to ISO 2808-5B, could be done but is more difficult if the coating is clear or translucent.

Wet film checks to ISO 2808-7B, help check the coating as it is being applied. When the solvents evaporate, the remaining solid material provides the protection. The relationship between wet and dry thickness is the Volume Solids ratio and it must be constant.

Measuring Volume Solids, according to BS3900-A10 and ISO 3233, could help. This is because different manufacturers measure and state the amount of protective solids in different ways, making it difficult to compare intumescent paints. But this test is more appropriate at the time of manufacture and does not prove the condition of the paint at the time it is used by the contractor. Shelf life, storage conditions and settlement may alter the composition of the paint including any thinning.

There are two ways of checking the condition of the paint.

The first is as mentioned before. The contractor can utilise an Elcometer 112 Wet Film Comb to ensure application thickness is correct. Then when dried, dry film thickness can be checked using either an Elcometer 456 Coating Thickness Gauge, or an Elcometer 121 P.I.G dependant on the substrate. This however involves checking after completion of the job.

Another way is to test the paint before use. As the specific gravity, according to ISO 2811, of the paint is usually printed on the tin, it can be tested with an Elcometer 1800 Picnometer and weighing scale. This will quickly identify whether the solids in the formulation have settled. If the measured density matches the stated density, the paint can be applied with confidence. But if the two figures differ, application of the coating must be adjusted accordingly, to ensure the fire protection required is that provided.

Viscosity - part 2

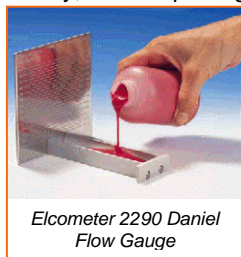
Having looked at the science of viscosity, this time we look at the equipment that assesses a liquid.

METHOD AND MACHINE

The choice of method to measure viscosity is based on more than this property. It should be appropriate for the other characteristics of the fluid, too. It also depends on the accuracy required; a QC measurement can be quick, simple and repeatable but only a laboratory experiment will have a high degree of precision.

FLUIDITY

The inverse of kinematic viscosity is fluidity; 'thin' liquids generally flow more than 'thick' ones.



Elcometer 2290 Daniel Flow Gauge

A simple assessment of fluidity is to measure the distance a known volume of product flows during a specified time.

Although such a reading is unrelated to units of absolute viscosity, this measurement is quite suitable for quality control of high-viscosity liquid products. Examples of this gauge are the Elcometer 2280 Matthis Fluidometer and the Elcometer 2290 Daniel Flow Gauge.



Elcometer 2280 Matthis Fluidometer

ORIFICE VISCOMETERS

These tools consist of a cup with a specific hole at the bottom. The viscosity is related to the time it takes for the cup to empty with a steady flow. It is difficult to correlate



Elcometer Zahn and Shell Cups

the result to absolute viscosity because of the influence of liquid clinging to the sides but the performance is consistent. These so called "dip cups" are best suited to low-viscosity fluids. The

Elcometer 2210 Zahn Cup is commonly used in the food and domestic chemicals industries. The Elcometer 2310 Shell Viscosity Cup is used for testing printing inks. However, both could be used for other liquids, too.

VISCOSITY CUPS

The ISO cup, Elcometer 2353, is a more sophisticated device whose performance is predictable, according to a formula. It can even have a heating jacket added to fix the sample's temperature before it is allowed to flow out. The result of the measurement is kinematic viscosity, which can be converted into absolute viscosity if the density of the liquid is known. The ISO cup is the 'modern' version of the BS, DIN and Ford cup series.



ROTATIONAL VISCOMETERS

A paddle, cylinder or other circular configuration is rotated to produce a defined shear rate in the sample. The power to maintain this rate at 200rpm comes from weights on a pulley or from an electric motor. In the Elcometer 2200 Digital Viscometer, the sample's resistance to flow is determined by measuring the increased current in the motor. The absolute viscosities of a wide range of liquids can be measured directly in this way. For flammable solvents, a version of the Elcometer 2200 Digital Viscometer with positive air pressure (air purge) will prevent sparks in the motor igniting the vapour.



Elcometer 2200 Digital Viscometer

Although the viscometer according to Stormer uses two flat paddles to shear a sample of paint, various cylindrical forms and helixes have also been developed. This widens the range of liquids that can be tested from very light ones to pastes.

CONE AND PLATE

A small sample of liquid is placed between a shallow cone mounted on the shaft of an electric motor and a static flat plate. When the cone is rotated, it results in a uniform shear rate throughout the sample and the resistance deflects the motor. In the Elcometer 2205 2206 and 2207, this twisting is translated into Absolute Viscosity. The temperature of the sample is quickly achieved and is precisely maintained by heating the plate. By selecting different speeds of rotation, the viscosity of non-Newtonian fluids can be tracked as they are progressively sheared. This is useful for testing non-drip or thixotropic paints that have a high initial value until they are sheared a little, when it drops to a lower value. After testing, the sample can be quickly wiped away with a paper tissue and solvent.



Elcometer 2205 Cone and Plate Viscometer

SELECTING

These are just a few of the many instruments and gauges used to determine how easily liquids flow. Some of them test more than one attribute of a liquid so it is important to consider what is expected from a particular liquid before testing.

Viscosity measurement is a powerful tool in the design of liquid products, also for their quality control during production. It quantifies the attributes so, with an accurate measurement technique, the task to produce uniform material becomes easier.

In the next and final part of this series on viscosity, we will look at some applications.