



Benchmark Testing eBook

Using Benchmark Testing to understand the properties of your and the competitions' products is an important means toward gaining a competitive edge in the marketplace.

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BENCHMARK TESTING

Did you ever wonder how successful companies stay successful? The answer is focus. Successful companies focus on what they are good at, on improving or eliminating the bad, and use the good to plan for the future. And how do they focus? One way is through benchmark testing. What is benchmark testing? It is a reference point; a set of objective results for comparing your current products and judging your future products or services. It is not difficult to do and it doesn't have to be expensive. You can design a Benchmark program and get payback. The more thorough the program, the bigger the payback. The testing part is simple. It is a tool for learning from your products and experiences and those of others in your field. It is a tool that provides insight into the strengths and weaknesses of your current technology; a baseline for future decisions and growth. Four reasons to benchmark test are: knowledge, quality, development strategies and marketing options. This article will explain these advantages and their key features in more detail.

REASONS TO BENCHMARK

Product Knowledge

You can't build a house without a foundation. The same applies to products; you can't build products without a baseline. Have you ever tried to fix something without knowing what was wrong? Have you ever given a sales pitch to a customer about your product only to find that it really didn't work that well?

Many of us perceive benchmark testing as something only suppliers do. But we are all suppliers of goods or services in some form. We purchase from our vendors, add value, then sell to our customers. It is to our advantage to have as much knowledge as possible about our products and those of our competitors, whether we're buying or selling.

Product Quality

When representative product samples are benchmark tested, the results may be accurate, but they are from only one snapshot in time. It may be desirable to perform the testing periodically throughout the year. We are all aware that many processes display seasonal variations. Periodic testing allows you to document the extent of the variability or assure the products are not significantly changing. This historical database can prove invaluable should a customer question the product performance of shipments from a particular time period. Periodic testing can also allow observation of your competitors' reproducibility.

Purchase Specifications

Benchmark testing provides a data base that allows you to establish purchase specifications which meet the requirements of your process or product. Vendors often supply you with data sheets outlining their products' typical values. Most of the time these products work well, but occasionally they may not. The reason may be that the product's variability is greater than your process will tolerate. By benchmarking incoming products from various suppliers over a period of time, a set of specifications can be established which, when met, assures incoming materials yield consistent results. Benchmarking your products also provides a valuable database when customers ask your assistance in establishing their purchase specifications.

Product Development

Another reason to perform benchmark testing is in the critical area of product development. As product suppliers in a dynamic marketplace, we need to know how our products compare to our competitors'. Using an objective set of standards and testing without bias, much can be learned about how your products stack-up in the

marketplace. This is true whether it is a consumer commodity or in a specialized niche industry. By going nose to nose with your competitors' products objectively, you can obtain a good understanding of each product's strengths and weaknesses. This knowledge can then serve as an excellent platform for future product development

Marketing Strategies

Marketing strategies can be built around the results of benchmark testing. A completed protocol of objective standards can allow you to make subjective or relative statements. You may now state with confidence that your product has twice the holding power as the leading brand or a more stable viscosity over a range of temperatures. You have the facts to prove it. On the other hand, a thorough knowledge of benchmark data and its relevancy allow you to weed out accurate but misleading claims. It may be truthful for your competitor to claim that his product will bond a postage stamp with a force of 100 pounds per square inch, but we know that's overkill.

Over the last few years we have seen a rise in the number of requests for third party, objective, competitive benchmark testing. In each case, the results have always been eye opening for the client. In some cases, the benchmark study confirmed their current speculation based on field feedback. In other cases, it stopped the introduction of products before they became an embarrassment to the company.

QUALITIES OF BENCHMARK TESTING

In order to be accurate and significant, benchmark testing must possess at least four qualities.

Testing must be objective and quantifiable

To be objective is to be real. Successful companies have learned to be objective with their benchmark testing. This "honesty" in testing allows them to see clearly and plan for the future based on the knowledge they have gained.

The properties tested must be quantifiable in a reproducible manner. Benchmarking is not a set of subjective impressions of how a product feels, looks or smells. Quantification demands that precision instrumentation be utilized that is accurately calibrated and recognized as suitable for the test. The reproducibility of the test methods must extend over time and with a diversity of operators.

The properties being tested must be significant

Each test performed must be relevant to characterize some real-world property of the product. If color or tensile strength or adhesion over time is important for the product, test it. If it's not, don't.

The product being tested must be representative of its group

If production material is the subject of the test, it must be a properly documented random sample. That is, it's manufacturing control (date, lot number, etc.) is to be noted, but it should not be selected because it ran better



that the product has for a long time. If it is a developmental product, it must represent material that at least can be reproduced.

All products should have similar histories

It would be unfair to compare a freshly manufactured product against one that has been in storage under unknown conditions for an extended period of time. This also applies when competitors' products are tested. If benchmarking competitive products, it is a good idea to purchase all samples from either retail or wholesale sources rather than pulling your own out of inventory.

TYPICAL BENCHMARK PROTOCOL

As mentioned earlier, benchmarking a group of products requires that measured characteristics be significant and relevant to real-world properties. For example, suppose you, as a pressure sensitive label manufacturer, want to compare the products of your present supplier to those of several other vendors. What would you do to assure you are using the best, or perhaps the most cost effective stock? What characteristics should be tested to allow you to make a knowledgeable decision with confidence?

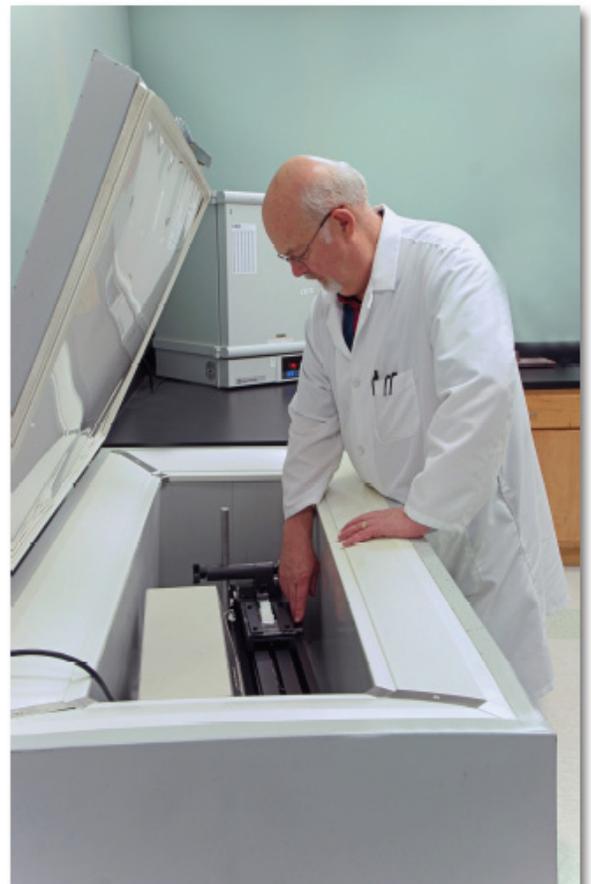
Our experience suggests that you need to test at least the following five characteristics:

1. Peel adhesion
2. Tack
3. Cohesion (shear resistance)
4. Release
5. Coat weight

You may need to test these characteristics when the labels are applied on different substrates, depending on the end use of the product. You may also need to see how the characteristics change upon aging, either prior to application (as might be experienced sitting in a warehouse), or after application (how well it holds up in use).

Peel Adhesion (ASTM D 3330, PSTC-101) is a measure of the force required to remove an adhesive from a substrate material under a standard set of conditions. There are many variables in the process (application pressure and time, substrate surface finish, temperature, dwell time between application and removal, removal speed, removal angle, and so forth), all of which need to be precisely controlled to achieve comparative results. It is important during testing to note not only the magnitude of the force measured, but the mode of failure as well. Does the adhesive leave a residue or a shadow on the substrate? Does the adhesive split? Is the peel smooth or zippy?

Tack is a measure of the instantaneous grip of a PSA. A number of techniques are used in the industry to measure this



characteristic; by probe, rolling ball, or loop (ASTM D 2979, PSTC-16, TLMI Loop Tack). We prefer to use loop tack because this method can be used successfully over a wide range of adhesive types, it tests a larger sample surface area and is the best for distinguishing modes of failure.

Shear is a measure of the internal strength, or guts, of the adhesive. A known surface area of the label material is applied to a standard surface. The substrate is held at an angle of 1° from vertical and a weight is applied to the end of the label (ASTM D 6463, PSTC-107, TLMI Static Shear). The shear is measured as the amount of time required for the sample to fall off the substrate. As with the peel adhesion test, a number of test parameters must be kept constant.

Release is the amount of force required to remove the liner from the label stock (ASTM D 5375, PSTC-4B, TLMI Liner Release). It is best to test this characteristic at, or at least near, typical application speed. Parameters need to be constant when testing each material. A precision instrument is required to achieve accurate results.

Coat Weight is a measure of the amount of adhesive on the label, measured either by thickness or in amount per unit area (ASTM D 3652, PSTC-33, TLMI Coat Weight). Thickness can be measured with an anvil micrometer, although accuracy may be sacrificed if the stock is not of uniform caliper. In many cases a more accurate method for determining coat weight is by the solvent wash-off method. A sample of known area is usually die cut to a standard dimension. The liner is removed and the sample is accurately weighed. The adhesive is then removed using one of a variety of organic solvents, dried, then reweighed. By calculating the weight difference, the coat weight can easily be calculated.



The standard test methods referenced above are not exclusive, they are simply the most common. Other methods to measure the same or similar properties are available from ASTM, PSTC and TLMI. Test methods are also available from FINAT, AFERA and others. As the marketplace becomes more global, there is a move to find common ground among professional societies and establish methods accepted universally.

Other specialized tests are also important when characterizing products that have been developed for a specific end use. Mandrel holding power; testing at high or low temperatures; testing after accelerated aging in heat, humid and UV environments; and SAFT (Shear Adhesion Failure Temperature) testing are just a few of the special end use tests that should be included in benchmark testing some products.

It goes without saying that all testing must be performed a number of times on a given sample to have assurances that the data produced is reasonably accurate and precise.

Typically, most of these tests are conducted with a minimum of five replicates per sample, sometimes more, occasionally less.

TESTING FACILITIES

Testing of this nature requires precision instrumentation: an adhesion/release tester, a shear tester, timers, tack tester, roll down equipment, Sample Cutters, analytical balance, precision dies, an oven, and micrometers among others, and a room with a controlled environment to house them. It is critical that the equipment and environmental conditions specified in the test methods are used for each test. This assures a minimization of the measurement uncertainty. Through round-robin testing we've learned that improperly maintained or calibrated equipment and an uncontrolled environment can adversely affect data to a significant degree.

Decisions based on the results of a benchmark study are only as good as the data. The knowledge that all testing was performed according to standard methods on suitable, accurate equipment allows decisions to be made with confidence.

The benchmark testing you need to compete and grow can be performed at a competitive price through an independent testing facility. By contracting with an independent laboratory, recognized in their field of specialization, you can be assured of impartial results. If that laboratory is also nationally accredited, you are confident the results are accurate because the lab's competency has been reviewed by a recognized third party. You can also count on their expertise to help you interpret the results.



WHY YOU NEED BENCHMARK TESTING

With the results of a benchmark study in hand you have greater knowledge of your product and its place in the market. You know where you stand in relation to your competition. It ensures that a quality product is being manufactured or opens opportunities for improvement. You have facts from which purchase specifications can be established and development strategies finalized. The results can be marketed to your advantage.

Benchmark testing is a means to determine the reality of the moment and provide the basis for future efforts. Successful companies stay successful by being focused.

Benchmark testing is one of the keys they use to maintain that focus. If you've been planning on doing a benchmark study but have been waiting for the right moment, the time has never been better.

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