



AI-SUPPORTED MATERIAL TEST AUTOMATION

Altair's artificial intelligence (AI) and machine learning (ML) software helps materials scientists understand how to best fill gaps in their material databases, even when it's impossible to test all possible variants. These advanced tools also optimize testing programs, improve efficiency, and reduce the time required to complete materials testing.

Use Altair Material Data Center

Product designers and engineers must often consult materials databases to select the best materials for new projects. For example, the variety of different thermoplastic and thermoset polymers, including ABS, nylon, polycarbonate, polyester, polyethylene, and polypropylene, is vast. Keeping material databases up to date with the number of offerings available is always a challenge. No materials database is complete if it's only using manufacturer-provided information.

Experimental engineers know from experience: Many curves have been measured, but the one they need is missing from the database.

[Altair's AI and ML technology](#) makes accurate predictions about the performance characteristics of new materials by analyzing test results for hundreds or even thousands of similar materials. Rather than test samples of every possible candidate material, engineers can use AI and ML to narrow down their choices to the materials that are the most likely to comply with their requirements before conducting tests. This makes the material selection process faster, saves money, improves product quality, and lowers cost of goods.

Predict Results for Every Testing Dimension

A typical thermoplastic consists of raw chemical material, reinforcing fibers that improve mechanics, fillers, color pigments, additives that stabilize the material, and more. In addition, most use cases – especially in consumer product, automotive, military, and industrial applications – require tests that consider aging, chemical attack, radiation exposure, and other environmental factors. The list of testing parameters is extensive, which makes efficient testing difficult.

Use Data Analytics to Close Gaps in Your Polymer Materials Database

[Altair's data preparation software](#) automates the discovery, extraction, reformatting, and merging of test data from virtually any source, including test equipment, laboratories, and suppliers, and in any format, including data only available in PDFs or on websites. Materials developers, scientists, and testing engineers without specialized training in AI can develop templates that identify new

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This approach means materials engineers can avoid unnecessary measurements by making it easy to access test results that may exist only in some difficult-to-access system. For novel materials, the team can make accurate predictions of test results based on data for similar materials. In the end, there is no way around high-quality measurements, but engineers can save enormous amounts of time by testing only the materials that have the best chances for success.”

Sam Mahalingam, CTO, Altair

data when it appears, import it into a shared, secure workspace, and process it to be fully compatible with an existing materials database. This facilitates “apples to apples” comparisons and simplifies the materials selection process.

Amplify the Capabilities of the Altair Material Data Center

Implementing advanced data preparation, AI, and ML capabilities increases the utility and value of the information available in the [Altair Material Data Center](#), our master materials database. The Data Center gives direct access to data sheets, raw test data, and solver cards with full traceability back to their sources. Engineering teams can also create automated workflows that identify and import new material formulations data and predict their characteristics.

Improve Productivity and Eliminate Guesswork

Anyone involved with material testing knows how expensive it is and how the time required to qualify materials affects time-to-market. AI, ML, and data preparation technology reduces direct costs, personnel time, and lab time, shortens product development cycles, and ensures that teams select the best materials for every project.

- **Enhanced Transparency:** Users can easily find and utilize test data performed with other machines, in other laboratories, in other regions
- **Ease of Access:** Altair’s Material Data Center provides both browser-based and API access to unlimited amounts of detailed test data
- **Insight Into New Materials:** Engineers can predict how new material formulations will perform – even if they have never been physically tested

Altair Data Analytics for Materials Test Automation

Altair allows materials scientists to develop, manage, and deploy sophisticated AI and machine learning models quickly with an explainable user interface. Altair provides a complete set of data science and analytics tools that support a wide range of capabilities:

Artificial Intelligence and Machine Learning: Our industry-leading visual approach to analytic modeling helps business users minimize repetitive tasks, share knowledge across the enterprise, and reuse steps within connected model workflows for faster analysis and shared insight.

Stream Processing and Data Visualization: Connect directly to streamed sensor data from MQTT, Kafka, Solace, and other message queues and build complex stream processing applications with a simple drag-and-drop interface. Build and publish sophisticated real-time dashboards without writing any code. Solve difficult problems quickly, understand complex relationships in seconds, and identify issues that require further investigation with just a few clicks.

Data Preparation: Access, cleanse, and format data from a wide variety of sources (including Excel, CSV, PDF, TXT, JSON, XML, HTML, SQL databases, Big Data like Hadoop, and more) without any manual data entry or coding.

Learn more about Altair Data Analytics at altair.com/data-analytics



Tests with long lead times, including creep tests and aging studies, can delay the critical path to market by months. Reducing the amount of physical testing required to utilize new materials accelerates time-to-market, facilitates faster procurement, and speeds up customer inquiry responses.

Data analytics provides a competitive advantage that helps manufacturers using new materials bolster market share, increase revenues, and maintain strong margins.