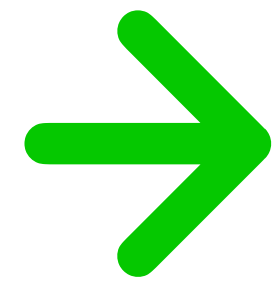


# Thermal Modelling

## NEW Giatec 360 Feature





# WHAT is Thermal Modelling?

1

New feature in Giatec 360

2

Predict the temperature of mass concrete elements

3

Tool to develop a thermal control plan

4

Forecast potential environmental changes and manage concrete workflow



# Six Reasons WHY



## SHOULD I USE BLANKETS?

We need to determine if temperature controls are required for our mass concrete



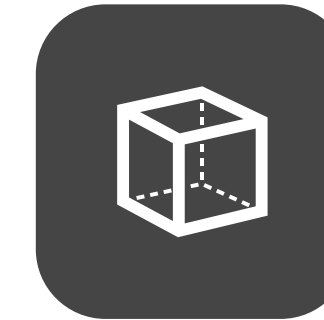
## TIMING

How long will I require my temperature controls to be in place?



## MIX DESIGN CHANGES

Prediction of how the mix design changes will effect the temperature of the concrete



## MOCK UPS

With accurate prediction models, expensive concrete trials will not be required



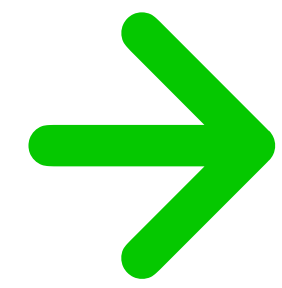
## KEEPING COOL

To determine if any cooling is required



## COMPLEX ANALYSIS

Current methods are timeous and difficult to be accurate



# Current methods for Thermal Modelling?

1

Manual excel sheets

2

Field testing

3

Complex numerical modelling

4

Independent software



GIATEC 360

Sarah D  
Giatec  
[Basic]

SmartRock / Thermal Modelling

Create new Thermal Model

1 Pour Settings      2 Mix Proportions      3 Concrete Element

Name\*      Int sales demo

Ambient Conditions       Location       Constant Temperature

Country\*      United Kingdom

Region\*      England

City\*      City of London

Pouring Time\*      2022/11/04, 06:00

Analysis Timeframe\*      7      Day(s)

If the pouring time and analysis timeframe are outside of our accurate forecasting range, historical data will be used to predict the ambient temperature.

Cancel      Next

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# Step 1

Define your pour location and date

GIATEC 360

Sarah D  
Giatec

SmartRock / Thermal Modelling

Pour Settings      Mix Proportions      Concrete Element

Ingredient	Quantity	Description
Cement Type V	250 kg/m <sup>3</sup>	
Water	150 kg/m <sup>3</sup>	
Fine aggregate	1000 kg/m <sup>3</sup>	
Coarse aggregate Limestone	1000 kg/m <sup>3</sup>	

+ Add Ingredient

Cement Composition

Load Defaults

Component	Value	Unit
Alite (C3S)	49.850	%
Belite (C2S)	24.410	%
Aluminate (C3A)	1.800	%
Ferrite (C4AF)	16.100	%
Total Sulfate (SO3)	2.700	%
Free Lime (Free CA)	0.800	%
Magnesium Oxide (MgO)	0.800	%
Sodium Oxide (Na2O)	0.270	%
Sodium eq. Alkalis (Na2O eq)	0.421	%
Blaine Finesse	410.000	m <sup>2</sup> /kg

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# Step 2

Define your mix design

GIATEC 360

SmartRock / Thermal Modelling

Create new Thermal Model

1 Pour Settings      2 Mix Proportions      3 Concrete Element

Height: 1 m  
Width: 1 m  
Length: 1 m

Width: 1 m      Height: 1 m      Length: 1 m

Concrete placement temperature: 20 °C  
Depth of monitoring from top face: 0.5 m  
0.05 m

Top   Sides   Bottom

Exposed Face:   
Protective Equipment:

Cancel      Back      Save

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# Step 3

Define your concrete element size surface conditions

**GIATEC 360** Sarah D Giatec [Basic] SmartRock Overview Projects Project map Thermal Modelling<sup>BETA</sup> Strength Prediction Temperature Differential Analysis Mixes Thresholds BlueRock User Company Subscription Order Sensors Resources

SmartRock / Thermal Modelling / Int sales demo

### Temperature

Temperature (°C) vs Time (hours)

- Time After Pouring: 0.5 Hour(s)
- Depth 0.5 m: 19.99 °C
- Depth 0.05 m: 14.65 °C
- Ambient Temperature: 10.00 °C

### Temperature Differential

Temperature Differential (°C) vs Time (hours)

Legend: Depth 0.5 m, Depth 0.05 m, Ambient Temperature

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# Results

Full prediction model of the concrete temperature

#### Scenario Details

Case Name: Int sales demo  
 Ambient Conditions: Forecast  
 Analysis Timeframe: 7 Day(s)

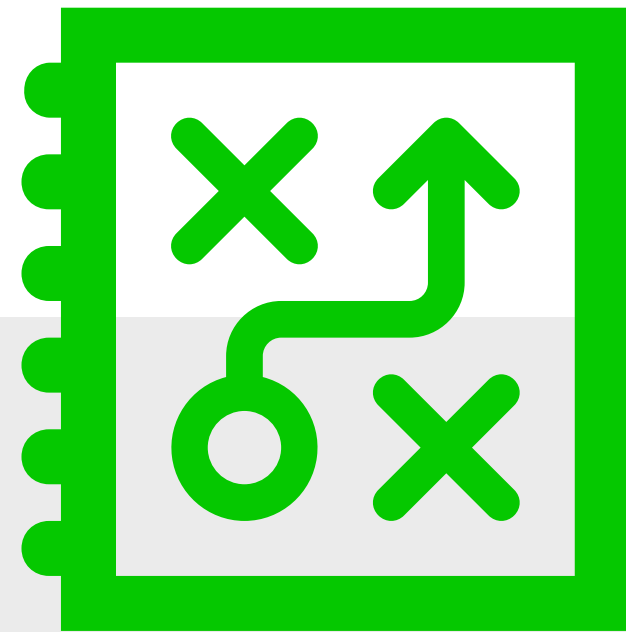
#### Mix Proportions

Cement: 250 kg/m<sup>3</sup>  
 Type: Cement - Type V  
 Water: 150 kg/m<sup>3</sup>  
 Fine aggregate: 1000 kg/m<sup>3</sup>  
 Coarse aggregate: 1000 kg/m<sup>3</sup>

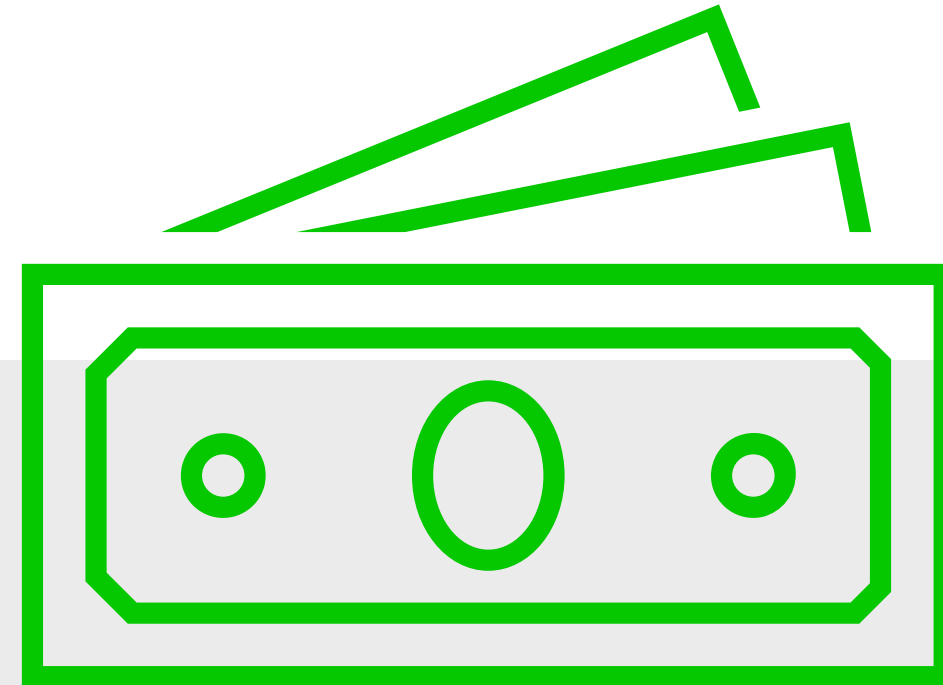
#### Concrete Element

Dimensions: 1 m H X 1 m W X 1 m L  
 Concrete Placement Temp.: 20 °C  
 Depth of Monitoring: 0.5, 0.05 m  
 Top Exposed Face: Yes  
 Protective Equipment: No  
 Equipment Type: -  
 Sides:

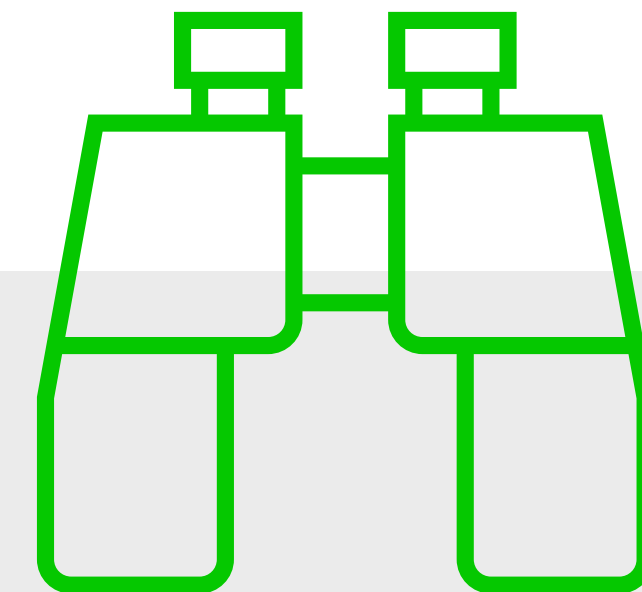
# ➔ Value Proposition for the customer



OPTIMIZED PLANNING ON  
CONCRETE POURS



TIME/LABOUR/COST SAVINGS



INSIGHTS INTO CONCRETE  
TEMPERATURE PERFORMANCE