

Can-can

Chrystel Pressat – Elcometer France, tells us how they solved a drinks can manufacturer's quality problem.

Alcan are a global manufacturer of packaging products for a wide variety of industry sectors including pharmaceutical, food, cosmetic and tobacco sectors.

In this instance, the quality control of printed drinks and baby milk cans was causing a problem.

Printed drinks cans must withstand shipping, loading, stacking, shelving and so on. They are tested for wear to ensure the printed design remains intact.

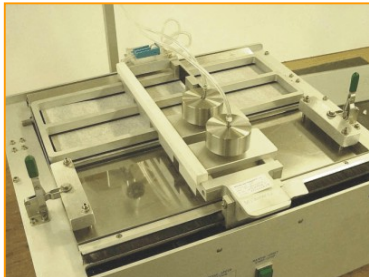
One of the tests carried out by Alcan is to use acetone on the surface of the printed can. Being a solvent, it could not be used with normal washability test equipment as the plastic tubing feeding it would disintegrate. So the tests were being done by hand.

The problem with non-automated testing is that there is no consistency. Acetone was being applied to a cloth and rubbed on to the printed surface. There was no control on the amount of acetone applied to the cloth, no control for the pressure applied to the can surface and no control of the amount of time spent on each test. The results were random with no repeatable or reproducible results.

Elcometer provided the solution by making some special adaptations to the Elcometer 1720 Washability Tester.

"We connected the feeder tank that holds the acetone with plastic pipes made of Tygon[®], a material resistant to aggressive chemicals," said Chrystel. "The pipes feed into the abrasive pads that are pressed down by weights. They move backwards and forwards over the sample at a set rate."

"The results obtained can be used to assess the coating quality because a repeatable, accurate and controlled test is now being performed. We are all delighted with the results."



Because the Elcometer 1720 allows more than one sample to be tested at a time, it increases the output of the quality control engineer, making the whole process more efficient. This special adaptation will be available from March 1st 2006.



Elcometer 1720 with Tygon[®] plastic pipe

With Tygon[®] tubes, aggressive solvents, such as MEK (Methyl Ethyl Ketone) can also be used, as specified in some Qualicoat[®] test procedures.

Expansion at Elcometer UK

The expansion programme at the Elcometer UK site is now underway. The UK facility which manufactures coatings and concrete inspection equipment as well as the industrial metal detection range is being doubled in size to help satisfy the needs of customers and is due for completion at the end of the year. Plans are already being drawn up for a new, larger Belgium facility within the next 12 months.



Clearing the way for the 3240m² (34875 sq.ft) construction project.

Growth in Australia

Paul Jenkins – Elcometer Product Development Manager, Phillro Industries, Australia, tells us about his plans for more.

Phillro Industries have been appointed as the Principal Australian Distributor for Elcometer.

Meeting with potential resellers around the country has enabled Paul to further establish the existing distribution network to cover each of the major Australian states and territories.



Signing the contract in Australia, from right to left: Elcometer - Mr IC Sellars, Mrs NPE Sellars, Phillro – Paul Jenkins

With Elcometer coatings inspection equipment already well known and respected in Australia, the initial focus will be on launching the concrete inspection range. Steve Pollard, Elcometer UK will be visiting Phillro Industries this month to assist with product training as part of the support strategy which Paul considers to be "one of the critical forms of support to allow identification of sales opportunities and product application."

product of the month

The Elcometer 107 Cross Hatch Cutter

The Elcometer 107 provides a quick assessment of the quality of the bond of a coating to a substrate. Due to its rugged construction, this gauge is ideal for thin, thick or tough coatings on flat or curved surfaces. It is ideal for use in the laboratory or in the field. For thin coatings, the Elcometer 1542 Cross Hatch adhesion tester is the ideal choice.

The Elcometer 107 is used in accordance with the following standards: ATSM D 3359-B, ASTM D 3002, BS 3900-E6, BS EN ISO 2409, DIN 53151 and NFT 30-038.



For further information on the Elcometer 107 Cross Hatch Cutter, or any of our other products, please visit our website www.elcometer.com or contact your local Elcometer distributor.

Micaceous Iron Oxide Paint

Micaceous Iron Oxide (MIO) pigment is used in certain paints to provide long-term durability. Its particles are flat and fall like autumn leaves to form a blanket over the surface, reducing the paint's permeability to moisture.

Although MIO has some slight magnetic properties, these are not enough to affect the readings of coating thickness gauges using Magnetic Attraction or Electromagnetic Induction techniques.

However, a problem is evident in some commercially produced paints when measurement is attempted. Gauge readings tend to be low and then decrease as more paint is applied, so it is clear that something in the paint has a magnetic effect.

MIO is a mineral mined in some four or five areas of the world. It is found naturally mixed with other oxides of iron in varying amounts, the main one being Magnetite. As the name suggests, this oxide has magnetic properties and influences gauge readings. Some commercial producers of MIO pigment refine their material, reducing the level of Magnetite, and when this is mixed into paint, there are no noticeable reading errors.

The presence of Magnetite in a paint formulation has no detrimental effect on the paint's performance, only on gauge readings.

Wet film gauges are not affected, though, and can be used to calculate the dry film thickness using the following equation:

$$DFT = WFT \times 0.01 \times VS$$

Where DFT = dry film thickness
WFT = wet film thickness
VS = volume solids percentage

The only sure way of measuring the thickness of dry MIO paint is to use a destructive tester, such as the Elcometer 141 Paint Inspection Gauge (P.I.G.) or the Elcometer 195 Säberg Drill. The values obtained can be compared to those from a magnetic or electronic gauge and the results will show conclusively if the instrument is reading correctly. This method, because of its accuracy, is very popular in bridge inspection where coating durability is so important.



Elcometer 115 Wet Film Comb



Elcometer 141 Paint Inspection Gauge

Did you know?



The 10" (25cm) pyramid at the top of the Washington Monument is made of aluminium rather than gold. This was the first time that aluminium was used in architecture.

Interestingly, when the monument was built in 1884, aluminium was more valuable than gold.

New Elcometer 5135 & 5155 Rotary Platform Abrasers

The Elcometer 5135 and 5155 Taber® Rotary Platform Abrasers are the latest versions of the industry standard in assessing the wear and durability of ceramics, plastics, textiles, metals, leather, rubber and painted, lacquered and electroplated surfaces. Replacing the Elcometer 5130 & 5150, the new range offers advanced and improved features while still being easy to use and operator friendly.



Elcometer 5135

The Elcometer 5135 model has one test head specimen holder, while the Elcometer 5155 has two. The dual head allows different or identical materials to be tested simultaneously for comparison and contrast, doubling the productivity of the operator.



Elcometer 5155

The new operator interface is larger and displays simple on-screen instructions, allowing easy alteration of test parameters including test mode, test duration, test cycles (completed or remaining), turntable speed and vacuum suction level (percentage).

A choice of preset cycles allows automatic programming of 100, 500, 1000 or 2500 test cycles. Both the Elcometer 5135 & 5155 have two turntable rotation speeds of 60rpm and 72rpm, enabling the speed stated in a standard to be used.

The mounting hubs have been redesigned with push button operation, permitting quick wheel mounting without the need for a locking nut. A spring loaded bevelled retaining nut provides a positive locking force, making certain the wheels remain securely fastened until disengaged.

Precision stainless steel weights of 250g and 750g are included. When mounted on the abrading arms, already 250g, they provide standard wheel loads of 500g and 1000g. Counterweights are available to reduce the 250g load to 125g or 75g. Counterweights can also be used in conjunction with the standard weights to further expand the range of wheel loads.

The height of the vacuum nozzle is now precisely adjustable making it significantly easier to set the exact distance between the nozzle and specimen surface.

Both the Elcometer 5135 and Elcometer 5155 are dual voltage 115 / 230V, 60 / 50Hz, switchable for maximum flexibility. This makes it easier to run the same test in different countries with different mains frequencies without a variation in rotation speed.

As with the previous models, the units can be used in accordance with a vast range of standards including ASTM, DIN, EN, FEDERAL, FTMS, ISO, JIS, MILITARY, NF, SAE, SIS and TAPPI. This makes them the most versatile abrasers available today.

Parts and accessories will still be readily available for the Elcometer 5130 and 5150 models.

New kid on the design block

Marble, granite, ceramic tiles, Formica and Corian all have new competition as concrete is now being used in kitchens, bathrooms, lounges, offices and retail facilities and it's popularity is growing.

Concrete used to be associated with greyness and dullness, but not anymore. Concrete is taking the interior design world by storm and is rapidly becoming the material of choice

WHY CONCRETE?

People are choosing concrete over other materials because of its versatility. It can be moulded to any shape, be stained or dyed virtually any colour and comes in a range of textures from rough to highly polished.



Concrete sink



Concrete countertop

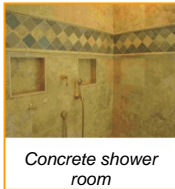
Concrete is now being used to produce counter tops, sinks, bathtubs, floors, fire surrounds, furniture, tiles – the list goes on. And the durability of concrete enables it to be used in commercial and residential projects alike.

Because the pieces are usually custom-made, customers can enjoy inputting their creativity into the project, making each one unique.



Highly polished concrete floor

Concrete also offers warmth and insulation that natural stone does not, making this an energy saving material as well as a highly customisable one.



Concrete shower room

This custom production attracts the same stringent quality control in the manufacturing processes that you would expect from mass produced pieces. Inspection equipment is used throughout the process to ensure a quality product every time.

CONTROL PROCESSES

When the concrete is being moulded, the climatic conditions are carefully monitored with an instrument such as the Elcometer 319 Dewmeter. Most concrete is moulded in workshops where humidity and air temperature can be closely controlled to provide the optimum curing conditions for the concrete. Sometimes, this is not possible and the concrete must be moulded on site where climatic conditions can vary from the ideal.

Hardness of the concrete structure is tested with a test hammer such as the Elcometer 181 to determine if the structure is hard enough to withstand the 20 years or so of use it has been designed for.



Elcometer 181 Concrete Test Hammer

Concrete can also be highly polished for certain requirements such as lobby floors. By using an Elcometer 402 Novo-Gloss Glossmeter, the finish can be checked to making sure the concrete looks it's absolute best and enhances the space.

SSPC-PA2: 2004

The Elcometer 456 coating thickness gauge is now available with upgraded software 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 T and S versions of the Elcometer 456 have preset calibrations so the user can choose from the menu the appropriate method and so 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 readings. Users set the lower limit of the gauge to 80% of the specified DFT and the high limit to 120%, to give an alarm signal outside of this range.

Revised ASTM Dictionary now available

The ASTM Dictionary of Engineering, Science and Technology, 10th Edition is now available.

This expanded and heavily revised edition contains all 29,000 standard definitions referenced in all ASTM terminology standards.

Including over 7,000 new terms, this single easy-to-use volume helps you to make faster, better use of ASTM standards and learn how particular technical fields use their terminology.

With each definition written by technical experts in their field, this valuable reference tool provides a clear and precise explanation for each term. This edition also includes the designation of the ASTM standard in which it is referenced and the ASTM committee that developed the standard. To purchase a copy or for more information, visit www.astm.org.

New publication from ASTM

A new publication from ATSM International, *STP 1463, Advances in Adhesives, Adhesion Science and Testing*, contains 11 papers focussing on new adhesives, particularly the newer test methods emerging to better determine adhesive reliability.

Some of the subjects covered include:

- Test methods & specification that improve ability to determine long-term durability, bonding & debonding of wood products.
- Accurate method of measuring yield-strength of adhesives and other materials.
- Coating adhesion testing.

STP 1463, Advances in Adhesives, Adhesion Science and Testing is available to buy directly from ASTM.

To order your copy of this 144 page document, or for more information, visit www.astm.org.

Colour measurement - part 3

In this final part, we look at how the colour of various materials and surfaces is measured.

DRY MATERIAL

For a flat surface with a plain colour of low or medium gloss, a 0/45 spectrophotometer is enough. The material can be paper, plastic, textile or dry paint. The reading can be compared to standards stored in its memory for a quick pass or fail decision. This is a typical role for this instrument in Quality Assurance system.

Surfaces with a high gloss appear darker. They are best measured with a sphere spectrophotometer, which can include or exclude the effect of the gloss reflection on the reading.

A sphere illuminates and collects light from many angles and so gives a more realistic reading of colour.

Multicoloured surfaces such as textiles benefit from the integration that a sphere provides. The individual colours are mixed together and then measured. Sometimes, a large aperture is required to let in as much variety from the surface as possible. This would be necessary for textiles with a coarse yarn or for natural wood coated with a transparent lacquer.

Even granular and powdered material can be measured if samples are presented the same way every time. This sometimes requires a little ingenuity though often a simple contrivance will do.

WET MATERIAL

Liquids must be measured too. Perfumes and domestic fluids have colours that are deliberately chosen and must remain constant from batch to batch. The spectrophotometer to use is the Bench-top version. Such samples are put in a colourless transparent container with flat sides called a cell or cuvette and placed within the light beam in the middle of the instrument to measure their transmission colour. Opaque liquids and solid materials are placed at the front of the sphere.

A simple reading of colour or colour difference is often all that is done. But if this is a regular routine and many different samples are being measured, some assistance from a computer may be necessary. Software is available to manage a database of standards and to pass readings to and from the spectrophotometer.

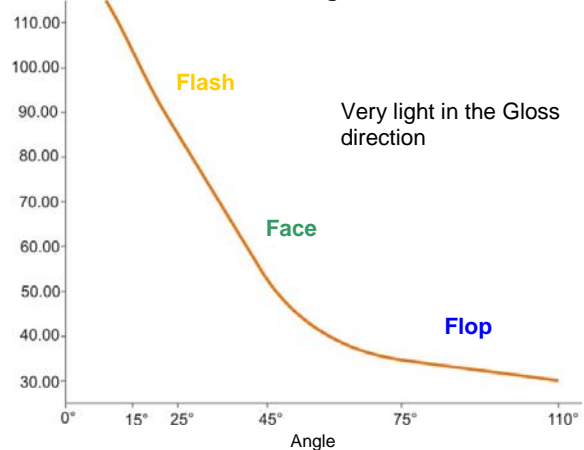
GLOSS AND COLOUR

Gloss can affect perceived colour; for example, a glossy surface looks darker than a matt one. Various new additions and mixtures have complicated this simple rule and confused the eye. The addition of metallic or mica flakes causes light to be reflected within the coating. The perceived colour depends on the orientation of these particles, their distribution and the direction of view.

The instrument to measure such coatings is a cross between a multi-angle glossmeter and a spectrophotometer. Analysis of the readings helps judge if a sample matches a standard, using a number of variables, not one.



Fig 1: A typical metallic paint showing lightness at different angles



One such graph is shown above (Fig 1).

The light reflected at angles relative to the main gloss angle must be matched to the standard at 5 points to be sure the result would look the same overall.

Another graph, with colour information is used when, for example, flakes of one colour are mixed into a translucent coating of another colour. This sounds complicated but the equipment is very easy to use. The paint chemist has the difficult job remixing the coating but at least he now has something to measure it with: the Elcometer 6070 Multi-angle spectrophotometer and its PC software.



TOLERANCE

In a Quality system, the question of how right and how wrong a test sample is must be judged against an agreed standard. This test must be based on the perception of humans on a good day. Instrument makers have mathematical models of colour space and use small volumes within it to represent what we can see as a change.

The latest of these is called CIE94, using ellipsoids in CIELch colour space. It has been found to give 95% agreement with visual perception. Users of the equipment simply switch to this function and use the result to pass or fail the sample.

CONCLUSION

Colour and perception are better understood these days and measuring equipment is more capable of the mathematic modelling.

Today, judging colour is a simple and straightforward process where an in-depth knowledge of the subject is no longer necessary. Certainly, it is no longer possible to handle coloured materials without expecting to measure or compare them to a standard, making the range of spectrophotometers and other colour assessment equipment available today an invaluable resource.

In the next issue of elconews e-zine our product focus group will concentrate on measuring the thickness of coatings.