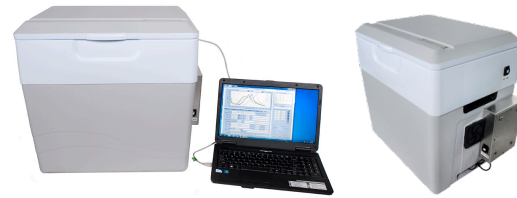


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I-CAL 8000



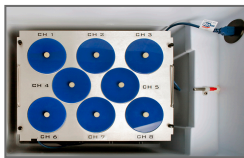
CALMETRIX I-CAL 8000 EQUIPMENT & SOFTWARE

Background: Isothermal Calorimetry in cement and concrete testing.

Isothermal calorimetry measures the heat generated by a cementitious binder as an indicator for the rate of reaction. Since the rate of reaction is very important for engineering properties such as workability, set and early strength development, calorimetry is widely used to study the effect of different chemical admixtures and binder compositions on the rate of reaction.

Isothermal calorimeters, as opposed to semi-adiabatic calorimeters, allow for testing at controlled temperature, thus enabling accurate studies of temperature effects on the rate of reaction. The curing (reaction) temperature greatly affects the reaction rate and thus the engineering properties of cementitious materials.

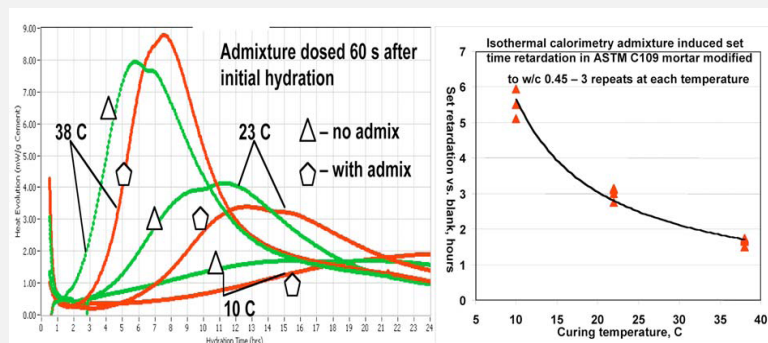
I-Cal 8000 Isothermal Calorimeter for Cement / Concrete Professionals.



The I-Cal 8000 is an 8-channel Isothermal Calorimeter that can be used to test cement paste, mortar or **even real concrete**. Testing on real concrete is particularly important to detect unwanted interactions between complex admixture molecules and aggregates. A thermal hydration curve is plotted as the ambient temperature around the sample is kept constant. The temperature is easily set via software interface with a feedback loop to ensure optimal control, while precision sensors measure the heat flow generated by the cementitious binders reacting in concrete during the first days. Embedded reference cells eliminate the need for duplicate test samples.

Data generated by I-Cal is retrieved and analyzed with Calmetrix' state-of-the art CalCommander software, which combines ease of use and a suite of analytical tools.

Example of use: temperature sensitivity and activation energy



This example shows a normal case, where chemical admixtures (or SCM's) retard less at higher temperatures.

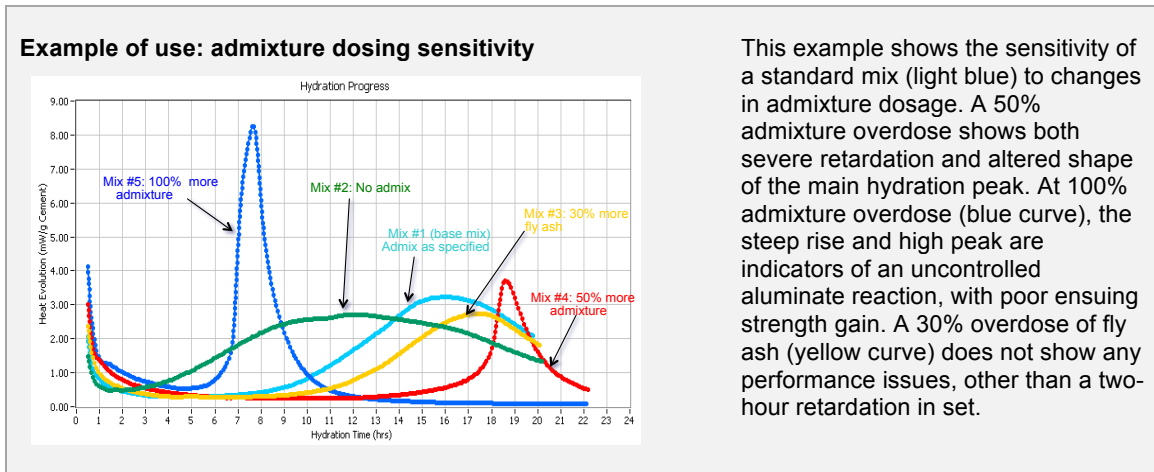
Any abnormal retardation at high temperatures as is sometimes seen with very reactive class C fly ashes would cause a larger retardation of the high temperature curve (red)

Applications and uses.

I-Cal 8000 is cost effective, yet precise enough for applications in multiple fields, including R&D and Investigative work on concrete properties, and daily QC needs in Cement and Concrete production.

I-Cal 8000 is typically used to perform the following tasks:

- determination of activation energy for maturity, strength and thermal crack prediction
- studies of hydration patterns and correlation to shrinkage or other parameters
- sensitivity tests on temperature variations
- testing and resolution of sulfate imbalance issues
- Mix design optimization, selecting type and dosage of admixture, SCM
- troubleshooting complex mixes, detect potential material – admixture incompatibility
- sensitivity tests on small variations in admixture or other material content
- prediction of setting times through thermal set indicators or maturity



Users of I-Cal 8000 can be found among Universities, Cement Producers, Concrete Producers, Fly Ash Distributors, Admixture Producers and Testing Laboratories.

Specifications.

Specifications			
Operating Voltage	110/220V - 50/60Hz	Baseline over 24 hours	
Number of Test Channels	8	Drift	< +/-0.2 mW
Operating Temperature Range	15 to 60°C (59 to 140°F)	Deviation	< +/-0.1 mW
Operating Temperature Range (dry conditions)	5 to 15°C (41 to 59°F)	Error	< +/-0.2 mW
Ambient Temperature Range	5-40°C (41 to 104°F)	Limit of detectability	0.02 mW
Ambient Temperature Range	+/-1°C (+/-1.8°F)	Precision	+/-0.5 mW
Humidity	< 65% RH	Dimensions	L21"xW16"xH20" (52.5cmx40cmx50cm)
Sample size	up to 125ml/340g (12oz.)	Weight	87 lbs (39.5 kg)

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Innovation and QC for Cement and Concrete ... Made Easy

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