Instron® TechNotes **Getting the most up-to-date information on materials testing**

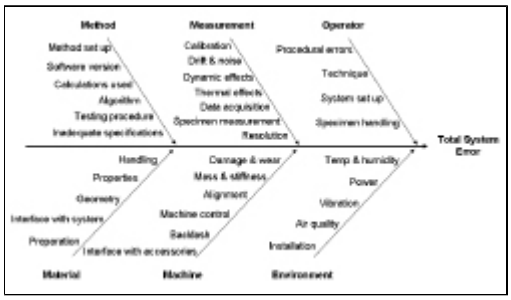
In This Issue

ISSUE 28

Tech Tip

Are You Receiving the Highest Quality Test Results?

During these tough economic times, companies are forced to carefully review their budgets. Some lab managers may be inclined to take shortcuts including less training for their operators or decreasing their budgets for testing. However, these shortcuts may introduce error in your test results. It's important to understand sources of error in test results in order to make informed decisions about your lab.



Gauge repeatability and reproducibility (GR&R) is a statistical analysis often performed by quality engineers and lab managers. This thorough statistical method determines the consistency of a testing instrument, and pinpoints the process variation for the measurement system. The term **repeatability** defines how well the system can produce a known result over multiple tests. **Reproducibility** is the ability of another operator to produce the same results from similar parts with the same level of consistency. The output of a GR&R study is a quantitative result by which a testing system can be measured. For most measurement systems, a GR&R value of less than 10% is ideal. It's important to remember that a GR&R number indicates consistency of the tester and all elements that may affect the tester (see diagram) – it **does not** indicate tester accuracy.

Read and download our online article:
GR&R: Understanding Sources of Error in Mechanical Testing Results

You Asked – We Answered

How does the mechanical testing of solar cells contribute to the "green energy" initiative?

With a growing global focus on "green energy", companies are racing to develop higher efficiency and lower cost solar cells for various applications. These companies must obtain the design qualification and type approval according to IEC 61646 Specification: Thin-film terrestrial photovoltaic (PV) modules. The mechanical load testing requirements (Section 10.16) include:

- Four-point bend testing requirement of glass and stainless steel substrates to ensure the edge strength of these substrates. This test is used to ensure the substrate's rigidity is sufficient to guarantee a reliable, long-term electrical connection throughout the cells.

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- A 90° peel adhesion test on various layers of thin films, also known as "stacks". This peel test confirms the quality of the adhesion between the layers and the adhesives used. It is important for companies to know the adhesion strength of these various film layers and which interface may contain the least amount of adhesion strength.

Read our online Testing Solution for more information on Mechanical Testing of Solar Cells.

A Note from the Editor:

The recent approval of the American Recovery Reinvestment Act of 2009 awards billions of dollars to industries including education, biomedical, renewable energy, and infrastructure. This means many of you have a second chance at improving your labs, developing more jobs, and "stimulating" the American economy.

In response to the numerous inquiries regarding the Act, we have posted on online educational site to share with you what we are finding. These pages are updated as we uncover new information. If you would like to share with us your expertise and information on what you're learning, please email me.

Thank you,

Denise Papa
TechNotes Editor

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