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Materials Testing Needs***

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## High volume concrete compressive strength testing demands reliability

A leading provider of geotechnical, environmental, paving and construction materials, as well as facilities engineering services, has completed projects nationwide for clients in agriculture, commercial development, finance, industry, oil & gas, site redevelopment, telecommunications and transportation. In addition to engineering and project management, the company maintains a large materials testing lab. Technicians at the facility conduct compressive strength tests on concrete cylinders, grout, mortar, and prisms. The high-volume operation demands reliability from every step of the testing process. That's why the company's test equipment sales and service provider, Cal-Cert, of Clackamas, Oregon, recommended an ADMET Digital Indicator to capture compressive strength testing data.

Materials testing for construction is a major business. Test labs throughout the country work to ensure that the materials delivered to the construction sites at a wide range of projects throughout the U.S. are in accordance with ASTM (American Society for Testing and Materials) standards.

The labs vary in size, in sophistication and in the volume of tests processed. Yet, they all have one common trait; they have the responsibility to certify that the materials used in construction projects are as specified by the designers and meet ASTM standards.

One such lab, located in the mountain states, is a full-service facility that has a staff of about 100. It includes one of the largest construction testing labs in the region. The Lab Manager oversees a staff of 12 testing technicians who conduct compressive strength tests on concrete cores, grout, mortar, and masonry blocks (prisms) for projects in the area.

### High volume stresses equipment

During the construction season the lab tests up to 150-200 concrete cylinders per day and conducts an additional 10-20 grout, mortar or prism tests. The volume, coupled with the dusty conditions, puts heavy demands on the equipment.

According to the lab's test equipment and service provider, Marshall Doyle of Cal-Cert, the lab runs a high-volume, heavy-duty operation. Although they avoid operating at the upper limits of their machines, they still put high demands on the mechanical and electronic equipment. This challenges reliability. Yet, during the construction season, they can't afford to be down."

Doyle commented, "Seldom have I seen a higher-volume, more demanding testing environment. They are a proving ground for compressive strength tests."

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## **SOLUTION OVERVIEW**

**Industry:** Concrete testing  
**ADMET Product:** Digital Load Indicators  
**Calibrator:** Cal-Cert

**Application:** Compressive strength testing  
**Customer:** Concrete testing laboratory

## Efficient testing process

The lab's primary compressive test frame is a Testmark 600,000 lb. machine; the lab also maintains a 250,000 lb. Forney machine as a backup. Both units are equipped with privately branded versions of the ADMET digital indicators to measure compressive strength.

Doyle recommended the ADMET indicators because they are reliable, simple to use and more accurate than analog gauges or competing digital indicators. ADMET produces a family of digital indicators including the pi Peak Load Indicator, the Gauge Buster Load Stress and Load Rate Indicator, the DC16 Load and Stress Indicator and the Precise Digital controller.

Each indicator automatically calculates compressive strength and displays it on its screen. With the higher-end indicators, compressive strength results are stored to permanent memory so that you can generate a hardcopy printout of the results at the machine; or download the results to a remote computer for import into a Laboratory Information Management System (LIMS) or database program.

In such a high-volume operation, the ability to verify that each test was performed according to specification becomes that much more important. ASTM C39 Standard Practices for the Compressive Strength of Concrete specifies how the tests are to be performed.

On average, the compressive strength of cylinders tested at the high load rate limit will be 3% greater than cylinders tested at the low load rate limit. A 20% increase in compressive strength of high strength concrete is possible when loading rates exceed C39 limits. To verify proper loading rates, ADMET indicators can be set up to report the average load rate for a test and/or generate a Load/Stress vs. Time curve.

ADMET digital indicators are rugged and are easy to calibrate. They all exceed ASTM E4 standards for accuracy. Commented Doyle, "We've been called in to recalibrate machines that have been moved from one lab to another and found that the calibration is still perfect."

A variety of specimen sizes and types are tested with the 600,000 lb. testing machine. All tests are compressive tests to failure. Depending on the application and the mix, concrete cylinders are tested to 100,000-200,000 lbs. Mortar and grout are tested to 15,000 lb. while masonry prisms are tested to 500,000 lb. The ADMET indicator has the dynamic range to simply and accurately measure them all.

Reliability is the key. "With the volume of tests that the lab is running, their equipment has to be up and running every day," concluded Doyle.

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## For More Information

For more information about ADMET products or services, please call us at 800-667-3220 in the U.S. or Canada, email [sales@admet.com](mailto:sales@admet.com) or visit our Web site at <http://www.admet.com>.

For information on Cal-Cert visit <http://www.cal-cert.com>, call 800-356-4662 or email [info@cal-cert.com](mailto:info@cal-cert.com).

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