Adventum Tech service: TempSense 3+

Sensors: TempSense 3+

Analytics: Liveload.app

Price is subject to project-specific parameters

The offer includes:

a) TempSense 4+ sensor rental (4 monitoring points per sensor)
b) 4 x point real-time parallel monitoring
c) 4 x thermocouples 10m, including installation and removal
d) Concrete mix design creation in Liveload.App (client provides strength data for the mix)
e) Automatic concrete strength prediction according to ASTM C1074 standard
f) Access to Liveload.App system for concrete strength prediction analytics
g) Adventum Tech technical support
h) On-site delivery and sensor installation
i) Travelling costs
j) Base station and Data plan
k) Monthly Liveload.app subscription fee

ADVENTUM TECH

TempSense

Technical Datasheet

OVERDESIGN

CO2 FOOTPRINT REDUCING

SAFETY EXCELLENCE

Product Overview

TempSense is a wireless concrete development monitoring system designed by Adventum Tech to measure the temperature, humidity, and maturity of freshly cast in-situ concrete. Utilizing real-time data and advanced analytics based on the ASTM 1074 standard, TempSense enables construction stakeholders to ensure high-quality, safe, and efficient concrete curing processes across any environmental conditions.

Why Monitor Concrete Curing Temperature?

Monitoring concrete curing temperature is essential for ensuring structural integrity, preventing defects, and achieving design specifications. Concrete development is highly dependent on environmental conditions, which can affect strength, durability, and long-term performance.

- **Cold Weather (Winter & Frost)**: Low temperatures can slow down the hydration process, delaying strength gain and potentially causing freezing of the fresh concrete, leading to structural weakness or cracking.
- **Hot Weather (Summer & Heat)**: Excessive heat accelerates evaporation and the curing process, increasing the risk of cracking, shrinkage, and non-uniform strength development.
- **Evaporation Risks**: Improper temperature and humidity control can lead to moisture loss, causing surface cracks and reducing the overall lifespan of the structure.
- **Environmental Adaptability**: TempSense provides proof that concrete was cured under adequate conditions, mitigating crack or deformation risks by accounting for surrounding environmental factors and project location.

ASTM C1074 Standard

The ASTM C1074 standard outlines the **maturity method** for estimating the strength of concrete. The maturity method is a reliable and simple approach to determine concrete strength development over time, based on its temperature history and age.

Maturity is calculated as a function of time and temperature, providing a direct correlation between curing conditions and concrete strength.

- **Simplicity**: The method eliminates the need for destructive testing and physical sampling during curing.
- **Precision**: Real-time data allows construction professionals to optimize formwork removal, post-tensioning, and load application, ensuring safety and efficiency.

Adventum Tech's **TempSense** solution automates maturity calculations using the ASTM C1074 standard within Adventum Tech's analytical software, **liveload.app**. The software offers a secure, personalized cabinet to store, analyze, and visualize data.

Key Features

- **Wireless Real-Time Monitoring**: Immediate access to curing data for on-site and remote decision-making.
- **Temperature & Humidity Data**: Simultaneously monitors air temperature, concrete curing temperature, and age.
- **Maturity and Strength Analytics**: Automatic ASTM C1074-based calculations to predict concrete maturity.
- **Secure Data Management**: All data is stored and analyzed through the liveload.app, accessible via a secure user interface.

TempSense Sensor Options

1. Wireless Sensor

- **Application**: Directly fixed on the reinforcement bar and cast into the concrete.
- **Measurement Capability**: Monitors **one point** per sensor in the structure.
- **Ideal For**: Conventional concrete thicknesses (up to 300 mm).
- **Advantages**: Easy to install, cost-effective for standard structures.

2. Wireless Sensor with Wired K-Type Thermocouple

- **Application**: Equipped with wired thermocouples to measure multiple points.
- **Measurement Capability**: Monitors **up to 6 points** per sensor within the structure.
- **Ideal For**: Thick concrete structures or projects requiring in-depth analysis.
- **Advantages**: Provides comprehensive temperature distribution insights.
- **Disadvantage**: Requires handling of K-type thermocouples (semi-wired solution).

How TempSense Enhances Construction Quality

- **Early Detection of Issues**: Prevents cracking, deformations, and structural failures by optimizing curing processes.
- **Project Efficiency**: Facilitates precise decision-making for formwork removal, load application, and timelines.
- **Compliance Assurance**: Ensures adherence to safety and quality standards, reducing risks of rework and delays.
- **Data-Driven Insights**: TempSense-generated data helps improve future project designs, enhancing sustainability and material efficiency.

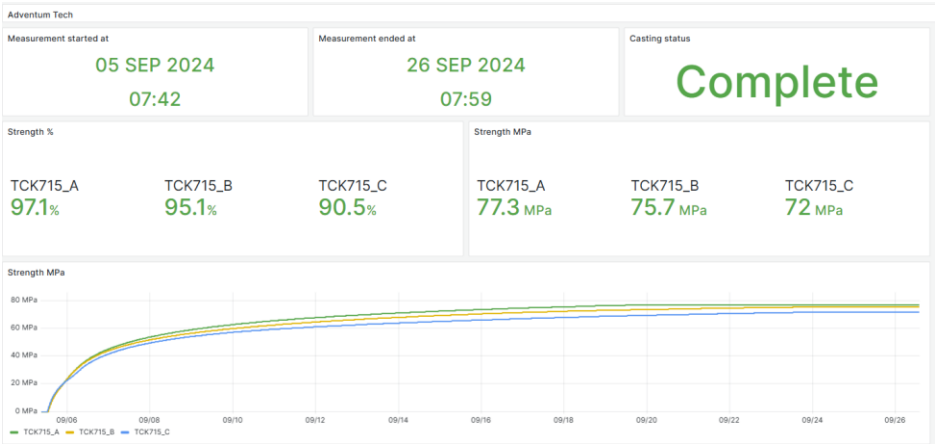
CO2 Footprint Reduction

By analyzing material performance during curing, TempSense identifies opportunities to reduce material use or substitute with lower-carbon alternatives without compromising safety and quality. This results in a significant reduction in the project's overall carbon footprint.

Concrete Development Analytics

The maturity method delivers clear, actionable insights into concrete development through real-time data visualization:

- **Temperature-Time Curves**: Track curing conditions against design targets.
- **Maturity Curves**: Illustrate concrete's maturity progression and strength development.
- **Threshold Alerts**: Identify deviations in curing temperature to prevent defects and ensure quality.



Software Integration

TempSense data is seamlessly integrated into **liveload.app**, which offers:

- Real-time data visualization and analysis.
- Secure, cloud-based storage.
- Project-specific dashboards for performance tracking.
- Exportable reports for documentation and compliance.

Technical Specifications

Feature	Wireless Sensor	Wireless Sensor with K-Type
Measurement Points	1	Up to 6
Temperature Range	-20°C to +80°C	-20°C to +80°C
Accuracy	±1°C	±1°C
Concrete Thickness (Ideal)	Up to 300 mm	For thick structures (>300 mm)
Installation	Fix directly to reinforcement	Wired K-thermocouples (semi-wired)
Data Transfer	Wireless	Wireless
Battery Life per charge	3-6 months	3-6 months
Analytics	liveload.app	liveload.app

Benefits of TempSense

Technical Benefits

- Real-time temperature and maturity monitoring.
- Early issue detection to prevent defects.
- Improved structural safety and quality assurance.

Commercial Benefits

- Reduced repair, rework, and project delays.
- Optimized construction schedules and processes.
- Enhanced reputation through high-quality deliverables.

Environmental Benefits

- Reduced material usage and CO2 footprint.
- Promotes sustainable construction practices.

About Adventum Tech

Adventum Tech delivers cutting-edge wireless real-time monitoring solutions for the construction industry. With extensive global experience, Adventum Tech understands the end customers' needs, offering comprehensive, turn-key solutions that improve quality, safety, and efficiency.

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