

Highlighting the importance of gloss measurement

Despite being an important factor in quantifying the appearance of a product, gloss is a property that is difficult to measure. Now, however, **AMECaL** has developed a method of calibration relating to optical gloss measurement and has been awarded the only UKAS accreditation for this

Gloss is an important factor in quantifying the appearance of a product – in particular where the perception of the product is dependent on its reflective properties – and this can be across many industries, from plastics to cosmetics. It is, however, often difficult to measure.

Gloss is an optical property related to the reflection of highlights – the ability of a surface to reflect light in a particular direction. Measuring it has to take into account a number of elements: the refractive index of the material, the angle of incident light and the surface topography. Essentially, it involves comparing the amount of reflected light from a sample to that reflected from a black glass calibration standard with a defined refractive index. Several different angles are used for measurement, with incident angles of 20°, 60°, and 85° the most common (for high, medium and low gloss surfaces respectively),

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but other angles are used for specific applications, such as 75° for plastic film, and 45° for vinyl siding.

Over the years, being able to quantify gloss has become increasingly important, and this has resulted in a variety of different instruments being produced that are capable of taking this measurement. However, these are often sold and calibrated without traceability, which is a problem for companies with (sometimes very specific) obligations under standardised quality management systems such as ISO 9001:2008, the more prescriptive and industry-related SAE AS9100/AECMA prEN 9100 in the aerospace sector, or ISO/TS 16949:2009 in the automotive sector, for example. In fact, accredited calibration of instruments is becoming crucial as new requirements specify that traceability and competent measurements are demonstrated by accreditation to ISO/IEC 17025:2005.

To meet the requirements, Newcastle upon Tyne-based Aerospace Metrology

& Electromechanical Calibration (AMECaL) has been awarded the only UKAS accreditation for gloss measurements (and meeting ISO/IEC 17025:2005).

Calibrating instruments

The company has spent four years researching and developing a method of calibration relating to optical gloss measurement. The emergence of an accredited laboratory which can calibrate both the instruments and reference standards will ensure that many more of these instruments can be calibrated against measurement standards traceable to international/national measurement standards. The company even manufactures the Reference Standards itself.

Technical director, Steve Oxborough, who set up the company, comments: “Many companies think – or have been told – that accredited calibration for

gloss measurement instrumentation simply doesn’t exist. That has left them unable to meet traceability and competent measurement requirements.”

He adds: “Companies can now get the same standards applied throughout the production process, from preparing metalwork, to painting it and measuring the paint thickness and gloss aspect – ensuring ongoing peak performance and compliance to both standardised quality management systems and international standards for all the equipment used.”

The road to UKAS accreditation began in 2004 for Oxborough. He explains: “I noticed that some red cars



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– and not necessarily very old ones – had faded to a dull pink, when other cars of different ages and colours didn’t have that problem. I just wanted to know why – but the search for an answer led me to yet more areas without answers and the path was longer than I imagined.”

In fact, the answer to this lies in the sun’s ultraviolet radiation breaking down binding chemicals and pigments in the paintwork, causing the surface to come apart. The effect is more marked on red cars as UV has its strongest effect on red pigmentation.

Meeting standards

The innovation of new calibration methods in this highly specialised field is not the company’s only area of development. It also covers other complex, and related areas, such as the conductivity of metal structure and paint- and flow-related instruments. The company is also developing new equipment, including a high accuracy Gonio photometer which, it claims, will have the best accuracies in the world.

Ongoing technical developments in such specialist areas, alongside an ability to deal with an ever-increasing portfolio of products, have put the company at the forefront of calibration know-how, it explains.

Today, it seems that the obligations of standardised quality management systems aren’t going to be so difficult for companies to meet after all.

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