

The Importance of Monitoring Concrete Temperature

Like with many other materials, concrete can change in quality as a result of its temperature. This can be especially important when there are certain temperature extremes where concrete is being poured.

Concrete has to be relatively warm for it to set and cure properly. It needs to be at least 40 degrees Fahrenheit while poured and at least 50 degrees when curing. The demands for a supportive environment are so strict that sometimes an outside heating source might be required to project warm air near the concrete during cold weather conditions.

A typical mass concrete mixture will generate heat as a result of the hydration process. This process involves the water within the cement moving around and being used up. This will create the heat that is required for concrete to thrive, but it still needs to be kept in a temperature where this process can actually be sustainable.

The concrete mixture must be analyzed carefully so it will solidify and stay strong for years to come. Concrete that is not set properly may have a hard time with solidifying and can end up having very poor quality.

This shows the importance of measuring **concrete temperature**. A temperature monitoring device can help you out in cold and hot weather conditions to protect the concrete (surface). At Giatec Scientific Inc., we have created a unique product called SmartRock™. This is a wireless sensor and concrete temperature meter that helps you track the temperature of concrete, from fresh to hardened stages. The temperature history can then be used to calculate the maturity index of concrete, enabling the user to predict its early-age compressive strength.

What Are Concrete Temperature Sensors Used For?

Concrete temperature sensors can be used at different stages of a concrete construction project. They can be used to get real-time readouts of the temperature in concrete. The temperature data can be used to get information on how well concrete is curing (or setting).

Wireless concrete temperature sensors can also be embedded in the concrete to monitor the temperature in a specific spot. They can be installed within the concrete formwork, typically on the rebar to increase the range of the wireless signal. The concrete sensor is then linked up to an appropriate device (sensor) that will wirelessly read the information. You can then transfer these readings to a computer.

A modern sensor like Giatec's SmartRock™ can directly send the information to your smartphone or tablet. The measurements of the temperature in the area and the concrete that is being applied will be recorded in real-time by the original sensor. The data will be stored in the memory of the sensor. A mobile app is used to review the history of temperature variations in concrete. The data can be used to study the hardening process of concrete.

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The temperature monitoring can be used for monitoring the variation of temperature on the surface of concrete, especially in the cold season, or to study the strength development in concrete. The latter is based on the maturity method and can be used to predict the early-age strength of concrete.

One important application for temperature sensors is to decide when covering concrete surface is necessary, or when it is safe to remove the coverings. Another important application is to decide when it is safe to open the formwork or shoring in a construction project.

How Does a Concrete Temperature Sensor Work?

The temperature sensors will typically work in many extreme conditions and can easily handle temperature values of up to 170 degrees Fahrenheit (as is the case for mass concrete foundations, retaining walls, or dams). However, the sensor will have to be buried in appropriate locations, and key structural components.

A reader is used to collect the temperature data. A traditional reader requires a wired connection to the sensor to retrieve the data. This can be done using wireless technology for the case of SmartRock sensor. The wireless sensor should be placed within the 3 to 4 inches distance from the surface. This will ensure that the signal strength is powerful enough to be detected by a smartphone or tablet. A mobile app will help the user to find and locate the sensors and connect to them. It is also used to retrieve the test data from the sensor and analyze the results.

The sensor collects temperature sensor in certain time steps (normally 30 minutes or less). This should be good enough as it can take a bit for the temperatures in your concrete to change rather substantially. Still, when used properly, it should not be much of a challenge for your app to give you the most accurate forms of analysis possible.

Curious About How Maturity Can Help You Reduce Labor Costs? [Learn More Here!](#)

Contact Giatec for Help

Giatec Scientific Inc. provides continuous technical support for our **SmartRock** concrete maturity sensor. You can always get in touch with us when you need assistance with installing the sensors, collecting the data, and analyzing the test results. Giatec's SmartRock is a unique sensor that can be easily used in various construction projects.

SmartRock is designed using wireless technology for enhanced data management. It is rugged and waterproof, and the mobile app provides a user-friendly and intuitive environment to collect data, view results, and share reports with team members.