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In an instant, see what's hot and what's not.

Jake Chisolm – Quality Manager, Collis Inc. USA, discusses how Elcometer has saved him production time and costs.

When Collis Inc., a global supplier of wire, metal and other storage solution products wanted an oven profiling system that could help them maximise productivity and minimise energy costs, they chose the Elcometer 215 Oven Logger.

The Elcometer 215 Oven Logger, with the new Ideal Finish Software is designed specifically for the powder cure and paint cure process. A programmable logger with the ability to store up to 250,000 readings in 10 batches, the Elcometer 215 features a large LCD display for easy menu-driven operation and quick display of the measurement results.

Jake Chisolm, a Quality Manager at Collis is impressed with the performance of the oven logger, saying "The Elcometer 215 allows me to save on production time, energy, rework and scrap costs." He further adds, "The Ideal Finish Software is very easy to use. Measurements, analysis levels and report options are fully customisable. I can create professional reports and documentation in my own style. I can even insert a picture of the product and have the probe position calculated automatically, complete with automatic position-lag compensation. With the six channel system that can expand to 12 channels and probes that are designed for maximum accuracy, it's the easiest way to measure, record and analyse product temperature. I am very pleased with our choice of the Elcometer 215 Oven Logger."

Pepsi syrup challenge

Pepsi Cola, a division of the $29 billion PepsiCo world-leading food and beverages giant, have invested in Elcometer 2210 Zahn Viscosity Cups in order to ensure uniform consistency of their syrups. Carbonated soft drinks comprise syrup containing the flavourings and carbonated water, which is added at a later stage. The syrup is sold directly to public houses, restaurants etc. as it takes up less storage room. It is therefore essential that the viscosity of the syrup is correct, so when mixed with carbonated water through the pumps, it tastes perfect each time. The Elcometer Zahn 2210 Viscosity Cups provide the ideal, simple and quick check on the production line. Any problems can be immediately rectified, saving time and preventing large recall quantities and waste.

Chiswick Park development

Max Gwynn – Special Projects Division, Stent Foundations Ltd, reviews the new Elcometer Covermeters.

"Stent Foundations, were awarded the foundations package for Chiswick Park, London. Built to an Arup design, this involved the construction of 213 new piles on a brownfield site. The piles were traditional large diameter type bored piles, with a circular reinforcement cage and readymix concrete. Pile sizes from 900mm/35" to 1800mm/70" in diameter were cast to support loads up to 500 tonnes per pile.

A unique feature in the construction of the new building design is the elimination of the need for a pile cap, with the steel supporting columns fixing directly onto the top of the cast pile. This meant one large pile would suffice, where previously 3 smaller piles would be required.

Due to the high lateral loads imposed on the piles, this required the reinforcement steel at the top of the pile to be placed within an extremely tight tolerance. If the steel was not placed correctly, the structure of the new building would be at risk. The site team realised that 8 out of the 213 piles had been cast without an accurate build record of the pile reinforcement being made, and that was when we called Elcometer.

After a brief explanation of the situation, Elcometer advised that their Covermeter would be suitable for this application.

All 8 piles were found to be within the specified tolerance, having reinforcement levels between 90mm/3.5" and 115mm/4.5" below the top of the concrete pile head. It was thanks to the Elcometer Covermeter that the site team did not have to delay the project by breaking down the pile concrete and expose the top of the reinforcement to prove the level of the pile cage."

product of the month

The Elcometer 6910 Setaflash Tester.

When developing any solvent based liquids such as coatings or perfumes, it is imperative that you determine the flashpoint in order to meet the stringent regulations laid down by most governments around the world and it is declared on the material safety data sheet. The Setaflash Series 3 offers the fastest and most accurate flash point instrument at a very cost-effective price. An extended operating temperature range allows tests from 0°C/32°F to 300°C/572°F. Features include automatic flashpoint detection, rechargeable gas tanks and options for open cup or closed cup testers. If you would like further information on the Elcometer 6910, or any of our products, please visit our website www.elcometer.com or contact your local Elcometer distributor.

Breaking news ….

SSPC in the 456

The Elcometer 456 coating thickness gauge is being upgraded to meet the new calibration method of the 2004 version of the Steel Structures Painting Council (SSPC) standard method PA2 (SSPC PA2: 2004 standard).

The Top and Standard version of this coating thickness gauge have Preset Calibrations. The user can choose from the menu the appropriate method and save time in setting up the various parameters.

In the case of the SSPC PA2: 2004 standard, identified in the Elcometer 456 as SSPC4, the preset is a 2-point calibration and a counted average of 3. This means the scale is calibrated using two foils on the typical blast-cleaned, but still uncoated surface. Then after 3 readings of the coating, the average of this spot is stored as one value in the memory. Using one batch for each area of inspection gives the average of the averages. As before, the user can set the lower limit of the gauge to 80% of the specified DFT and the high limit to 120%, to give an alarm.

Newly produced Elcometer 456 gauges will have this preset calibration included in their menu. Earlier models can be reprogrammed as part of a calibration check. Remember to request that SSPC4 be added when you send it in. The Basic version of the Elcometer 456 does not have preset calibrations but does have a 2-point calibration available.

BS EN 14431:2004

Vitreous and Porcelain enamels – Characteristics of the enamel coatings applied to steel panels intended for architecture

When powdered inorganic glass is fused on to the surface of steel sheets above 500°C, it forms a continuous glassy layer with a long-term corrosion resistance that can be used as an alternative to liquid coatings. Wall panels made from this coloured material are self-cleaning and graffiti-resistant as well as hardwearing.

The assessment of the quality of such panels is described in this standard and includes porosity and abrasion resistance as well as a check for thickness.

Small bubbles sometimes form when the steel sheet is heated and the glass flows into a continuous layer. They can burst, exposing some steel. A number of such holes can be accepted when the surface is tested. EN 14430 (Elcometer 236) allows up to 10 pores per square metre, 5 for EN ISO 8289 method A (Elcometer 270) and 10 for method B (wet paper).

The enamel's resistance to abrasion is determined using the Taber 5130 Abraser with S33 emery paper and a 1kg load. The loss in mass after 100 revolutions must be less than 100mg. The thickness of the enamel coating is in the range 60 to 500 microns (2.5 to 20 mils) depending on the gauge of the steel sheet. It is easily measured using, for example, an Elcometer 456F with an F1 probe. For calibration, use an uncoated panel of similar material with a clean bright surface.

How do you check wear & tear before you buy?

Washability and abrasion testers are generally used by manufacturers of coated surfaces to see how they would fair in everyday conditions and to ensure they meet minimum industry standards.

Companies can spend vast amounts of money on office chairs, as they must conform to the latest health and safety directives. Unfortunately their fabric cover often wears out quite quickly and the chair must then be recovered. Because of this, the 'heavy duty fabric' option is often chosen automatically as it is believed that these will last longer. But how can a buyer be sure how durable the cloth is?

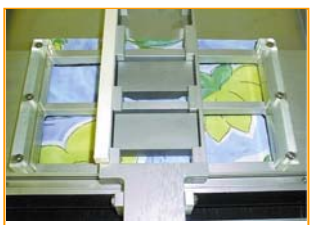
When new chairs were being purchased for Elcometer's head office, the choice was narrowed to 4 options. The standard fabric chairs and the heavy duty fabric chairs. To choose which version to buy, samples of each fabric were tested on the Elcometer 1720 Abrasion, Scrubbing and Washability tester. With this apparatus, many months of wear can be simulated in a comparably short space of time to show the difference in durability of fabrics.

Elcometer 1720

Four working stations were used on the Elcometer 1720, enabling up to 4 samples or 4 different tests to be performed simultaneously, with each path separated by a water-tight gasket frame. Due to the preset cycle counter automatically stopping the machine, the technician's productivity was dramatically increased.

The results were surprising. Although the heavy duty fabric felt thicker, it wore in exactly the same way as the standard fabric. With this information, the standard chairs were purchased making a saving of £30 per chair – saving thousands of pounds just on chairs. A proportion of this saving paid for the cost of the gauge!

The Elcometer 1720 is not just restricted to textiles or office equipment. It can test coatings such as paint, lacquer, ink, and materials such as leather, wood, plastic and printed materials. With variable speeds, adjustable stroke length and various test tools to meet a wide range of different standards and test methods, the Elcometer 1720 is a highly versatile piece of equipment.

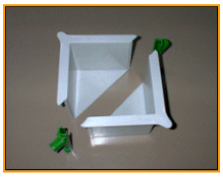


Testing wallpaper on the Elcometer 1720/5

concrete inspection

Inspectors on the move

Strength of concrete is key in the construction process. The compressive strength of concretes and cements used in a structure are specified and carefully monitored. To control the quality of the mix, site inspectors test the compressive strength of samples by applying load.



Site inspectors often move from site to site, with a car boot full of hard hats, boots, equipment and inspection kits and the single use polystyrene concrete compression moulds take up too much room. However, inspectors do have another option – the Elcometer 190 Quick Benton Concrete Cube Compression Mould. This innovative, low cost, accurate and space saving cube mould used for compression and quality testing of concrete, can be dismantled.

This lightweight mould is designed to allow samples to be removed with minimal effort. Two modular identical half-shells are brought together and clipped in place to prevent separation when the mould is filled. As the concrete sample manufactured with the Elcometer 190 has all the geometrical and physical specifications required to comply with the dimensional tolerances specified by UNI EN 12390-1:2002, there is no need to grind the surface of the cubes to get the end faces flat and parallel. With each mould being able to be used at least 15 times, the Elcometer 190 provides the perfect, portable solution.

Renovate with confidence

Renovating and refurbishing a building serves many challenges to the developers. One of the most important factors is an accurate survey, as this provides the foundations of a successful refurbishment.

A company refurbishing a building with multiple supporting pillars, wanted to add internal walls to break up the huge open space. In order to achieve this, the existing supports within the pillars needed to be located accurately. This was to ensure the integral strength of the pillars were not compromised by drilling into already present rebars, while also ascertaining where the supports for the new internal walls could be added.

The company turned to Elcometer for a solution. The Elcometer P120 Rebar Locator is one of the easiest and fastest ways of detecting rebars. Widely used before coring or drilling holes to find ‘safe spots’, the Elcometer P120 not only indicates the rebar’s location and direction but is also highly sensitive and was able to locate the thin wire circumferential supports that many other rebar locators simply would not ‘see’.

The company were delighted with the results as it allowed them to map and plan accurately for the internal walls, saving them both time and money.

standards news

Salty surface in the field

SSPC have issued GUIDE 15, Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Non-Porous Substrates. It summarises the various techniques being used today.

Retrieval of a sample is classified by a patch or tube fixed to a small known area; by absorbing by paper or swabbing a larger known area; and by boiling in the laboratory. The liquid used to dissolve the salt is generally (but not always) de-ionised water.

There is a list of analysis methods in the guide. The result can be given as total salt density (mass of salt per unit area) or specifically the chloride, iron-ion, sulphate or nitrate over that area.

Guide 15 for analysing salt on surfaces can be obtained directly from The Society for Protective Coatings, USA. Visit www.sspc.org for further information.

BS EN ISO 8502-5:2004

BS 7079-B5:2004

Measurement of chloride on steel surfaces prepared for painting (ion detection tube method)

If concerned parties could agree to some variation of this standard method, a commercially available test could be used.

According to the standard, a proportion of the water-soluble chlorides on the test substrate are removed by controlled washing. Such washings are then analysed to determine the concentration of the chloride ions using tubes containing silver chromate.

By agreement, hand-made tubes could be replaced by commercially made ones, whose performance would be more certain. The specified wash area of 0.5m x 0.5m could be replaced by a number of smaller areas, some of which could be in compact locations**.**

Agreement would mean the Elcometer 134S Salt Detection Kit (Chlor*Test) could be used. This would simplify the inspection in yet another way; the sample area used by the kit gives a direct reading in micrograms per square centimetre so no calculations are necessary.

Viscosity

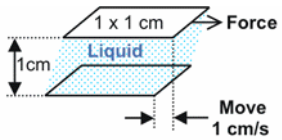
In the first of this 3-part series, we look at how liquids are measured, starting with the nature of viscosity. It affects both the economics and ergonomics of liquid coatings. A certain viscosity is necessary when applying a coating because it takes energy and time to move it. But how is this assessed?

Consider this example. Mayonnaise and honey are thick liquids. Under the same conditions, it is easier to stir the mayonnaise than the honey. If the containers are inverted, the honey will run out but the mayonnaise will not. One has more resistance to shear; the other has more resistance to flow.

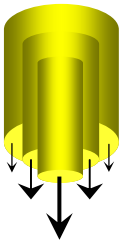
When materials are stressed, they deform. A liquid will deform irreversibly and usually flows. Because of its internal friction, energy is required to move it and viscosity is the measure of the liquid's resistance.

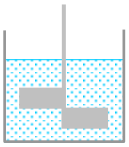
TWO VISCOSITIES

The force of gravity produces flow through a short tube at the bottom of a cup (right) at a controlled temperature. The time it takes before the flow breaks is a measurement of **Kinematic Viscosity** and its unit is the Stoke. A more convenient unit is the centistoke (cSt) or millimetres per second (mm/s). The relationship between time taken to drain the cup and the viscosity of the liquid depends on the dimensions of the cup and orifice or hole.



The metric unit of **Absolute Viscosity** is the Poise, which is defined as the force in dynes required to move a flat surface one square centimetre in area past a similar parallel surface at a speed of one centimetre per second, with the two surfaces separated by a liquid one centimetre thick. This action is called 'shear'. Imagine many such layers clinging to each other. The same applies if the layers are cylinders (see right) such as in a tube. Power is required to overcome the friction and slide them over each other. Some layers will move quickly, those below will move slowly and those further away will not move at all.





Absolute Viscosity is typically measured by a rotary viscometer. The torque on a paddle (see left), a cylinder or a disc immersed in the liquid, rotated at a constant rate, is related to the fluid's resistance to shear, sometimes called 'consistency'. It can be expressed in Kreb units, which are a logarithmic function of the torque, but generally the Centipoise (cP) or millipascal-second (mPa.s) is used.

The two viscosities can be related by this equation:

Absolute V (cP) = Kinematic V (cSt) x density* of liquid

**A Density Cup / Picnometer, such as the Elcometer 1800, determines density.*

VARIABLE SHEAR

The Cone and Plate Viscometer is one of the simplest and quickest methods of measuring absolute viscosity for production and QC purposes.

A cone with a large angle (almost flat) rests on a flat plate while a motor rotates it quickly. A small sample is placed between them. The motor is free to twist about its axis but is controlled by a spring. As the cone rotates, the resistance of the sample displaces the motor and spring. This equates to shear resistance or the viscosity of the sample. There are choices of cone angle, motor speed and temperature to suit from thin inks to thick pastes. The results are given in 'poise at rotation speed', e.g. 1P at 10,000/sec.

TEMPERATURE

Warm liquids flow more easily than cold ones; for example, paint can be difficult to spray at low temperatures. When the temperature is increased, the viscosity decreases, making it easier.

Some mixtures containing polymers with long molecules have a very high viscosity that does not reduce when their temperature is increased. These materials must be sheared to reduce their viscosity but it gradually increases again afterwards. This is a useful property for paint applied by a brush; the movement of the brush provides the power to overcome the internal friction. When it stops, the friction predominates and the paint stays in one place. Such materials are called 'thixotropic'.

STANDARD OIL

To confirm that the various viscometers and cups are still performing correctly, standard oils are used to check them. They are carefully formulated to keep their characteristics for 2 years or more. Some oils are rated in centistokes and others rated in centipoises; do not confuse the two types.

CONDITIONS OF TEST

The viscosity of many liquids are not constant (Newtonian) under all conditions; liquid changes under different Stress, Shear Rate and Temperature. A few liquids are only constant over a limited range. That is why it is so important to measure and compare viscosity under the relevant conditions.

In the next issue of **elconews ezine** *we will look at the equipment available to measure viscosity.*

The Poise was named in honour of French physician Jean Louis Poiseuille (1797-1869), who in 1843 was the first to study viscosity in a quantitative manner. He determined how blood moved through blood vessels and his observations proved to be valid for all liquids.

George Gabriel Stokes (1819-1903) was an Irish-born mathematician who studied many subjects and started the science of hydrodynamics. His most famous work described the motion of a sphere through viscous fluids.