KI-Calculus® Instructions for use

Overview

KI-Calculus® is an AI-based web tool for predicting the difference in indoor temperatures and deriving possible energy savings when walls and/or roofs are coated with the *ClimateCoating©* products *ThermoProtect* and *ThermoActive*.

The artificial intelligence (AI) was and is trained with a large amount of data from worldwide practice, also from very hot climates. The algorithm uses data from building physics: the reflection of solar radiation.

With the help of AI-Calculus®, the costs and energy efficiency of buildings can be better calculated. This facilitates the planning of the energy concept of different building types under climatically divergent conditions.

The web tool is constantly being further developed. We are happy to receive your suggestions and questions. Please use the form on the website https://www.climatecoating.com/calculus/

Data entry – This is how you proceed.

First select the language: German or English.
(Attention: Your entries will be deleted if you change the language while entering).

Enter the desired location and address.
Select the applicable building type.
Specify whether the building is air-conditioned or non-air conditioned. If >air-conditioned< is selected, please select the target temperature. The default values are from 15 °C to 34 °C.

Entering the dimensions
This is about the outer building surfaces. In the simplest case, this is a flat roof (without cardinal direction) and 4 walls.
For the dimensions (width, height) you can enter two digits after the decimal place manually, e.g., 5.35. If you use the arrow keys for the entry, the number can only be changed in whole steps. A total of 5 characters are currently visibly displayed in the input field, but you can click to the left or right with the arrow keys to convince yourself of your digit entry. (View optimisation is in progress).

Entering the insulation

For the insulation you currently have the choice between "insulated" (yes) and "not insulated" (no). The insulation thickness used in the algorithm is 10 cm. (It is planned to add variants as soon as further data is available).

Entering the coating

In the right column "Coat" you can put a tick. This stands for "Coating with *ClimateCoating®* products". If one or more ticks are set, the web tool can predict how the temperature difference curve to be expected will turn out. To do this, click on the >Predict< button. The result is now displayed (results) below the table in the form of a curve and three temperature specifications. If you now change the parameters in the table, e.g., set more or fewer ticks under "Coat" (or select >yes< for "Insulation" or adjust the area dimensions) and click on >Predict< again, the temperature difference curve is recalculated and displayed accordingly.

Entering additional wall or roof areas

The table can be extended using the plus (+) and minus (-) buttons.
If, for example, the roof area cannot be completely coated for construction reasons, then two partial areas are created, and a distinction is made between the coated area and the uncoated area. This principle can also be applied to articulated structures.

Caution: the button with the round arrow (↻) deletes all entries!

Result display - This is what comes out of it.

General
Temperature profile curves for a complete year are shown.
Orange curve = not coated.
Blue curve = coated (with *ClimateCoating®* products).
In addition, further values are displayed in % or in °C. This result display depends on whether the building is air-conditioned or not.

Non-air-conditioned buildings
If the object (building or container) is not air-conditioned, no cooling energy can be saved, only the inside temperature can be lowered (by *ClimateCoating®* coating).
If "Coat" is clicked in the table, two temperature curves are displayed as an annual curve. In addition, the average annual value of the reduction of the inside temperature is nominally displayed.

MKT is the Mean Kinetic Temperature, an important parameter for professionals, especially in the food and pharmaceutical industries. It is a non-arithmetic average calculation that considers the entire influence of temperature fluctuations during storage or transport of a product, with greater weight given to higher temperatures than to lower temperatures in terms of perishability.

Air-conditioned buildings
If the building is air-conditioned, a target temperature is set (currently you can choose between 20 °C, 25 °C, 30 °C, 35 °C). The result shows the percentage saving in cooling energy over the year because of reduced cooling loads. This is visually illustrated by the two different curves of the utilisation of the cooling units.

Example:
For the variant >Container, air-conditioned, 20 °C, uncoated< a reduction of the cooling load of 0 % is displayed because it is the initial state without comparison. Nevertheless, a consumption curve is displayed that spans a certain range as an arc over the year: this is the value which displays the capacity utilisation of the air conditioner. The air conditioner does not run through continuously; it is switched on and off depending on what the controller specifies.

The inputs and results are compiled in a PDF that can be downloaded from the website.

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Apply KI-Calculus®

Visit the website.
www.climatecoating.com/calculus

Do you have any questions?

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