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

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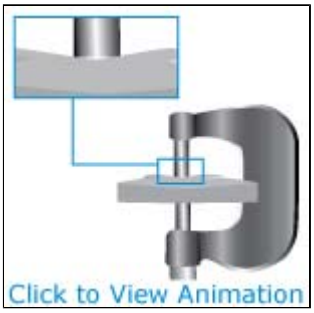
ISSUE 27

Tech Tip

What to Consider When Measuring Plastics



When injection molding plastics, the outer surface of the specimen may collapse inward, causing it to form a concave shape. Commonly referred to as "sink", it may cause variations in the specimen's thickness as a result of the concave surface.

When a specimen exhibits sink, it is important to understand the affect it may have on stress-based calculations, such as yield stress or modulus. Sink will often cause the measured cross-sectional area to appear larger than what it actually is and this can result in lower modulus, yield stress, and other stress-based calculations.

Methods to measure cross-sectional area may vary depending on the standard you are testing to. Standards may specify different procedural requirements, as well as different requirements for the measuring device itself. In some cases, it may not be possible to account for sink. For potential solutions, view our animation.

You Asked – We Answered

How can I improve the accuracy and repeatability of my Poisson's Ratio results?

Poisson's Ratio is the ratio of transverse strain divided by axial strain in the elastic region of a uniaxial tensile test. It is a measure of how much of a material contracts under tensile conditions, and is typically on the order of 1/3 (0.3). Since the displacement associated with transverse strain can be 10 to 12 times smaller than the displacement for axial strain (~4 times smaller gauge length multiplied by ~3 times smaller displacement), the accuracy of Poisson's Ratio is often limited by the accuracy of the transverse extensometer .

Improving the accuracy and repeatability is best achieved by using a high-resolution biaxial extensometer designed specifically for this purpose.

View our complete solution for testing Poisson's Ratio.

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Upcoming Plastics Events

- **NPE** (USA) – Booth # 8013
- **Plast '09** (Italy) – Hall 16, Booth B25
- **DFYP Conference 2009** (Netherlands)
- **M-Plas 2009** (Malaysia)
- **Polymer Society Seminar** (Korea)
- **ChinaPlas 2009** (China)

You Asked – We Answered

Can clip-on extensometers affect my strain results when testing thermoplastics?

There are a variety of attributes used to describe thermoplastics since properties are dependent on the polymer, as well as additives. In some instances, thermoplastics are relatively soft, so knife edges on traditional clip-on style extensometers may cause premature failures. This occurs when high stress points are created where the knife edges contact the specimen. In other instances, thermoplastics may be rigid, if glass or talc is added. For these materials, significant energy releases may occur at failure, possibly damaging the clip-on extensometer since they are in direct contact with the specimen.

Non-contacting video extensometers overcome both issues by providing a means to measure specimen strain without having direct physical contact with the specimen. A high resolution digital camera and real-time image processing allows the device to acquire accurate strain data without interfering with the specimen.

What do you think? Tell us!

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